PART III.

APPENDICES.

APPENDIX A.

TEACHERS' CERTIFICATES.

Following are the names of persons to whom certificates of qualification to teach were issued:—

ACADEMIC CERTIFICATES.

(Names in alphabetical order.)

Alexander, Elizabeth, M.A., University of Aberdeen.
Appleyard, Edith M., B.A., Western College, London.
Biggar, Ethel Isobel, B.A., University of London.
Black, George Patton, M.A., University of Manitoba.
Black, Norman Fergus, M.A., Ph.D., Queen's University and University of Toronto.
Boyd, Lillian Martha, B.A., University of British Columbia.
Bragg, Thomas George, B.A., University of Toronto.
Brown, Leo B., B.Sc., University of Alberta.
Campbell, Robert Henry, University of Saskatchewan.
Clarke, Denis.
Clement, William James, Queen's University.
Coates, Kathleen McKie, B.A., University of British Columbia.
Connor, Carl Y., B.A., University of Toronto.
Copley, Robert J., B.A., University of Alberta.
Copping, Marjorie, B.A., University of British Columbia.
Craig, Gwynnyford Anne, B.A., University of Alberta.
Dancey, Percy Morrow, B.A., Queen's University, Kingston.
Davidson, Edna Brown.
Draper, Hester Elizabeth, B.A., University of British Columbia.
Dunbar, John, B.A., Queen's University, Kingston.
Elsey, Charles Roy.
Falconer, Kathleen, M.A., University of Aberdeen.
Flint, Mrs. Eleanor J., B.A., University of Manitoba.
Giegerich, Laura Clinton, B.A., University of Toronto.
Gladwin, Aleen Harrison, B.A., University of British Columbia.
Harrop, Ruth Elizabeth, B.A., Queen's University, Kingston.
Hartness, Dumail Horatio.
Irvine, Florence Annabel, B.A., University of British Columbia.
Johnston, Edna Ruth, B.A., University of Manitoba.
Jones, Grace Eleanor, B.A., University of Wales.
Kion, Gertrude Anna.
Law, Elmer Ellsworth, B.A., University of Toronto.
Livingstone, John Hartwell, B.A., University of Manitoba.
Lockhart, William Love, M.A., University of Glasgow.
Lucas, Evyline Caroline A., B.A., University of British Columbia.
Lundie, George Archibald, M.A., University of Durham.
Magee, Vesta Isabel, B.A., Acadia University, Nova Scotia.
Marwick, Edna Marian, M.A., University of British Columbia.
Masterton, Robert B., M.A., King's College, Nova Scotia.
Matheson, Agnes Helen, B.A., University of British Columbia.
Mitchell, W. McGregor, B.A., Queen's University, Kingston.
Morris, Verna Edna, B.A., University of British Columbia.
Munro, Norman, B.A., B.Sc., University of Aberdeen.
MacDonald, George Duncan, B.A., St. Francis Xavier University, Nova Scotia.
McDowall, Jessie, B.A., University of London.
McIntosh, Mabel I., B.A., University of Alberta.
MacKirdy, Margaret, B.A., University of London.

ACADEMIC CERTIFICATES—*Continued.*

(Names in alphabetical order.)

McLeish, William Young, B.Sc., University of London.
Nicholas, Albert Perry, B.A., University of Saskatchewan.
O'Meara, Kathleen Marion Newton, B.A., McGill University, Montreal.
Parker, Edith Helen, B.A., Dalhousie University, Halifax.
Partridge, Phyllis Marion Ulmer.
Perks, Mrs. Lillian Charlotte, M.A., B.Sc., St. Andrew's University.
Reid, William Tennant.
Riddell, Annie Thorn, M.A., University of Glasgow.
Roy, Henrietta.
Siddons, John Donald, B.A., University of British Columbia.
Smith, Mrs. Edith M., B.A., University of Toronto.
Smith, Frederick Benjamin, M.A., University of Durham.
Swencisky, Dylora Mary, B.A., University of British Columbia.
Thompson, Marie Spence, B.A., University of Durham.
Thurrott, Alice Ethel, B.A., University of New Brunswick.
Walsh, Violet Charlotte, B.A., University of British Columbia.
Whitney, Ralph L., B.A., University of Toronto.

FIRST-CLASS CERTIFICATES.

(Names in alphabetical order.)

Alexander, Ottillie Dorothy Love.
Archibald, Ruby Clare.
Baillie, Eunice Elizabeth.
Balmer, Mary Lucinda.
Barnes, Margaret H.
Beairsto, Mrs. Elsie Parkin.
Binns, Marjorie.
Black, Dorothy Lindesay.
Blackwood, Isabelle Katherine.
Bowles, Myrtle Pauline.
Boyes, John Calvin Patterson.
Breadner, Mrs. Frances S. C.
Brennan, Alice Hart.
Broome, Enoch Bunting.
Brown, Jennie Frances.
Carruthers, William Thomas.
Condon, John Ernest.
Coombs, George Alexander.
Corry, Kathleen Florence.
Creelman, Jean Turner.
Curwen, Greta Elizabeth.
Darwin, Charles Bascom.
Dedolph, Lucy Laura.
Desrosiers, Marie Cecilia.
Disney, Gladys Mabel.
Dunlop, Mary.
Edwards, Ursula.
Elliott, Kathleen.
Findlay, Marjorie Livingstone.
Fletcher, Lillian Maud.
Gagnon, Eulalie Elizabeth.
Gammie, Jane Polson.
Garlick, Beatrice.
Godfrey, John D.
Grant, Neal.
Gray, Mrs. Laura B.
Hall, Howard Hager.
Hart, Ellen.
Hayton, Alma Beryle.
Henderson, Rachel Catherine.
Hendricks, Louise.
Horner, Barbara Jane.
Hunt, Adah Lilian.
Innes, Mary Winona Elizabeth.
James, Elizabeth.
Johnson, Hilda Gledhill.
Johnston, Edna M.
Johnston, Eleanor Isabel.
Kantz, Kathryn Lois.
Keatley, Nora Kathleen.
Keenan, John Kane.
Keeping, Ewart Allan (Interim).
Kidd, Eli Leeson.
Kirk, Katherine.
Kirk, Norman Leslie.
Laking, Vera Evelyn.
Lawrence, Olive Beatrice.
Lingard, Jane Josephine.
Livingstone, Ethel Belle.
Main, Hannah Scott.
Martin, Elizabeth Eva.
Martin, James.
Mercer, Marion Isabelle.
Murray, Marion V. (Interim).
Murray, Norman.
Macdonald, Pauline Mary Grant.
McIvor, Louise C.
MacKenzie, Agnes Tryphena.
MacLeod, William Roy.
Nakabayashi, Annie Kiku.
Oliver, Sarah Ellen.
Price, Edith Ethel.
Redpath, Muriel Annie.
Riddell, Georgina Gordon.
Roberts, Alexandria Mary.
Robertson, Archibald Philip.
Scott, Gladys MacRitchie.
Shaw, Mary Jeannie.
Skelding, Cecil Howes.
Skidmore, William.
Sparkes, Ralph Edward.
Spouse, Mrs. Margaret.
Stewart, Emma Mary.
Stuart, Dorothy Louise.
Thompson, Hazel M.
Thomson, Charlotte McGregor.
Vallance, Evelyn G.
Wagstaff, Nellie Ada.
Wallace, Edna Elizabeth.
Weatherbee, Ava Ryetta.
Webster, Lila H.
Whittaker, Helen Hazel.
Wilby, Elsie Louisa.
Williams, Ethel Jane M.
Williams, Ruth Naomi.
Wilson, Mary.
Wood, Alice Margaret.
Wood, Margaret Amelia.

Second-class Certificates.

(Names in alphabetical order.)

Adair, Florence Elizabeth.
Adams, Edith Lilian.
Aikenhead, Edna Ross.
Aldcorn, Mary Findlay.
Allardyce, Catherine M.
Allen, Eva Muriel.
Anderson, Margaret Christine.
Andrews, Grace Mary.
Archibald, Marjorie Gordon.
Arkell, Kathleen.
Armstrong, Rachel.
Atkinson, Mrs. Mabel.
Auld, Marion Lucy.
Ault, Kathleen Sarah.
Baillie, Annie Taylor.
Ballson, Celene Agnes.
Barker, Jennie C.
Barr, Mary Eunice.
Barton, Lurlene Mary.
Baxter, Muriel Lillian.
Beach, Sarah Evelyn.
Beairsto, Harold King.
Beech, Laura Ethel.
Bell, Gertrude Helen Hope.
Bell, Irene Dora.
Bevan-Pritchard, Gilbert H.
Bewell, Wilfrid Frank.
Birkett, Arthur.
Birkett, Edith.
Black, Helen Margaret.
Boucher, Edrie Evelyn Alexandra.
Boulton, Mrs. Mary Edna.
Bowden, Beatrice Duthie.
Bowing, Martha Elvira.
Boyes, James Thomas.
Boyes, William Earl.
Brackett, Margaret A.
Braithwaite, E. Victor.
Brandon, Ilsa Sarah.
Brennan, William J.
Brown, Elizabeth Margaret.
Brown, Ethel Mary.
Burns, Sarah.
Burrow, Mary G.
Busby, Grace Elizabeth.
Cain, Florence Marguerite.
Cameron, Lila Evelyn.
Cameron, Lillian Mai.
Cameron, May.
Campion, Flora Isabel.
Carder, Winnifred.
Carlson, Esther Gunhilda.
Carlson, Ruth Matilda.
Carmichael, Thomas Spurgeon.
Carruthers, Dorothy Kathleen.
Carty, Margaret Veronica.
Caspell, Mrs. Fanny.
Cates, Kathleen Wilson.
Chadwick, Marjory Lory.
Chasteney, Kathleen Noel.
Cheeseman, Stephen A.
Chute, Isabella Beaton.
Clancey, Emma Violet.
Clark, Helen Bruce.
Clements, Ella Violet.
Cody-Johnson, Mary Adele.
Colman, Alice J.
Cordingley, Norma Millicent.
Creighton, Phyllis Ogilvie.
Crompton, Amy.
Davies, Charles Edgar.
Davis, Grace L.
Davis, Kathreen.
Davis, Violet Alma.
Deans, Margaret McCallum.
Dee, John Sanderson.
Denton, Beatrice Irene.
Dew, Annie Nina.
Dickman, Lavina Frances.
Dixon, Caroline.
Donley, Ethel Annie.
Douglass, Agnes Gray.
Driver, Esther Ruth.
Dryden, Grace Good.
Duke, Alma Mercer.
Edwards, Ethel Anne.
Elliott, Jennie May.
Elliott, Margaret Lillian.
Ellis, Muriel Mae.
Elsey, Gertrude Elizabeth.
Feakes, Harry James.
Featherstone, Kathleen M. G.
Fee, Edith Alberta.
Fee, Mary Ethel.
Ferguson, Eulalie Laird.
Ferris, Mrs. Agnes J.
Fielder, Rhoda Jayne.
Fletcher, Hazel M.
Foley, Wilbur Lucian.
Ford, Euphemia Grace.
Ford, Laura Joanna.
Forrest, Helen Dorothy.
Forrest, Sadie Jane.
Forster, Clara Catherine.
Gaudin, Francis Hugh.
Geddis, Jenda Hamilton.
Geekie, Jean.
Gibbs, Eleanor Josephine.
Gibson, Edith Eleanor.
Girard, Rowena May.
Graham, Helen.
Grant, Clara Annie.
Green, Edith Flora.
Green, Katie.
Hale, Winifred Kathleen.
Hand, Verna Margaret.
Hardwick, Dorothy Winnifred G
Hardwick, Walter Henry.
Hargreaves, Lucy.
Harris, Hermia.
Harrison, Margaret.
Haskin, Almera Sara.
Hastings, Violet Gordon.
Hayton, Freda May.
Head, Dorothy Grace.
Heady, Nellie.
Hodnett, Mrs. Jessie.
Hoggan, Dorothy Evelyn.
Hole, Gwendoline Mabel.
Homuth, Mary Lois.
Hopkins, Agnes Clara.
Horsman, Helen Dorothea.
Houston, Elizabeth Irvine.
Howarth, Mrs. Sara Julia.
Huddleston, Hilda.
Hurton, Gertrude.
Inglis, Bertha M.
Inglis, Mary Arnott.
Irvine, Robert Barker.
Irving, Norma Alfreda.
James, Lillias Olga.
Jerome, Agnes Elizabeth.
Johnson, Lyda Annie.
Johnston, Katherine Freda.
Kane, Joseph Patrick.
Keir, Marie Isabel.
Kellie, Evelyn Augusta.
Kennedy, Irene Mary Margaret.
Kidd, Ruby Winnifred.
Lade, Mary Eliza.
Larsen, Pauline.
Lavis, Charlotte Hannah.
Lee, Phyllis Joyce.
Link, Marion Martha.
Link, Mary Mildred.
Lloyd, Vida Valerie.
Logie, Grace.
Lusk, Gladys Muriel.
Lyons, Ronald Adlai.
Malott, Marion.
Martin, Catherine M.
Martin, Edith Irene.
Millar, Ethel J.
Miller, Ruby Robeson.
Moody, Ethel May.

SECOND-CLASS CERTIFICATES—*Continued.*

(Names in alphabetical order.)

Moore, Marion Elizabeth.
Morgan, Annie Allan.
Morrison, Marion Stephen.
Mouat, Gertrude Eleanor.
Moulton, Muriel Emma.
Murray, Louise E.
MacArthur, Olive Edwina.
McCaffrey, Elizabeth.
McCallum, Sara Vina.
Macaulay, Annie.
McClelland, Margaret L.
McColm, Sara W.
McCusker, Dorothy Victoria.
McDonald, Mauretta Evelyn.
McDougal, Colin.
McDougall, Margaret Alexandra.
McEachern, Mary.
McFadyen, Ida.
MacGill, Jennie Ethel.
McGowan, Virginia.
McIntosh, Cecelia M.
MacKay, Kate.
McKenna, Helen.
McKenzie, Louisa Victoria.
McKinnon, Annie Sophie.
McLaren, Myrtle Viola.
MacLeod, Helen Ethel.
McLeod, Ina Marguerite.
McLeod, Margaret Adelaide.
McManus, Edith Mildred.
McNairn, Christina.
MacNaughton, Eunice.
Nichols, Oliver.
Noble, Islay Barbara.
Olson, Vera Charlotte.
Owen, Lucy Ellen.
Pack, Mrs. Alice L.
Page, Beulah I.
Parker, Mona I.
Pears, Frances Winifred.
Pearson, Harry L. O.
Peresian, Alice Maud.
Peters, Camille Marie.
Peterson, Ida Helena.
Philip, Mary Brown.
Phillips, Edith Anne.
Piggott, Eleanora.
Port, Nellie Edna.
Postill, Mrs. Eleanor Armour.
Potter, Elsie.
Potter, Winifred Annie.
Pottinger, Myrtle Gladys.
Power, Laura R. M.
Preston, Marjory.
Pullen, Mabel F.
Raftery, Rosalie Alice.
Ratledge, Vera.
Reid, Hazel Ella.
Revercombe, Elsie Aileen.
Richmond, Lizzie.
Rogers, Victoria Elizabeth.
Ross, Carrie Evelyn.
Rowse, Florence Mina.
Russell, Mrs. Agnes G.
Sangster, H. Isabelle.
Scarth, Nellie B.
Schneider, Elizabeth Erna.
Scott, Mrs. Minnie.
Scurrah, Margaret.
Shaw, Sybil Jean.
Sheepy, Janet.
Short, Caroline E.
Smith, Brenda.
Smith, Harry.
Smith, Marie Aline.
Smith, Ruby.
Southam, Harold Davey.
Spiers, Grace Steel.
Stanton, Lilian Sarah.
Steward, Gilbert Richard.
Stewart, Edna Margaretta.
Stewart, Gertrude Elliott.
Stringer, Harold C.
Sutherland, Jeanne Henderson.
Sutherland, Wesley.
Sutton, Phyllis May.
Tait, Ina Belle.
Teague, Phyllis Elwy.
Thacker, Nellie Linton.
Thorpe, Gladys Maud.
Thompson, Jennie Burnside.
Thomson, Lela Esther.
Trembath, Ethel Agnes.
Tripp, Verner Edward.
Turnbull, Agnes Hutchinson.
Turner, Ruth Ellis.
Tyacke, William John.
Utz, Mary Elizabeth.
Wallace, Elizabeth Hart.
Wallace, Etta Hamilton.
Walsh, Margaret L. M.
Watson, Lily Isabella.
Watson, Marjorie G. C.
Willoughby, Gladys.
Wilkinson, Mary Grace.
Wilson, Isabel.
Wilson, Margery.
Wollaston, Catherine M.
Woods, Mary Loretto.
Woodward, Lilian M.
Wright, Margaret Anne.

THIRD-CLASS CERTIFICATES—VALID FOR LIFE.

(Names in alphabetical order.)

Allan, Mabel Ruth.
Baker, Helen Burnard.
Bauld, Simpson Wallace F.
Braden, Clare E.
Brander, Nora M.
Cameron, Phyllis Jean.
Catto, Helen Mitchell.
Dell, Viola Evangeline.
Edwards, Florence Elizabeth.
Edwards, Maggie.
Hawthornthwaite, Cecilia Eros.
Larson, Effie Helen.
Livingstone, Edward.
Lomas, Gladys E.
Marshall, Elizabeth Christian.
Marshall, Isabella Margaret.
Moore, Blanche.
Mutrie, Jean Anita.
Macdonald, Catherine Alma.
McDonald, Marjorie Vera.
MacKay, Elizabeth A. G.
McSpadden Mabelle Marguerite.
Newman, Elizabeth Marjory.
Patterson, Pearl Elizabeth.
Pullinger, Percy.
Purdy, Dorcas Ethelwyn.
Rhodes, Gladys.
Sanborn, Harriet Agnes.
Schou, Frances Dorothy.
Seater, Jane Lizzie.
Sharp, Barbara J.
Sutherland, Janet Margaret.
Taylor, Jessie Marjorie.
Wark, Mrs. Elsie D.
Weetman, Winifred Mary.
Whitley, Ida Philippa.
Wilkie, Mary Beatrice.

Third-class Certificates—Valid for Three Years.

(Names in alphabetical order.)

Adams, Violet.
Baker, Marjorie Lillian.
Barlow, Margaret Young.
Beall, Gladys Winnifred.
Beatty, Edna M.
Bell, Mary Cecilia.
Binnie, Mary Christiana.
Bradshaw, Hazel Inez.
Brown, Kathleen Winifred.
Cousins, Alice.
Cousins, Anna Lillian.
Cowdell, Lillian Frances.
Dilworth, Joseph.
Dryden, Jean A.
Essler, Martha.
Flatt, Samuel Alexander.
Goodman, Christine.
Griffin, Margaret Alice.
Hazlett, Norah.
Hetherington, Ruth B.
Holmes, Edna Sophia.
Hopwood, Sadie Eleanor.
Houston, Mildred Elsie.
How, Anna B.
Ingram, Lucy.
Kania, Mary Ernestine.
Kilby, Edward Wheatley.
Klien, Gretha.
Larson, Nellie E.
Larson, Winifred E.
Lindmark, Ruth A.
Macey, Elizabeth Irene.
Maloney, Rita A.
May, Margaret Lucy.
Mercer, Marion Isabelle.
Michie, Alice Charlotte Esther.
Mitchell, Arthur Hilton.
Moses, Grace Evelyn.
Murray, May Louise.
McColl, Margaret Duff.
McCubbin, Ila Mildred.
MacDonald, Gladys Evelyn.
McDonald, Josephine.
McElhinney, Lina Baker.
McKay, Irene Isabel.
McLaren, Alexander Gordon.
McLellan, Isabel Jean.
MacPherson, Mary Ellen.
Newhauser, Hattie Louise.
Patchett, Delphine H. R.
Pengelly, Helen South.
Phillips, Margaret.
Rock, Mrs. Vera J.
Rogers, Beatrice Adelaide.
Rogers, Olive Alice.
Ross, Gladys L.
Ross, Willow Katharine.
Standen, Alice E.
Shannon, Jean Annie.
Steele, Frederick Holmes.
Taylor, Clara Louise.
Wagg, Ola Ezetta.
Walters, Mrs. Kate.
Woods, Dorothy Beulah.

HIGH SCHOOL AND UNIVERSITY MATRICULATION EXAMINATIONS, 1921.

The High School and University Matriculation Examinations began on June 20th and were held simultaneously in the High School Buildings at Agassiz, Armstrong, Bridgeport, Chilliwack, Courtenay, Cranbrook, Creston, Cumberland, Duncan, Enderby, Esquimalt, Fernie, Grand Forks, Greenwood, Kamloops, Kaslo, Kelowna, Ladner, Ladysmith, Langley, Maple Ridge, Matsqui, Merritt, Mission, Nanaimo, Nelson, New Westminster, Oak Bay, Peachland, Penticton, Point Grey, Port Alberni, Prince George, Prince Rupert, Revelstoke, Rossland, Salmon Arm, Summerland, Surrey, Trail, Vancouver (Britannia, King Edward, King George, and Kitsilano), North Vancouver, South Vancouver, Vernon, and Victoria, as well as at Abbotsford, Hedley, Howe Sound, Nakusp, Port Alice, Princeton, and Quesnel.

The Examiners appointed to act with the Superintendent of Education were: E. H. Archibald, M.A., Ph.D.; H. Ashton, M.A., D.Litt.; D. Buchanan, Ph.D.; J. B. DeLong, B.A.; Ira Dilworth, M.A.; W. J. Fee, M.A.; G. A. Ferguson, B.A.; J. K. Henry, B.A.; H. P. Hope, B.A.; A. H. Hutchinson, M.A., Ph.D.; Annie B. Jamieson, B.A.; R. A. Little, B.A.; S. W. Mathews, M.A.; D. L. MacLaurin, B.A.; L. F. Robertson, M.A.; D. M. Robinson, B.A.; L. V. Rogers, B.A.; E. H. Russell, B.A.; W. N. Sage, M.A.; Albert Sullivan, B.A.; O. J. Todd, Ph.D.; F. G. C. Wood, M.A.

The following are the names of the winners of His Excellency the Governor-General's silver medals:—

Kathleen Mary Gwendolyn Hardie, Oak Bay High School;
Homer Armstrong Thompson, Chilliwack High School;
Kathleen Dodds, Vernon High School;
Grace Elizabeth Mabel Smith, King George High School, Vancouver;
Alan Campbell, South Vancouver High School.

The winners of the Royal Institution Scholarships awarded by the University of British Columbia on the results of the Junior Matriculation Examination follow:—

Student.	High School.	Standing obtained at Examination.	Scholarship.
Kathleen M. G. Hardie	Oak Bay	First in Province	$ 150
Norah A. Keay	"	" District No. 1	100
Vera G. Mather	North Vancouver	" " 2	100
Grace E. M. Smith	King George, Vancouver	" " 3	100
Homer A. Thompson	Chilliwack	" " 4	100
Kathleen Dodds	Vernon	" " 5	100
John C. Wallis	Rossland	" " 6	100

Number of Successful Candidates at each Centre.

Examination Centre.	Third-class, Non-professional Teachers' Certificates.	Third-year Commercial.	Third-year Technical.	Third-year Household Science.	Junior Matriculation.	Returned Soldiers' Applied Science Matriculation.	Senior Matriculation.	Total.
Agassiz					2			2
Armstrong					4			4
Bridgeport					2			2
Chilliwack					8			8
Cranbrook	3				2		1	6
Creston	1							1
Cumberland	1				2			3
Duncan:								
Duncan High	2				5			7
Private Study					1		1	2
Enderby					2			2
Esquimalt					2			2
Fernie					3			3
Grand Forks					6			6
Howe Sound					3			3
Kamloops:								
Kamloops High					9			9
St. Ann's Academy	2							2
Private Study	1							1
Kaslo					6		2	8
Kelowna:								
Kelowna High					13			13
Westbank Public	1							1
Ladner					2			2
Ladysmith					3			3
Langley	9				5			14
Matsqui					2			2
Merritt					1			1
Nakusp					1			1
Nanaimo	1				5			6
Nelson:								
Nelson High		6					2	8
Bosun					2			2
New Westminster:								
Duke of Connaught High					31			31
Columbian College	1							1
St. Ann's Academy	2							2
Private Study					3			3
Oak Bay					13			13
Peachland					4			4
Penticton High	1				3		1	5
Keremeos	2							2
Point Grey:								
King George V. High	1				15			16
Prince of Wales High					15			15
Port Alberni					1			1
Prince George:								
Prince George High					1			1
Private Study	1							1
Prince Rupert	1				8			9
Princeton	2							2
Quatsino					1			1
Revelstoke					5			5
Rossland					4			4
Salmon Arm					1			1
Summerland					5			5
Surrey					2			2
Trail:								
Trail High					3			3
Private Study					1			1
Vancouver:								
Britannia High		2			33			35
Cecil Rhodes High		17						17
King Edward High				7	69			76
King George High	3				39			42
Kitsilano High					23			23
Technical High			18		1			19
Crofton House	11				5			16
Mabyn College					1			1
St. Ann's Academy					1			1
St. Marina	2							2
School of Pharmacy and Science					6	3		9
Private Study	2				10			12
Vancouver, North:								
North Vancouver, High					15			15
Private Study					1			1

NUMBER OF SUCCESSFUL CANDIDATES AT EACH CENTRE—*Continued.*

Examination Centre.	Third-class Non-professional Teachers' Certificates.	Third-year Commercial.	Third-year Technical.	Third-year Household Science.	Junior Matriculation.	Returned Soldiers' Applied Science Matriculation.	Senior Matriculation.	Total.
South Vancouver	.....	5	.....	.....	52	.....	.....	57
Vernon:								
Vernon High	.....	.....	.....	.....	10	.....	4	14
St. Michael's	1	.....	.....	.....	5	.....	.....	6
Private Study	.....	.....	.....	.....	2	.....	.....	2
Victoria:								
Victoria High	3	.....	.....	.....	50	.....	.....	53
St. Ann's Academy	7	.....	.....	.....	2	.....	.....	9
St. George's School	9	.....	.....	.....	2	.....	.....	11
St. Margaret's School	6	.....	.....	.....	1	.....	.....	7
Private Study	1	.....	.....	.....	7	.....	1	9
	77	30	18	7	542	3	12	689

Number of candidates examined 1,530
Number of successful candidates 689

HIGH SCHOOL ENTRANCE EXAMINATION, JUNE, 1921.

Following are the names of the winners of His Excellency the Governor-General's bronze medals:—

District No. 1—Arthur Stonier, Cloverdale School, Saanich;
" 2—Donella M. Willing, Langford;
" 3—Lawrence J. Meredith, Lord Roberts School, Vancouver;
" 4—Mildred M. Townley, Kingsway West School, Burnaby;
" 5—Pearl E. George, Crescent Beach School, Surrey;
" 6—Philip C. Fraser, Salmon Arm;
" 7—Jean O. Fraser, Ellis School, Penticton;
" 8—Kathleen M. Cairns, Trail;
" 9—Odin Sostad, Nelson;
" 10—Reid L. McLennan, Prince Rupert.

HIGH SCHOOL ENTRANCE EXAMINATION, JUNE, 1921—*Continued.*

NUMBER OF SUCCESSFUL CANDIDATES AT EACH CENTRE.

Abbotsford Centre.

Abbotsford	9
Clayburn	3
Huntingdon	2
Upper Sumas	4

Agassiz Centre.

Agassiz	14

Armstrong Centre.

Armstrong	1
Hullcar	2
Larkin	1
Glenemma	1
Heywood Corners	2
Salmon Valley	1

Arrowhead Centre.

Arrowhead	5
Galena Bay	1
Trout Lake	2

Ashcroft Centre.

Ashcroft	1

Athalmer Centre.

Athalmer	2

Atlin Centre.

Atlin	1

Barkerville Centre.

Barkerville	1

Bradner Centre.

Aberdeen	1
Bradner	2
Mt. Lehman	4

Bridgeport Centre.

Bridgeport	5

Britannia Beach Centre.

Britannia Beach	2
Britannia Mine	1

Burnaby Centre.

Douglas Road	2
Gilmour Avenue	3
Kingsway East	7
Kingsway West, Div. 1	14
Kingsway West, Div. 2	14
Schou Street	1

Burns Lake Centre.

Burns Lake	2

Chase Centre.

Chase	7
Chase Creek	2
Martin's Prairie	1
Turtle Valley	1

Chilliwack Centre.

Chilliwack City	2
Atchelitz	3
Camp Slough	3
Cheam	4
East Chilliwack	2
Lotbiniere	4
Rosedale	2
Sardis	15
Strathcona	5

Clinton Centre.

Clinton	4

Clo-oose Centre.

Clo-oose	1

Cloverdale Centre.

Anniedale	1
Cloverdale	16
Colebrook	1
Crescent Beach	2
Hall's Prairie	5
East Kensington	2
Kensington Prairie	1
Springdale	2
South Westminster	2
White Rock	1

Courtenay Centre.

Courtenay City	7
Grantham	2
Lazo	2
Merville	1
Royston	1

Cranbrook Centre.

Bull River Bridge	1
Jaffray	1
Kimberley	2
Moyase	2
Moyie	1
Wardner	1

HIGH SCHOOL ENTRANCE EXAMINATION, JUNE, 1921—*Continued.*

NUMBER OF SUCCESSFUL CANDIDATES AT EACH CENTRE—*Continued.*

Creston Centre.

Camp Lister	1
Canyon City	3
Creston	9
Erickson	1
Wynndel	6

Cumberland Centre.

Minto	1

Duncan Centre.

Chemainus	5
Cowichan	2
Glenora	2
Mill Bay	3
Shawnigan	4
Sylvania	1

Enderby Centre.

Enderby	8
Grindrod	1
Hupel	1
Mara	3

Esquimalt Centre.

Esquimalt	3
Colwood	1
Highland	1
Langford	3

Essington Centre.

Essington	3

Fernie Centre.

Fernie, Div. 1	7
Fernie, Div. 2	2
Baynes Lake	1
Coal Creek	4
Michel	1
New Michel	1
Waldo	3

Ganges Centre.

Beaver Point	1
Galiano	1
Saturna Island	1
Private Study	1

Golden Centre.

Field	1
Golden	4

Granby Bay Centre.

Granby Bay	8

Grand Forks Centre.

Cascade	1

Greenwood Centre.

Greenwood City	3
Bridesville	1
Christian Valley	2
Coltern	1
Eholt	1
Kettle Valley	2

Hazelton Centre.

Hazelton	3

Hedley Centre.

Hedley	4

Hope Centre.

Concord	1
Hope	5
St. Elmo	1
Yale	3

Howe Sound Centre.

Howe Sound	5
Sechelt	1

Kamloops Centre.

Kamloops City	1
Blue River	1
Campbell Range	1
Duck Range	2
Fish Lake Road	1
Upper Heffley Creek	2
Long Lake	2
Louis Creek	1
Monte Creek	2
Rose Hill	1
Private Schools:	
St. Ann's Academy	1
Zetland	3
Private Study	1

Kaslo Centre.

Kaslo City	12
Riondel	1

Kelowna Centre.

Kelowna City	1
Westbank	1

HIGH SCHOOL ENTRANCE EXAMINATION, JUNE, 1921—*Continued.*

Number of Successful Candidates at each Centre—*Continued.*

Keremeos Centre.

Keremeos	4

Kingcome Inlet Centre.

Kingcome Inlet	2

Kitsumgallum Centre.

Kitsumgallum	1
Usk	1

Ladner Centre.

Ladner	12
Trenant	1

Ladysmith Centre.

Cassidy	1
Diamond Crossing	3
Extension	3
North Oyster	2
St. Joseph's Convent (Private School)	4

Lillooet Centre.

Pemberton Meadows	1
Seton Lake Creek	1

Lytton Centre.

Lytton	1

Malcolm Island Centre.

Malcolm Island	1

Maple Ridge Centre.

Hammond	5
Haney	9
Maple Ridge	9
Ruskin	4
Whonnock	5

Masset Centre.

Masset	2

Matsqui Centre.

Matsqui	4
Ridgedale	2

Merritt Centre.

Merritt	5

Mill Creek Centre.

Mill Creek	1

Mission Centre.

Hatzic	2
Mission	6

Murrayville Centre.

Aldergrove	1
County Line	2
Langley Fort	6
Langley Prairie	6
Langley, West	3
Lochiel	3
Milner	4
Murrayville	5
Otter	1
Patricia	3

Macalister Centre.

Macalister	3

MacKenzie Centre.

MacKenzie	1
Noosatsum	2

Nakusp Centre.

Burtondale	3
Fauquier	1
Glenbank	3
Nakusp	1
Needles	1
West Demars	2

Nanaimo Centre.

Nanaimo City	5
Brechin	1
East Cedar	1
North Cedar	4
South Cedar	1
Chase River	4
Northfield	1
Wellington	3
South Wellington	1
St. Anne's Convent (Private School)	3

Naramata Centre.

Naramata	3

Nelson Centre.

Nelson Central, Div. 1	5
Nelson Central, Div. 2	9
Nelson, Hume	7
Balfour	1
Belford	1
Boswell	2
Crescent Valley	2
Duhamel	2
Fruitvale	2

HIGH SCHOOL ENTRANCE EXAMINATION, JUNE, 1921—*Continued.*

NUMBER OF SUCCESSFUL CANDIDATES AT EACH CENTRE—*Continued.*

Nelson Centre—Continued.

Harrop	2
Park Siding	1
Procter	4
Thrums	1
Ymir	3

New Denver Centre.

New Denver	2
Rosebery	1
Sandon	3
Silverton	5

New Westminster Centre.

Howay	5
Lister	5
McBride	2
Spencer	2
Annieville	1
Barnston Island	1
Hamilton Road	2
Blue Mountain	5
Millside	1
Private Schools:	
Columbian College	1
Our Lady of Lourdes	1
St. Ann's Academy	10

North Bend Centre.

North Bend	1

Notch Hill Centre.

Notch Hill	6
North Shuswap	5

Oak Bay Centre.

Monterey Avenue	12
Private Schools:	
St. Margaret's	1
St. Michael's	1
Private Study	1

Ocean Falls Centre.

Ocean Falls	9

Oyama Centre.

Oyama	7
Woods Lake	3

Parksville Centre.

Errington	2
Parksville	3

Peachland Centre.

Peachland	10

Penticton Centre.

Ellis	20
Poplar Grove	3

Point Grey Centre.

Edith Cavell	9
Kerrisdale	2
Magee	3
Marpole	2
Prince of Wales	7
Queen Mary	9
Bowen Island	2

Port Alberni Centre.

Alberni City	6
Port Alberni City	8
Beaver Creek	1

Port Alice Centre.

Port Alice	3

Port Coquitlam Centre.

Port Coquitlam City	10
East Coquitlam	1
Glen	2

Port Moody Centre.

Port Moody	10
Ioco	1
Sunnyside No. 2	1

Pouce Coupe Centre.

North Pouce Coupe	1

Powell River Centre.

Lang Bay	1
Lund	1
Powell River	7
Savary Island	1

Prince George Centre.

Prince George City	6
Fort George	3
South Fort George	1

Prince Rupert Centre.

Borden Street	3
Alice Arm	1
Annunciation (Private)	7

Princeton Centre.

Allenby	2
Copper Mountain	2
One-mile Creek	1
Princeton	5

HIGH SCHOOL ENTRANCE EXAMINATION, JUNE, 1921—*Continued.*

Number of Successful Candidates at each Centre—*Continued.*

Quesnel Centre.

Quesnel	1

Revelstoke Centre.

Albert Canyon	1
Big Eddy	2
Malakwa	1
Tonkawatla	1

Robson Centre.

Castlegar	3
Robson	5
Syringa Creek	1

Rock Bay Centre.

Granite Bay	2
Wellbore Channel	3

Rossland Centre.

Rossland City	5

Rutland Centre.

Ellison	2
Rutland	9

Saanich Centre.

Cedar Hill	8
Cloverdale	1
Craigflower	3
Gordon Head	1
Keating	5
Model	10
MacKenzie Avenue	7
Prospect Lake	4
Royal Oak	4
Saanichton	3
West Saanich	6
Strawberryvale	2
Tillicum	9
Tolmie	1

Salmon Arm Centre.

Salmon Arm City	16
Canoe	2
North Canoe	1
Mount Ida	2
Salmon Arm West	2
Silver Creek	1
Tappen Siding	3
Tappen Valley	2

Sandspit Centre.

Sandspit	1

Sayward Centre.

Sayward	3

Sidney Centre.

Deep Cove	2
James Island	2
North Saanich	3
Sidney	4

Slocan City Centre.

Slocan City	6

Smithers Centre.

Smithers	9

Sooke Centre.

Sooke	3

Squamish Centre.

Brackendale	1
Squamish	3

Stewart Centre.

Stewart	2

Summerland Centre.

Summerland	11
Meadow Valley	1

Surf Inlet Centre.

Surf Inlet Beach	1
Surf Inlet Mine	1

Trail Centre.

Trail City	3
Annable	1

Ucluelet Centre.

Ucluelet	1

Union Bay Centre.

Denman Island	1
Fanny Bay	1
Union Bay	1

Vananda Centre.

Blubber Bay	2
Vananda	3

Vancouver Centre.

Alexandra	3
Dawson	1
Model	2
Grandview	1

HIGH SCHOOL ENTRANCE EXAMINATION, JUNE, 1921—*Continued.*

NUMBER OF SUCCESSFUL CANDIDATES AT EACH CENTRE—*Continued.*

Vancouver Centre—Continued.

Lord Roberts	1
Cecil Rhodes	2
Private Schools:	
Endistine	1
Holy Rosary	15
St. Augustine's	9
Private Study	1

North Vancouver Centre.

Queen Mary	1
Capilano	4
Lynn Valley	5
North Star	8
St. Edmund's (Private)	2

South Vancouver Centre.

General Brock	10
Carleton	7
Moberley	10
McBride	5
MacKenzie	16
Norquay	2
Secord	10
Selkirk	8
Sexsmith	13
Tecumseh	7
Van Horne	5
Wolfe	10

West Vancouver Centre.

Hollyburn	13

Vanderhoof Centre.

Nechako	1
Vanderhoof	7

Vernon Centre.

Vernon	36
Coldstream	2
Lumby	1
Okanagan Centre	2
Reiswig	1
Vernon Preparatory (Private)	1

Victoria Centre.

Girls' Central	1
George Jay	2
Margaret Jenkins	1
North Ward	3
Oaklands	1
Quadra	2
Victoria West	1
Albert Head	1
Private Schools:	
St. Ann's Academy	20
St. Louis College	3
William Head	1

Whaletown Centre.

Squirrel Cove	1
Whaletown	1

Williams Lake Centre.

Beaver Lake	1
Chilcotin	1

Number of candidates examined	2,556
Number of successful candidates	1,307
Number of pupils promoted on recommendation	2,689
Total number of pupils promoted to high schools	3,996

APPENDIX B.

HIGH SCHOOL ENTRANCE EXAMINATION, JUNE, 1921.

ARITHMETIC. (Time, 2¼ hours.)

Value.

10 1. (*a.*) Express in figures: Thirty million, eighty-five thousand, six; three hundred and seven thousandths; three hundred seven thousandths; MDXCII.

(*b.*) Find the prime factors of 42, 56, and 70; from the prime factors find the H.C.F. and the L.C.M. of the three numbers.

10 2. (*a.*) Find the cost of 17½ yards of cotton at 17½c. a yard.

(*b.*) How many yards of muslin at 72c. a yard can be bought for $27?

(*c.*) What is a piece of cloth containing 46.7 metres worth at 26c. a decimetre?

12 3. (*a.*) A man walks 2½ miles. If he takes a step 32 inches in length, how many steps will he take in his walk?

(*b.*) Find the length of a side of a square field which contains 40 acres.

12 4. (*a.*) A school-room is 35 feet long, 28 feet wide, and 10 feet 6 inches high. There are 39 pupils in attendance. How many cubic feet of air-space does this provide for each pupil?

(*b.*) A wooden pillar is 3 feet square and 76 feet 8 inches high. Find its weight, if a cubic foot of wood weighs 29½ lb.

12 5. (*a.*) Find the tax on property assessed at $6,800 in a district where the rate of taxation is 18.7 mills on the dollar.

(*b.*) An architect charges 3¼% of the cost of a building for plans and specifications and 2½% for supervising the construction of the building. What would be his total commission on a building costing $15,750?

12 6. Find the cost at $4.70 a yard of the carpet required for the floor of a room 15 feet long and 12 feet 4 inches wide. The carpet is laid lengthwise in strips 30 inches wide.

16 7. A close board fence 4 feet high is built around a garden 72 feet long and 45 feet wide. The boards, which are 1 inch thick, are nailed to two lines of scantling 2 inches by 4 inches. The posts are placed 9 feet apart. Find the total cost of the lumber in the fence, if the posts were bought at 35 cents each and the boards and scantling at $28 a thousand feet.

16 8. A man sold his house and lot on October 3rd, 1920, and received in payment a promissory note for $4,900 payable two months later without interest. He discounted the note on the same day at 8% per annum. Find the amount of cash he received for the promissory note.

GRAMMAR AND COMPOSITION. (Time, 2 hours.)

Value.

27 1. Write the subordinate clauses in (*a*), (*b*), and (*c*), and the phrases in (*d*), stating the kind and relation of each:—

(*a.*) I should like to know how your friend found the house *where* I live.

Value.

(*b.*) There were many boys in the room by whom *that* little scene *was taken* to heart before they slept.

(*c.*) *Think* not, because thine *inmost* heart means well,
Thou *hast* the *freedom* of rude speech: sweet words
Are like the voices of returning birds
Filling the *soul* with summer, or a bell
That calls the weary and the sick to prayer.

(*d.*) *No* fires *have swept* over the hills and *left* behind them the desolation of a *bristly* landscape.

15 2. Answer the following questions regarding the italicized words in the above sentences:—
What part of speech is the word *where* and what is its relation?
That (in second sentence): Part of speech and relation?
Was taken: Transitive or intransitive? Why?
Think: Mood and person?
Inmost: Degree and relation?
Hast: Person and tense?
Freedom: Case and relation?
Soul: Case and relation?
That (in third sentence): Part of speech and relation?
No: Part of speech?
Have swept: Tense?
Left: What part of the verb?
Bristly: Part of speech?

12 3. Rewrite the following sentences, filling the blanks and giving in each case a reason for your choice:—

(*a.*) Each of the girls . . . a white rose. Use *has* or *have.*

(*b.*) . . . did you buy it from? Use *whom* or *who.*

(*c.*) John parted . . . him at the corner. Use *with* or *from.*

(*d.*) It is for . . . . Use *me and you* or *you and me.*

(*e.*) Neither George nor Thomas . . . there. Use *is* or *are.*

(*f.*) . . . I leave the room? Use *can* or *may.*

8 4. Write sentences showing that the word *last* may be used as a verb, a noun, an adjective, and an adverb; and that the word *as* may be used as a pronoun and a conjunction.

6 5. Give the voice of each of the following verbs, and then rewrite the sentences changing the voice of each verb without changing its tense:—
The rebels will be defeated by the loyal troops.
My father has bought a box of apples.

8 6. The following advertisement appeared in one of the daily papers:—
"WANTED—High school boy to assist about house and garden in return for board, clothing, and school expenses. Apply J. Williams, 5246 Robson St., Vancouver."
Write a letter applying for the position.

24 7. Write a composition on *one* of the following:—
The Unknown Soldier of Westminster Abbey.
What I would do if I had a Thousand Dollars.
Malcolm Graeme.
What I did on Christmas Day.
How I made my First Cake.
My First Pocket-knife.

DICTATION AND SPELLING. (Time, 1¼ hours.)

NOTE.—*The passages (questions A and B) are to be read slowly and distinctly to candidates three times—the first time to enable them to gather the meaning; the second time to enable them to write the words; the third time for review. Punctuation marks should not be dictated. Candidates are not permitted to rewrite the passages.*]

Value.

25 A. A fleet of canoes suddenly appeared, bounding down the rapids, filled with warriors eager for revenge. The allies had barely time to escape to their fort, leaving their kettles still slung over the fires. The Iroquois made a hasty and desultory attack and were quickly repulsed. They next opened a parley, hoping no doubt to gain some advantage by surprise. Failing in this, they set themselves, after their custom on such occasions, to building a rude fort of their own in the neighbouring forest.

25 B.

The war-pipes ceased, but lake and hill
Were busy with their echoes still;
And, when they slept, a vocal strain
Bade their hoarse chorus wake again,
While loud a hundred clansmen raise
Their voices in their Chieftain's praise.
Each boatman, bending to his oar,
With measured sweep the burden bore,
In such wild cadence as the breeze
Makes through December's leafless trees.

25 C. (1.) In idleness alone is there perpetual despair.

(2.) "A stranger I," the huntsman said.

(3.) I live in Brantford, Ontario. Where do you live?

(4.) They accepted the recommendations that were made by Premier Lloyd George.

(5.) The French took possession of the surrounding region of Acadia and Canada.

(6.)

The antlered monarch of the waste
Sprung from his heathery couch in haste.

(7.) Spain ceded Florida to Britain, while France rewarded her ally with the vast territory of Louisiana.

(8.) Before the end of the eighteenth century there appeared a vigorous rival that threatened to deprive them of their profitable monopoly.

25 D.

Educational institutions,
decimal currency,
essential features,
unfailing patience,
transportation facilities,
dangerous venture,
varied perils,
fearful dilemma,
steep ascent,
fateful answer,
characteristic costumes,
knitted goods,
solitary heath,
purple peak,
reflected hue,
beach of pebbles,
irrigated district,
harsh criticism,
defenceless condition,
military service,
heroic theme,
Yours truly,
too hurriedly,
envious tongues,
stern pursuit.

GEOGRAPHY. (Time, 2 hours.)

Value.

12 1. Your study of geography has shown you that three important influences affecting the climate of a country are: (*a*) Latitude; (*b*) direction of prevailing winds; (*c*) location and direction of highlands. Show how each of these affects the climate of: (*a*) Coast of British Columbia; (*b*) central part of South America.

10 2. What causes account for floods in the lower courses of the Nile and Fraser Rivers? In what ways are these floods: (*a*) Beneficial; (*b*) harmful?

10 3. What three countries make up the island of Great Britain? Name the chief occupations of the people in *one* of these countries, indicating districts or centres where the occupations you have named are carried on.

24 4. There are, on an average, one hundred and eighty persons to the square mile in India and only two to the square mile in Canada.

(*a.*) Give reasons why India is so much more densely peopled than Canada.

(*b.*) In what districts or areas of each of these countries do we find the densest population? Account for this.

(*c.*) In the case of each country, name *three* important exports and *three* important sea-ports.

(*d.*) What would you expect to be a leading *import* into each country? Give reasons for your answer.

(*e.*) Write three or four lines about the form of Government of each country.

28 5. Draw, as large as your paper permits, a map of the Dominion of Canada. Indicate the boundaries of the Provinces of British Columbia, Alberta, Saskatchewan, and Manitoba; mark with a dot or small circle the location of each of the following cities, and neatly print in the name: Edmonton, Brandon, Winnipeg, Regina, Calgary, Vancouver, Revelstoke, Prince Rupert, Victoria; trace the main line of the C.P.R. System from Winnipeg to Vancouver; show, by neatly printing on your map the words OIL, COAL, STOCK-FARMING, LUMBERING, the regions where these products, or industries, are of special importance.

16 6. Make a sketch-map of Australia. Indicate where the Tropic of Capricorn crosses the Continent; neatly print in the names of three adjoining coast waters, the six States of the Commonwealth, the following cities: Melbourne, Sydney, Adelaide, Brisbane, and Hobart; show and name the Great Dividing Range and the Darling-Murray River System.

BRITISH HISTORY. (Time, 1¾ hours.)

Value.

12 1. Write an account of the rise and fall of Cardinal Wolsey.

12 2. (*a.*) Describe some of the methods Charles I. used to raise money while trying to rule without a Parliament.

(*b.*) What finally forced him to call a Parliament?

18 3. (*a.*) When were the Crowns of England and Scotland united? When were the parliaments united?

(*b.*) State the terms upon which the parliaments were united.

(*c.*) Why was the union of the parliaments so long delayed after the union of the Crowns?

14 4. What events, measures, or policies made the following persons famous: (*a*) Walpole; (*b*) Chatham; (*c*) Lord John Russell; (*d*) Lloyd George?

Value.

14 5. Write on any *two* of the following:—

(*a.*) The Petition of Right.

(*b.*) Pride's Purge.

(*c.*) The Test Act.

(*d.*) The Declaration of Rights.

12 6. (*a.*) Mention reforms brought about by Pitt the Younger.

(*b.*) What event interfered with his plans for further reforms?

18 7. Show how British industry was affected by: (*a*) Opening of canals; (*b*) opening of railways; (*c*) invention of the fly-shuttle; (*d*) invention of Arkwright's frame.

CANADIAN HISTORY. (Time, 1¾ hours.)

Value.

15 1. (*a.*) Name, with dates, the different Acts of Parliament under which Canada has been governed since the country became a British possession.

(*b.*) What Parliament passed these Acts?

(*c.*) Under which Act is Canada governed to-day?

15 2. Give an account *either* of the War of the American Revolution in so far as it affected Canada, *or* of Lord Durham's mission to Canada.

15 3. (*a.*) Who were the United Empire Loyalists?

(*b.*) Where in Canada did they principally settle?

18 4. Explain any *three* of the following:—

(*a.*) Reciprocity Treaty.

(*b.*) National Policy.

(*c.*) Municipal Government.

(*d.*) Family Compact.

(*e.*) Fenian Raids.

15 5. (*a.*) Give the causes which led to the war of 1812–14.

(*b.*) In what three regions was Canada attacked in this war?

12 6. Name four Prime Ministers of Canada since 1867 and give an account of the career of *one* of them.

10 7. (*a.*) Who is the Premier of Canada; Governor-General of Canada; Lieutenant-Governor of British Columbia; Premier of British Columbia?

(*b.*) What is meant by a Coalition Government?

ENGLISH LITERATURE. (Time, 2 hours.)

Fourth Reader.

Value.

10 1. Quote any *one* of the following:—

(*a.*) The Charge of the Light Brigade, 3 consecutive stanzas.

(*b.*) "Break, break, break . . . " 4 stanzas.

(*c.*) Twenty-third Psalm.

(*d.*) "When I look upon the tombs of the great . . . " 19 lines.

15 2. Assign to author and selection each of the following quotations, and explain the references contained in the italicized words:—

(*a.*) *He* told them of a *river* whose mighty current gave
Its freshness for a hundred leagues to ocean's briny wave.

(*b.*) O just and faithful *Knight* of God!
Ride on! the *prize* is near.

(*c.*) I gazed and gazed—but little thought
What *wealth* the *show* to me had brought:

(*d.*) Blessed is he who has found his work; let him ask no other blessedness.

16 3. Give in your own words the thought expressed in each of the following passages:—

(*a.*) Now dance the lights on lawn and lea,
The flocks are whiter down the vale,
And milkier every milky sail
On winding stream or distant sea.

(*b.*) Regions Caesar never knew
Thy posterity shall sway
Where his eagles never flew
None invincible as they.

(*c.*) And never earth's philosopher
Traced with his golden pen
On the deathless page truths half so sage
As he wrote down for men.

(*d.*) For if the worst befall me, why better axe and rope
Than life with Lenthall for a King, and Peters for a pope.

9 4. In his poem, "The Red River Voyageur," in what three ways may Whittier be said to compare the journey of life with the journey of the Voyageur on the Red River of the North?

The Lady of the Lake.

13 1. An instant in this porch she staid,
And gaily to the stranger said,
"On heaven and on thy lady call,
And enter the enchanted hall!"

(*a.*) Write a description of the "enchanted hall" on Ellen's Isle.

(*b.*) Narrate what occurred on the instant that the stranger crossed the threshold.

(*c.*) Who was the stranger? Who was his guide?

(*d.*) By whom and in what manner was he entertained?

11 2. (*a.*) What was the Highland Coronach?

(*b.*) Why was the loss of Duncan of Duncraggan likened to "a summer dried fountain when our need was the sorest"?

(*c.*) Describe the part taken in the stirring events that followed by Angus the son of Duncan.

(*d.*) During the battle of Beal an Duine, what heroic deed was performed by "Duncraggan's widowed dame"?

Value.

16 3. Clearly explain each of the following passages, giving in each case the setting in the story:—

(*a.*)
And from the silver beach's side
Still was the prow three fathom wide
When lightly bounded to the land
The messenger of blood and brand.

(*b.*)
Farewell to thee,
Pattern of old fidelity! . . .
. . . . . .
Tell Roderick Dhu, I owed him nought,
Not the poor service of a boat.

(*c.*)
Why is it, at each turn I trace
Some memory of that exiled race?
Can I not mountain-maiden spy
But she must bear the Douglas eye?
Can I not view a Highland brand,
But it must match the Douglas hand?

(*d.*)
Pent in this fortress of the North,
Think'st thou we will not sally forth,
To spoil the spoiler as we may,
And from the robber rend the prey?

10 4. Quote any *one* of the following:—

(*a.*) Fourteen lines beginning, "The western waves of ebbing day."

(*b.*) Twelve lines beginning, "No rude sound shall reach thine ear."

(*c.*) "Hail to the Chief," 2 stanzas.

(*d.*) "Harp of the North, farewell!" 2 stanzas.

DRAWING. (Time, 2¼ hours.)

Value.

21 (*a.*) Select three examples of work from your drawings, as follows:—

1. The best example of freehand design (coloured).
2. The best example of object or model drawing.
3. The best example of printing.

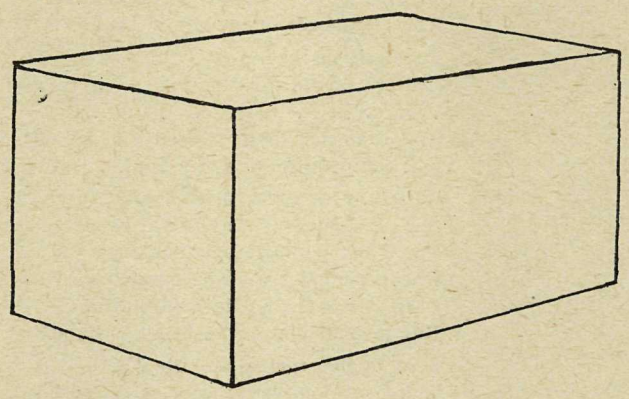
30 (*b.*) Freehand drawing:—

With ruler and set-square draw an oblong 5 inches by 7 inches. In this space draw a design in the form of a scroll and put a suitable border around the oblong.

Value.

25 (*c.*) Freehand object-drawing:—

Make an enlarged drawing of the square prism shown below and then change the drawing so that it shall represent some common object; for example, a book-stand.



24 (*d.*) Geometrical drawing:—

1. Draw a line 4 inches long, and mark off the following distances in the order given: 1 inch; ¾ inch; ½ inch; 1¼ inches. Then draw a line 2½ inches long, and divide it in the same proportion as the first line.
2. Draw a line AB 3½ inches long, and on this line construct a triangle with the angle at A 90 degrees, and the angle at B 60 degrees.
3. Draw a circle having a radius of 2½ inches. Within the circle construct the largest square you can.

(Set-squares not to be used in parts 2 and 3 of question (*d*).)

NATURE LESSONS. (Time, 1½ hours.)

[NOTE.—*Answer the first* three *questions and any* four *of the remaining nine questions.*]

Value.

15 1. (*a.*) What dangers arise from the use of the common drinking-cup, and how can such dangers be overcome?

(*b.*) Mention four of the most common causes of impurities in milk.

(*c.*) What is the one great danger in the drinking of impure water or impure milk, and what measures would you take to make a suspected sample safe for drinking?

15 2. (*a.*) What dangers to health arise from careless sweeping and dusting, and how should this work be done in the home or school-room in order to minimize those dangers?

(*b.*) What is meant by disinfection, and under what circumstances should it be carried out?

(*c.*) Mention some methods used in disinfecting articles.

14 3. (*a.*) What are the three greatest uses of the skin?

(*b.*) "Perspiration fulfils a double purpose." Explain this statement.

(*c.*) What are the values to be derived from regular bathing? Mention some precautions with reference to it.

Value.

14 4. (*a.*) What breed of dairy cattle do you know best? Write a brief description of a cow typical of this breed.

(*b.*) What is the best record you know of for a cow of this breed: (1) In pounds of milk produced in one day, one week, or one year? (2) In pounds of butter produced in one week or in one year?

(*c.*) What would you consider a low percentage and what a high percentage of butter-fat in cows' milk?

14 5. (*a.*) What are the two main classes or types of sheep raised in the Province? Name a breed representative of each of these two types. How would you distinguish one breed from the other?

(*b.*) Name two breeds of swine commonly used for the production of bacon and two that are more suitable for making fat or salt pork.

14 6. (*a.*) Make a drawing not less than 4 inches in length of any bird with which you are familiar; name it and label the parts.

(*b.*) What information would you try to get with reference to a new species of bird which you wished to identify?

14 7. (*a.*) Insects are sometimes divided into two great classes according to the manner in which they take their food. Name the two great classes referred to and give an example of each.

(*b.*) Name a poison or spray mixture commonly used for destroying insects of each of the two classes mentioned, and give reasons why the poison or mixture named by you should be used for the purpose.

14 8. (*a.*) Represent by drawing: (1) The green or vegetative form of the plant known as common horse-tail; (2) the spore-bearing form of it. Show in your drawing the connection that these two forms have in the same plant.

(*b.*) Make a drawing of a spore-bearing fern-leaf and mark the location of some of the spore-cases.

(*c.*) State briefly how a fern-plant is produced.

14 9. (*a.*) Make a drawing of quack or couch grass, showing parts under the ground as well as those above the ground, and explain why this is such a difficult weed to eradicate.

(*b.*) Enumerate the most common methods by which weeds and weed-seeds are scattered through a country.

14 10. Using the scale 1 inch equals 8 feet, draw a plan for a home garden which is to be 40 by 80 feet and which is to include small fruits as well as the usual range of garden crops. Name and show on the plan the location of each variety to be planted.

14 11. Write brief directions on care and management of a garden under the following heads:—

(*a.*) Preparation of the soil for planting.

(*b.*) Precautions to be observed in the planting of garden seeds.

(*c.*) Thinning.

14 12. (*a.*) What gas is given off when small pieces of limestone are placed in a jar containing a weak acid? How would you test this gas to prove your answer correct?

(*b.*) Name the three most important chemical constituents found in all complete fertilizers.

APPENDIX C.

HIGH SCHOOL EXAMINATION, 1921.

Third-class Certificate (Non-professional).

ALGEBRA. (Time, 2 hours.)

Value.

11 1. Factor :—

(*a.*) $108a^3 - 500$.

(*b.*) $x^3 + x^2 + x - y^3 - y^2 - y$.

(*c.*) $a^2 - 4b^2 - 3a - 6b$.

(*d.*) $x(x-2) + y(x-2) - x + 2$.

(*e.*) $x^4 - 7x^2 - 18$.

13 2. Simplify :—

$$\left\{\frac{x + \dfrac{y-x}{1+xy}}{1 - \dfrac{x(y-x)}{1+xy}} - \frac{y - \dfrac{y-x}{1-xy}}{1 - \dfrac{y(y-x)}{1-xy}}\right\} \div \left\{\frac{y}{x} - \frac{x}{y}\right\}.$$

18 3. Solve :—

(*a.*) $(2x-1)^2 - (x-3)(x-2) = 3(x-2)^2 - 4$.

(*b.*) $\frac{x}{2} - \frac{3y}{4} + z + 1 = 3(x-y) + 5z + 4 = x + 6y - 2z - 9 = 0$.

9 4. Find the H.C.F. and L.C.M. of :—

$x^3 + 6x^2 + 11x + 6$, $x^3 + 7x^2 + 14x + 8$, $x^3 + 8x^2 + 19x + 12$.

12 5. (*a.*) Find the cube root of $1 - 6x + 21x^2 - 44x^3 + 63x^4 - 54x^5 + 27x^6$.

(*b.*) Find the square root of $(2x^2 - x - 3)(x^2 - 4x - 5)(2x^2 - 13x + 15)$.

13 6. A man bought 8 cows and 50 sheep for $900. He sold the cows at a gain of 20% and the sheep at a gain of 10%, receiving in all $1,030. Find the cost of a cow.

10 7. When $x = \frac{ac}{a+c}$, find the value of $\frac{x-2a}{x+2c} - \frac{x+2a}{x-2c} + \frac{4ac}{x^2-4c^2}$.

14 8. A's wages are half as much again as B's, but A spends twice as much as B. If A save $5 and B $10 per week, what are the wages of each per week?

ARITHMETIC. (Time, 2 hours.)

[*All work must be shown. It must be neat and accurate.*]

Value.

12 1. A wholesale merchant bought a car-load of berries for $1,380. He was obliged to sell them at a loss of 12½%. One retailer who purchased $375 worth of berries on credit failed in business and paid his creditors 40 cents on the dollar. Find the wholesaler's total loss.

12 2. A grocer buys 6 bags of Rio Coffee, 125 lb. in a bag, at 12 cents a pound, and 9 bags of Java Coffee, 75 lb. in a bag, at 20 cents a pound. If he makes a mixture of the two kinds and sells it at a profit of 90%, how much does he receive per pound?

12 3. Find the duty on 25,000 cigars, invoiced at $62.50 per thousand, weighing on an average 10½ oz. per box of 50 cigars. The tariff rate is $3 per pound and 25% ad valorem.

12 4. A man borrowed $450 on March 10th at 6%, and $1,200 on April 10th at 5%. He paid both principal and interest in each case on December 30th of the same year. How much did he pay?

12 5. A manufacturer's profit on a bicycle was 20%; the wholesaler's profit was 16⅔%, and the retailer's profit was 25%. If the retailer's selling price was $35, what was the cost of the bicycle to the manufacturer?

12 6. A company paid $3,000 for a hall. During the first year they rented it 148 evenings at $15 an evening. Their expenses were: Coal, 7½ tons at $12.50 per ton; lighting, $31.40; repairs, $78.60; insurance, $18.45; taxes, $47.80. What per cent. did they make on their investment?

12 7. An advertising company constructs a billboard 50 feet long and 10 feet high with boards 1 inch thick. The posts are 12 feet long and 4 inches square; they are placed 10 feet apart. There are three rows of scantling to which the boards are nailed, 3 inches wide and 2 inches thick. Find the total cost of the lumber required if the boards cost $35 per thousand feet, the posts $30 per thousand, and the scantling $25 per thousand.

16 8. My money in the Savings Bank was paying me 3½% interest. I drew out $2,002 and invested it in railroad stock at 125, paying the usual brokerage of ⅛%. This stock yielded a semi-annual dividend of 2½%. Was my semi-annual income increased or diminished, and how much?

BOTANY. (Time, 1½ hours.)

[NOTE.—*Answers should be illustrated with diagrams.*]

Value.

35 1. Write an account of leaves under the following headings, giving examples:—

(*a.*) Compare evergreen and deciduous leaves.

(*b.*) The condition of leaves in buds and during the opening of buds.

(*c.*) The arrangement of leaves in relation to light.

(*d.*) Food manufacture as it is carried on by leaves.

(*e.*) Compare the leaves of a plant belonging to the Liliaceæ with those of a plant belonging to Rosaceæ (using a specific example in each case) with respect to venation, shape, etc.

Value.

30 2. Describe the flower of a plant belonging to the Cruciferæ, *or* Labiatæ. What part in the production of fruits and seeds is taken by each whorl of the flower described?

35 3. (*a.*) Name a plant belonging to each of the families: Cruciferæ, Labiatæ, Compositæ. Describe and compare the corollas of the plants named.

(*b.*) Name a plant belonging to each of the families: Ranunculaceæ, Rosaceæ, Liliaceæ. Compare the carpels of the plants named.

CHEMISTRY. (Time, 2 hours.)

[*All questions are of equal value. Answer any* seven.]

1. Show by means of a drawing how you could obtain nitrogen gas from the atmosphere. What are the chemical and physical properties of this gas?

2. Of what elements is water composed? How can you prove your statement?

3. What relationship exists between the temperature of a gas and its volume? What scientific men were concerned in the discovery of this relationship?

4. What volume of hydrogen, measured at 750 mm. Hg. pressure and 24° C., will be formed by the action of sulphuric acid on 2.55 grams of zinc? 1 litre of hydrogen at 760 mm. pressure and 0° C. weighs 0.09 grams. ($Zn = 65.4$; $H = 1.008$.)

5. What do you understand by Gay-Lussac's law of volumes? Illustrate your answer by applying this law to the formation of hydochloric acid from hydrogen and chlorine.

6. What is the difference between a saturated, an unsaturated, and a supersaturated solution? How could you determine the extent to which a salt would dissolve in a given volume of solution?

7. If the formula of copper sulphate is $CuSO_4$, $5H_2O$, what is the per cent. of sulphur and of copper in this substance? ($Cu = 63.6$; $S = 32.06$; $O = 16.00$; $H = 1.008$.)

8. What weight of ferric oxide (Fe_2O_3) can be prepared from 4.84 grams of iron? What weight of zinc nitrate ($Zn(NO_3)_2$) from 5.55 grams of zinc? ($Fe = 55.9$; $O = 16.00$; $H = 1.008$; $Zn = 65.4$; $N = 14.01$.)

COMPOSITION. (Time, 2 hours.)

Value.

60 1. Write any essay on *one* of the following subjects:—

(*a.*) Life in the Village of Auburn.

(*b.*) Byron's Impressions of Rome.

(*c.*) Scott's Love of the Romantic and Picturesque.

(*d.*) Do Moving Pictures Help the High School Student?

30 2. Write a descriptive paragraph of about a page in which you aim to give a *clear* and *pleasing* picture of *one* of the following:—

(*a.*) Sunset on the River Brenta.

(*b.*) The Falls of Terni (Velino).

(*c.*) London From Westminster Bridge.

Value.

10 3. Make necessary corrections in the following sentences and point out the nature of the error in each case:—

(*a.*) He was neither expert in one or the other.

(*b.*) He asked John and I to go with him.

(*c.*) I would deliver your message but have no one who I can send.

(*d.*) Let each esteem others better than themselves.

(*e.*) The landscape was the most gorgeous I ever witnessed.

Third-class Certificate (Non-professional), Full Course.

DRAWING. (Time, 2 hours.)

(a.) Selections from Drawings.

[*The time taken to collect these drawings is not to be deducted from the two hours allowed for this paper.*]

Select the following from your drawing-books, and write your distinguishing number at the top right-hand corner of each. Before beginning your drawing give these to the Examiner.

Value.

6 1. An example of shaded object-drawing.

7 2. An example of painting from nature.

7 3. An example of freehand design.

(b.) Geometrical.

[*All lines used in constructions must be clearly shown.*]

[*Attempt* three only *of the following five questions.*]

10 1. Construct a rhomboid with one side 1½ inches long, short diagonal 1¾ inches long, and one angle 37½ degrees.

10 2. Give the number of degrees in one interior angle (i.e., between two adjacent sides) of the following polygons: Regular pentagon, regular heptagon, regular octagon, regular nonagon, regular decagon.

10 3. A quadrilateral ABCD has the sides AB and AD each 1¾ inches long, BC and DC each 2½ inches long, the diagonal AC 3 inches long. Draw the quadrilateral and inscribe a circle in it.

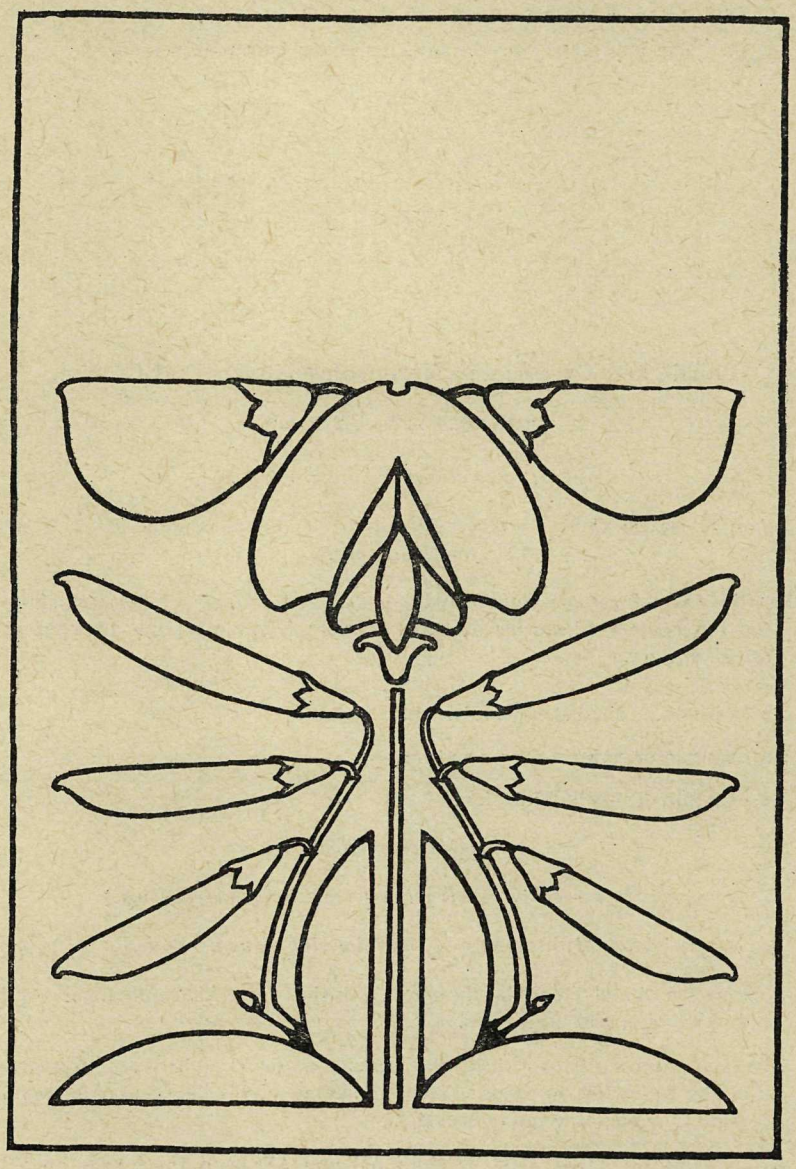
10 4. Construct a rhombus with long diagonal 3 inches long and obtuse angles each 105 degrees.

10 5. Draw any irregular pentagon on a base 1⅞ inches long and construct a similar pentagon having its base 2⅝ inches long.

(c.) Freehand.

Value.

25 Adapt the partly finished book-cover design, given below, to suit a book 8 inches high by 5½ inches wide. Utilize the blank space for the title GARDENS OF ENGLAND. You may use instruments to draw lines to indicate the edges of the cover, as well as to draw guide lines for the title. All other lines must be drawn freehand.



(d.) Object.

25 Draw from memory a group of two or more common objects attractively arranged on a rectangular supporting surface. This drawing should be at least 6 inches wide.

Third-class Certificate (Non-professional).

ENGLISH LITERATURE. (Time, 2 hours.)

Value.

10 1. Quote *any two* of the following:—

(*a.*) Byron's Address to the Ocean (one stanza).

(*b.*) A Sonnet of Wordsworth.

(*c.*) Ozymandias.

(*d.*) The Village Teacher or Preacher (ten lines).

(*e.*) Rosabelle (three stanzas).

30 2. (*a.*)

"The Niobe of nations! there she stands,
Childless and crownless, in her voiceless woe."

(*b.*)

"Thou bringest unto me a tale
Of visionary hours."

(*c.*)

"We look before and after
And pine for what is not."

(*d.*)

"The fiend whose lantern lights the mead
Were better mate than I."

(*e.*)

" . . . it is a curse
To understand, not feel thy lyric flow,
To comprehend, but never love thy verse."

(*f.*)

"Away! away! for I will fly to thee,
Not charioted by Bacchus and his pards,
But on the viewless wings of Poesy,
Though the dull brain perplexes and retards."

(i.) Assign the above quotations to their authors and selections.

(ii.) Explain each passage carefully but briefly.

12 3. Compare the "Ode to a Nightingale" and "To a Skylark," paying special attention to subject-matter and treatment and showing how each poem is characteristic of its author.

14 4. Arnold Bennett has said: "Luxury . . . has nothing whatever to do with happiness." Discuss fully Goldsmith's views on this subject.

14 5.

"For I have been accustomed to entwine
My thoughts with Nature rather in the fields,
Than Art in galleries."

What evidence have you in the "Childe Harold" that this statement is true? Discuss fully.

20 6.

"The beings of the mind are not of clay;
Essentially immortal, they create
And multiply in us a brighter ray
And more beloved existence: that which Fate
Prohibits to dull life, in this our state
Of mortal bondage, by these spirits supplied,
First exiles, then replaces what we hate,
Watering the heart whose early flowers have died,
And with a fresher growth replenishing the void."

(*a.*) Write a careful prose paraphrase of the above stanza.

(*b.*) Write a brief note on the characteristics of Byron illustrated by it.

(*c.*) Give the name of the stanza-form and describe it briefly, scanning lines 8 and 9.

FRENCH (Siepmann, etc., and Fraser & Squair, etc.). (Time, 2 hours.)

Value.

10 1. Rewrite, changing all genders:—

Mon oncle avait donné à son cher neveu un boeuf roux. Ma vieille tante n'en était pas contente, parce qu'elle n'aimait pas ce garçon franc. Elle préférait toujours son autre neveu qui était moins impulsif.

10 2. (*a.*) Construct sentences with the following, expressing the comparison indicated and replacing italicized words by possessive pronouns:—

(1.) *Le cadeau de Charles* est—bon—*mon cadeau* (superiority).

(2.) Ces filles sont—belle—Marie (equality).

(3.) Mon chien n'est pas—grand—*votre cheval* (equality).

(4.) Votre lettre était—amusant—*la lettre de ma mère* (inferiority).

(*b.*) Give the superlative of:—

(1.) Celle-ci est (joli) de toutes les fleurs.

(2.) Voici les livres (intéressant).

10 3. Mon ami lui parle.

Rewrite the above sentence, inserting in turn each of the following expressions:—

(demain-pendant que l'homme travaillait—il écoutera quand—je serais content si—quelquefois—s'il avait été possible—dès qu'il eut reçu la lettre—tout à coup—si cela était vrai—envoyez-moi une lettre aussitôt que—)

5 4. (*a.*) Supply suitable relative pronouns:—

(1.) Voici le garçon—j'ai prêté mon livre.

(2.) Rendez-moi le livre—je vous ai prêté.

(3.) C'est votre frère—me l'a prêté.

(4.) C'est la maison—vous me parliez.

10 (*b.*) Rewrite (substituting personal pronouns for italicized words, and changing the second verb in each instance to the past indefinite tense):—

(1.) C'est *sa soeur* qu'il cherche.

(2.) Parlez *à ses amis.* Il les écoute toujours.

(3.) Accompagnez *votre frère.* Nous le cherchons longtemps.

(4.) Voilà *vos cousins.* Quelles belles fleurs ils apportent!

(5.) Je suis bien content. J'ai reçu *quelques lettres.*

8 5. Repeat the following passage, putting the verbs in the past indefinite (perfect), past definite (preterite), or imperfect, according to the meaning:—

"Georges, (demander) sa mère. Où (être)-tu ce matin? (Acheter)-tu ce joli petit chat?"

Voici l'histoire de son aventure.

Louis et lui (se promener) au bord du ruisseau quand ils (rencontrer) cinq ou six cruels enfants avec un pauvre chat qu'ils (tourmenter). Georges en (être) si fâché qu'il (sortir) tout son argent pour acheter la pauvre bête.

7 6. Put into French:—

(1.) What time is it? (2.) It is half-past twelve. (3.) To-day is the 25th of June. (4.) He gave me half of it. (5.) He set out on Thursday. (6.) How many francs have you? (7.) I have only a hundred.

20 7. Put into French:—

(1.) Finally he returned to France. (2.) She is too young to go to school. (3.) He paid three francs for them. (4.) In spring the birds begin to sing. (5.) Our house was a few yards from the school. (6.) Whose is this hat? It is mine. (7.) The tailor would take your measure. (8.) The tallest in the class are not so tall as they. (9.) Are the children having a good time? (10.) How beautiful those flowers are!

Value.

20 8. Put into English:—

(*a.*) Les événements que nous avons rapportés dessinèrent nettement la position de nos personnages. Craignant de perdre à la fois un chat bien-aimé et les avantages qu'elle ambitionnait, la mère Michel redoubla de vigilance et d'attention. Moumouth, sachant désormais à qui il avait affaire, se promit d'éviter le maître d'hôtel, ou de le combattre, au besoin, des griffes et des dents. Quant au père Lustucru, il suffisait que ses projets eussent été déjoués pour qu'il y persistât avec acharnement; il voulait maintenant la perte du pauvre et innocent Moumouth, non plus seulement par jalousie envers la mère Michel, mais par inimitié contre le chat lui-même.

(*b.*) La mère Michel se tut; mais son parti était pris, et, dès qu'elle eut un moment de liberté, elle courut chez la nécromancienne. Celle-ci montra d'abord quelque embarras à l'aspect de la mère Michel; cependant, après avoir fermé une porte vitrée qui communiquait à d'autres pièces, elle revint saluer sa nouvelle cliente, et dit d'un ton solennel:

"Que désirez-vous?"

"Interroger le présent, le passé et l'avenir."

"Je suis à même de vous satisfaire," repartit madame Bradamor.

GEOMETRY. (Time, 2½ hours).

[*N.B.—Draw neat diagrams, use printed capitals, and give authorities.*]

Value.

14 1. (*a.*) State four cases in which two triangles are equal in all respects.
(*b.*) Prove any *one* of these cases in full.

14 2. In a triangle the perimeter is greater than the sum of the medians.

14 3. If there are three or more parallel straight lines, and the intercepts made by them on any transversal are equal, then the corresponding intercepts on any other transversal are also equal.

14 4. P is a given point within the angle AOB. Draw through P a straight line terminated by OA and OB and bisected at P.

14 5. Parallelograms on the same base and between the same parallels are equal in area.

14 6. To find a point equidistant from three given points, A, B, C, which are not in the same straight line.

16 7. Construct a triangle having given the perimeter and the angles at the base. State your construction and give a theoretical proof.

GERMAN. (Time, 2 hours.)

Value.

12 1. Supply correct endings to the adjectives in the following sentences :—

Der lieblich — Garten gehörte ein — alt — Manne, der unser — Hause gegenüber wohnte. Manch — gut — Apfel hat er mir und mein — Vettern geschenkt. Viele bunt-Blumen brachte er unser — Mutter. Etwas Gut — hatte er immer für jen — klein — Mädchen das ihn so sehr liebte. Das waren schön — Zeiten.

10 2. (*a.*) Supply the correct article or possessive adjective :—

(1.) Ich wohne bei — Tante. (2.) Er stellte sich hinter — Tür. (3.) Sie kauft das Buch für — Vetter. (4.) Wir fahren morgen nach — Stadt. (5.) Georg stand hinter — Bruder.

(*b.*) Rewrite the above sentences, substituting phrases with pronouns for those with nouns.

10 3. Connect the following sentences by means of relative pronoun forms :—

(1.) Das war mein Bruder. Sie haben ihn gestern getroffen. (2.) Kommen Sie in den Garten. Ich habe schöne Blumen darin. (3.) Er hat schlechte Augen. Es ist schade. (4.) Kannst du es mir nicht sagen ? Ich bin dein Freund. (5.) Haben Sie den Mann vergessen ? Wir haben sein Haus gestern gesehen.

5 4. (*a.*) Supply correct forms of demonstrative or interrogative pronouns :—

(1.) Weshald hast du — geholfen, der immer dein Feind gewesen ist ? (2.) Er hat von Goethe und Bismarck gesprochen ; — war Dichter, — Feldherr. (3.) — sind diese Manner ? (4.) — Hund is das ? (5.) Erinnern Sie sich — nicht ?

10 (*b.*) Put into German :—

(1.) What weather ! What a storm ! (2.) Which one is your brother ? (3.) That sort of thing often happens. (4.) This is my book, not my wife's. (5.) I don't like men of that kind.

12 5. Change the verbs in the following sentences to *present* and *perfect* indicative :—

(1.) Der Junge lief nach Hause. (2.) Paul wurde müde. (3.) Sie ließ das Buch binden. (4.) Was fraß das arme Tier ? (5.) Karl saß vor der Tür ? (6.) Was geschah gestern ?

4 6. (*a.*) Put into English :—

(1.) Das läßt sich leicht machen. (2.) Das Eis will brechen. (3.) Was soll das ? (4.) Wie dem auch sein mag.

8 (*b.*) Put into German :—

(1.) I should like to have seen that. (2.) They are said to be very rich. (3.) You should have helped your brother. (4.) He claims to have been here at that time.

9 7. Put into German :—

(1.) Somebody is knocking. (2.) I give the best that I have. (3.) Come at six o'clock on the first of July. (4.) This boy reads best. (5.) He cut his finger. (6.) Let us set out. (7.) How are you today ? (8.) Is that you, Ernest ? (9.) What has become of them ?

20 8. Put into English :—

(*a.*) Heute Abend waren die zwei ältesten Kinder etwas ausgelassen ; das eine hüpfte auf einem Beine in seinem langen weißen Nachthemdchen, das andere stand auf einem Stuhl, umgeben von den Kleidern aller andern Kinder, es sagte, es wären lebende Bilder. Das dritte und das vierte legten die Wäsche fein

Value.

ordentlich in das Kästchen, und das muß auch gemacht werden; die Mutter aber saß an dem Bette des kleinsten und bedeutete allen, daß sie schweigen sollten, denn die kleine Schwester würde das Vater-unser beten.

(*b.*) Es war mehr als vierzehn Tage her, daß der Mond nicht geschienen hatte, jetzt stand er rund und hell da über den langsam ziehenden Wolken. Höre, was der Mond mir erzählte: „Von einer Stadt in Fezzan aus folgte ich einer Karawane; vor der Sandwüste auf einer der Salzebenen, die wie eine Eisfläche glänzte und nur stellenweise mit leichtem Flugsande bedeckt war, wurde halt gemacht.

(*c.*) Dabei machte er sich nun seine Gedanken. Ach! wenn er doch auch das Spinnrad drehen dürfte. Der Vater und die Mutter schliefen, er sah sie an, sah das Spinnrad an und kurz darauf guckte ein kleiner nackter Fuß zum Bette heraus, nnd dann noch einer, und dann zwei Beinchen. Da stand er. Er schaute sich nochmals um, ob Vater und Mutter auch noch schliefen; ja, sie schliefen; und nun schlich er leise, ganz leise, in seinem kleinem kurzen Hemde zu dem Spinnrade hin nnd fing an zu spinnen.

LATIN. (Time, 2 hours.)

Value.

5 1. Decline in the singular: *spes, pedes, vulnus, fructus, illé* (neuter).

5 2. Decline in full: *qui* (all genders) and *fortior.*

10 3. Compare: *inferus, altus, multus, prudens, nobilis, bene, magnopere, facilis, aeger, malus.*

8 4. What is a Deponent verb? In what tenses does it retain an active formation? Exemplify your answer.

12 5. Give the ordinal numerals from one to ten inclusive, and the cardinals for 20, 30, 40, 50, 60, 70, 80, 90, and 777.

10 6. Conjugate in full:—

(*a.*) Present indicative passive of *rego.*

(*b.*) Present indicative of *patior.*

(*c.*) Present subjunctive of *volo.*

(*d.*) Future indicative of *possum.*

(*e.*) Imperfect subjunctive of *nolo.*

10 7. Give the Latin for:—

I establish friendship; he pitched a camp; to Rome; on the next day; a revolution; provisions; the seventh legion; in the middle of the river; he promised to go there; in the rear.

16 8. Translate into Latin:—

(*a.*) When the signal was given, Caesar joined battle.

(*b.*) Caesar ordered Ariovistus not to bring any infantry to the conference.

(*c.*) After delaying there a few days to secure supplies, he discovered that his soldiers were unwilling to advance.

(*d.*) So great was the valor of the soldiers that the enemy turned and fled.

9. Translate into English:—

Value.

8 (*a.*) Helvētiī proximī sunt Germānīs, quī trāns Rhēnum incolunt; reliquōs Gallōs virtūte *praecēdunt*, quod ferē cotīdiānīs proeliīs cum Germānīs contendunt. Sed undique locī nātūrā continentur: ūnā ex parte est flūmen Rhēnus altissimus et lātissimus; alterā ex parte mōns Jūra altissimus; tertiā ex parte flūmen Rhodanus nostram prōvinciam ab Helvētiīs *dīvidit*. Hīs dē causīs Helvētiī nōn lātē vagārī poterant, nec facile fīnitimīs bellum *īnferre*.

Give the principal parts of the verbs printed in italics.

8 (*b.*) Ubi eum castrīs sē tenēre Caesar intellexit, nē diūtius commeātū *prohibērētur*, ultrā eum locum ubi Germānī cōnsēderant, circiter passūs sescentōs ab iīs, castrīs idōneum locum dēlēgit, aciēque triplicī *īnstrūctā* ad eum locum vēnit. Prīmam et secundam aciem in armīs *esse*, tertiam castra mūnīre jussit.

Give the construction of the verbs printed in italics.

8 (*c.*) Ulixēs simul ac vōcem audīvit adulēscentem esse deum Mercurium sēnsit; nūllō tamen modō ab cōnsiliō dēterrērī potuit. Quod cum Mercurius sēnsisset, herbam quandam eī dedit, quam contrā carmina plūrimum valēre dīcēbat. "Hanc cape," inquit, "et ubi Circē tē baculō tetigerit, dēstrīctō gladiō, impetum in eam fac."

Express *gladio destricto* by some other Latin construction.

PHYSICS. (Time, 2 hours.)

Value.

4 1. (*a.*) Define Physics.

10 (*b.*) If the mass of one cu. cm. of air is 0.001293 gm., find the number of kg. of air in a hall 30 metres long, 15 metres wide, and 6 metres high.

6 (*c.*) Name and briefly explain the fundamental units of mass, length, and time in both the Metric and British systems.

6 2. (*a.*) What is the difference in the manner of transmission of pressure by fluids and by solids? State the law regarding pressure by fluids.

4 (*b.*) To what is pressure in fluids due? Upon what does the amount of pressure depend?

10 (*c.*) What is the pressure on the base of a vessel 15 cm. square if filled with benzine to a depth of 12 cm.? (Specific gravity of benzine 0.9.)

10 3. (*a.*) Explain clearly the three modes of heat transference and mention six applications of these principles in our daily life.

10 (*b.*) How would you proceed to make and graduate a Centigrade thermometer? Why is mercury a good liquid for thermometers?

10 4. (*a.*) Describe an experiment to show that a medium is required to transmit sound-waves. Name five substances that will transmit sound-waves.

10 (*b.*) How many metres distant is an aeroplane if the report of a gun fired from it is heard four seconds after the flash is seen? (Average temperature 15° Centigrade.)

5 5. (*a.*) Define Buoyancy. What is the cause of buoyancy in fluids?

5 (*b.*) Why will an iron ship float while a piece of iron of which it is made will sink?

10 (*c.*) A block of pine has a mass of 24 gm. and a volume of 40 cu. cm. What fraction of the block would be immersed if floating in water? What volume of the block if floating in an acid having a relative density of 1.5 gm. per cu. cm.?

PHYSIOLOGY. (Time, 1½ hours.)

[NOTE.—*Answers should be illustrated with diagrams.*]

Value.

35 1. (*a.*) Trace, briefly, the circulation of the blood.

(*b.*) What part is taken by the blood in the work of nutrition, respiration, and excretion? Why does life cease almost immediately after the heart stops beating?

30 2. (*a.*) Describe the structure of the skin.

(*b.*) Of what importance is the skin in the economy of the body; that is, what work does it perform?

(*c.*) Name three diseases of the skin; give causes, symptoms, and control or cure.

35 3. (*a.*) Briefly describe the nervous system under the headings: Brain, spinal cord, nerves, sympathetic ganglia, and sense-organs.

(*b.*) Describe one of the sense-organs in detail and show how it is related to the central nervous system.

Third-year Course, Commercial.

ARITHMETIC. (Time, 2 hours.)

B. General.

[NOTE.—*The time allowance for Arithmetic, Third-year Course, Commercial, is 2½ hours; after the expiration of 30 minutes, answers to Section A (Rapid Calculation) will be collected, and Section B (General) will then be distributed to candidates.*]

[*All questions of equal value.*]

1. Arrange the following fractions in ascending order of magnitude:—

$$\frac{5}{8}, \frac{105}{163}, \frac{151}{230}, \frac{2211}{3535}.$$

Show your work or explain your method.

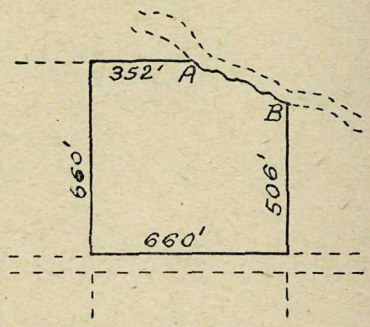
2. The travelling salesman for a Vancouver Wholesale Grocery Company is paid according to the following agreement: $200 per month, and 5% of his sales for the month over $8,000. His monthly sales for the year 1920 were:—

January	$9,600 00
February	8,980 00
March	9,210 00
April	9,210 00
May	8,500 00
June	8,110 00
July	7,540 00
August	6,870 00
September	8,620 00
October	10,750 00
November	9,857 00
December	8,993 00

What is his total salary for the year?

3. As accountant for the Burrard Milling Company you find on hand November 30th, 1920—at the end of your fiscal year—two notes, one from J. H. Black for $730, dated July 3rd, 1920, at 8 months; the other from Murray and Wilson for $475, dated September 17th, 1920, at 6 months and bearing interest at 7%. If the security is satisfactory, what valuation should you place on these notes when preparing a statement of assets?

4. About how many acres are there in this piece of land? What is, approximately, the distance from A to B?



5. The books of the Bruce and Howard Hardware Company show the following:—

Value of stock on hand January 1st, 1920 (valuation taken at cost)		$12,800 00
Purchases for 1920	$27,500 00	
Less returns	690 00	
		26,810 00
Sales for the year 1920	$43,250 00	
Less returns	730 00	
		42,520 00
Value of stock on hand December 31st, 1920 (valuation taken at cost)		15,375 00

Determine:—

(*a.*) The cost of the goods sold.

(*b.*) The gross profit of the business for the year.

(*c.*) The percentage gain on "turnover."

What other considerations have to be taken into account in determining the net profit?

6. A gasoline drum (cylindrical) is 32 in. long and 22 in. in diameter, inside measurements. How many gallons of gasoline will it hold? If the drum itself weighs 76 pounds, and the specific gravity of the gasoline is .74, what will be the total weight of the drum and gasoline?

7. A mortgage for $2,500, bearing interest at 7% per annum payable yearly, has three years to run. How much should a purchaser pay for this in order to make 8% per annum on his investment?

8. The "Gross Takings" (or income from sales) of the Columbia Sheet Metal Works have to be divided as follows:—

	Totals.	Division of the Sales Dollar.
Cost of Raw Material	$29,560 00	
Cost of Manufacturing	19,492 00	
Cost of Administration	16,250 00	
Net Profit	10,795 00	
Gross Takings		$1 00

In order to show more clearly what becomes of the "Takings," express in tabular form the number of cents out of each dollar of "Takings" that have to be allotted to each of the four items named.

ARITHMETIC. (Time, 30 minutes.)

A. Rapid Calculation.

[NOTE.—*The time allowance for Arithmetic, Third-year Course, Commercial, is 2½ hours; after the expiration of 30 minutes, answers to Section A (Rapid Calculation) will be collected, and Section B (General) will then be distributed to candidates. Candidates will complete their work on this sheet and hand it in; no other work is necessary.*]

[*All questions of equal value.*]

1. Add:—

48673
29848
96276
37589
64876
43734
97849
86897
42678
37894
69675
42845
73769
89497
78946
73894
24896
62646
73249
49684

2. Fill in the second column (to *five* places):—

DECIMAL EQUIVALENTS OF PARTS OF AN INCH.

Parts of an Inch.	Decimal Equivalents.
$\frac{1}{32}$	
$\frac{1}{16}$	
$\frac{3}{32}$	
$\frac{1}{8}$	
$\frac{5}{32}$	
$\frac{3}{16}$	
$\frac{7}{32}$	
$\frac{1}{4}$	

3. Extend and total the following bill:—

8	Kitchen Tables, No. 176.....	$ 2.85			
12	Sewing Tables, No. 892.....	6.75			
6	Turkish Rockers, No. 457.....	23.25			
4	Dining Tables, No. 551.....	24.75			
24	Dining Chairs, No. 412.....	6.35			
9	Oak Rockers, No. 435.....	16.25			
6	Oak Desks, No. 746.....	23.75			
5	Library Tables, No. 132.....	21.25			

4. The following table shows the legal weights per bushel :—

Wheat ..... 60 lb. per bushel. Oats ..... 34 lb. per bushel.
Barley ..... 48 „ „ „

Find the cost of :—

63,500 lb. Wheat @ $1.60 per bush.....

78,400 lb. Barley @ .80 „ „ .....

31,500 lb. Oats @ .44 „ „ .....

5. Total the following invoice, and find the cost, in Canadian currency, of a draft purchased at 4.85 to pay it :—

£	s.	d.
42	11	6
127	3	8
58	2	9
11	15	10

Cost of draft, $.....

6. Correct the errors in the following :—

BRITISH COLUMBIA DRY GOODS COMPANY.

Profit and Loss Statement for 1920.

	Dry-goods Department.	Shoe Department.	Men's Wear Department.	Totals.
Sales	$165,780	$96,370	$142,960	$405,110
Goods returned	630	250	610	1,490
NET SALES	165,150	96,120	142,350	403,620
Cost of Goods	100,740	70,015	96,370	268,125
GROSS PROFIT	64,410	25,105	45,980	135,495
Overhead Charges	16,480	7,216	10,860	34,556
NET PROFIT	47,930	17,889	35,120	100,939

ACCOUNTANCY PRACTICE. (Time, 3 hours.)

[NOTE TO PRESIDING EXAMINER.—*Please provide candidates with journal and ledger paper.*]

Value.

20 1. As accountant for the Western Trading Co. show how you would record the following transactions in a Cash Book containing special columns for Cash, Bank, Discounts, Cash Sales, Expense, and any others you please:—

(i.) Balances—Cash, $25. On deposit, $1,250.

(ii.) Traveller's memo:—Collected the following: Cheque from J. Brown for invoice No. 131, $300 less 3%. Postal orders from F. White for $115. Cash from L. Green, $25. From W. Weir, cheque to pay account of $145 with 2% deducted. From J. Thomas, cash in full of account of $175 with $3 allowed off. Traveller deducted $47.50 from cash received as his expenses and handed you the balance. The $3 allowed J. Thomas was an error and you deducted it from traveller's salary of $75 and gave him cheque for balance. You deposited all cash, exchange on cheques, ¼ of 1%.

(iii.) Cash sales, $124.65. Paid Small & Co.'s account of $400 less 3% by cheque.

(iv.) Discounted W. May's note for $120, discount $1.45, proceeds deposited.

(v.) Prepaid firm's note of $300, discount $2.50, by cheque.

Balance and close the Cash Book.

20 2. Ames and Bragg are partners. Ames invested $20,000 and withdrew $2,500. Bragg invested $10,000 and withdrew $1,200 during the year; Ames and Bragg to receive $1,500 and $1,000 salaries respectively, and each to receive 6% interest on his net investment; Losses or gains to be divided ⅔ to Ames and ⅓ to Bragg. Their books, recorded by single entry, exhibit the following results at the end of one year:—

Cash on hand, $110; On deposit, $990; Stock on hand, $25,410; Notes on hand, $2,100; Notes outstanding, $5,400; New Building, $20,000; Mortgage on same, $7,000; Debtors, $10,389; Creditors, $15,000.

Show the partners' Accounts properly closed at the end of the year.

15 3. Ames and Bragg are joined by Cowan, Duncan, and Elliott, and organize a Joint Stock Company capitalized at $40,000 to carry on the above business, Ames and Bragg together to receive $32,900 fully paid stock for their interest in the business, any fractional amount due to either of them to be paid in cash. Cowan subscribes 15 shares; Duncan, 25 shares; and Elliott, 20 shares, respectively, and pay 50% in cash.

Give the necessary Journal entries to open the books of the Company.

20 4. Give the Journal entries for the following transactions:—

(*a.*) A. L. Benson has made an assignment in favour of his creditors, who receive 65c. on the dollar. We receive a cheque for $650 in settlement of our claim.

(*b.*) At the close of the financial year a firm has book debts to the value of $8,650. Provide a sum equal to 6% of this amount for possible bad debts.

(*c.*) R. L. Smith owns a business in which his net capital is $4,000. R. Bennett buys a half-interest by investing $800 in the business and paying Smith personally $2,500.

(*d.*) A Company ends its financial year with a net profit of $8,464. The directors declare a Cash Dividend of 8% and a Stock Dividend of 5% on a paid-up Capital of $40,000. The balance of Profits are placed in a Reserve Account. The required cheques and stock certificates are issued.

Value.

25 5. From the following data prepare:—

(*a.*) Trial Balance.

(*b.*) Trading Account.

(*c.*) Profit and Loss Account.

(*d.*) Statement of Assets and Liabilities.

(*e.*) Statement of Distribution of Profits.

Goods on hand Jan. 1, 1920, $12,000; Purchases, $70,000; Sales, $86,000; Expenses, $2,500; Wages, $6,100; Cash on hand, $45; Cash in bank, $3,905; Salaries, $1,250; Rent, $900; Commission paid, $75; Sales rebates, $750; Sales discounts, $400; Purchase credit notes, $400; Purchase discounts, $560; Machinery, $11,000; Book debts, $8,000; Creditors, $7,000; Notes on hand, $2,000; Notes outstanding, $850; Interest on deposits, $100; Office furniture, $600; Repairs, $50; Freight, $200; Duty, $150; Advertising, $1,200; Discounts allowed, $200; Profit and Loss account credit, $1,415; Capital Stock, $25,000.

Inventories.

Stock on hand, $18,500; Advertising prepaid, $60; Wages unpaid, $300; Rent unpaid, $200; Depreciation on machinery 10%, on Office furniture 10%. Provide 8% of Accounts receivable for bad debt reserve.

The Directors instruct you to pay a cash dividend of 8% from Undivided profits account.

ACCOUNTANCY THEORY. (Time, 2 hours.)

Value.

10 1. State briefly the difference between Single and Double Entry systems of Bookkeeping. Which do you prefer? Give your reasons.

15 2. A. Johnston's account on your books shows a debit balance of $1,095. You draw on him at 90 days' sight. The draft is accepted June 1, 1921. On June 16th you discount the draft at the Bank at 8% and deposit the proceeds.

Give the necessary Journal entries to record these transactions.

10 3. How would you deal with items accrued and unpaid (such as rent, commission, wages) when closing the accounts of a business?

10 4. Give the ruling for a Stock or Share Ledger for a Limited Company. Show entries recording stock subscribed, calls paid, and stock transferred.

10 5. Explain the method by which the net result of a double entry Profit and Loss Account may be proved by the use of the Asset and Liability Statement.

6. Give Journal entries to show how you would record:—

5 (*a.*) The receipt of a consignment of apples on which you have paid freight charges by cheque.

5 (*b.*) The sale of the consignment, for which you have received in payment a sight draft, your own note taken at a discount, and an order on Henry Jones for the balance.

10 (*c.*) The closing of the consignment and the rendering of the account sales, charging commission and storage; and remitting the sight draft received above, the order on Henry Jones, and your cheque for balance.

Value.

15 7. Give the main reasons for the use of: (i) A Special Column Cash Book; (ii) A Synoptic Cash Journal; (iii) Self-balancing Ledgers; (iv) Triplicate Sales Invoice; (v) Bank Reconciliation Statement.

4 8. (*a.*) Rule a Purchase Book suitable for a business having three departments.

6 (*b.*) Name the books you would require for a limited company conducting a trading as well as a shipping and commission business.

BUSINESS CORRESPONDENCE. (Time, 2 hours.)

[NOTE TO PRESIDING EXAMINER.—*Please provide candidates with plain white letter paper.*]

[*Candidates may use either pen and ink or typewriter for any portion of their work.*]

Value.

17 1. Write a letter to a delinquent customer enclosing statement of account for $250. Review the facts, and ask for prompt attention and payment. Be courteous but firm.

15 2. 707 Granville St., Vancouver, B.C., March 18th, 1921. Edward J. Wells, Esq., 996 Broadway West, Vancouver, B.C. Dear Sir:—The insurance on your two-story frame dwelling, situated at 1002 Twelfth Ave., for $1,200, with the Aetna Fire and Marine Insurance Company, expires on March 28th.

Please send us your instructions in regard to the renewal of this policy.

We do not wish to leave our clients unprotected, but we cannot renew insurance unless we are directed to do so. Fuller, Denver and Company. J. R. Chelsea, Manager, Insurance Department.

Write a reply to this letter.

17 3. (*a.*) A lumber dealer in Calgary ordered from the Great West Lumber Company, Vancouver, a carload of No. 1, 4-in. fir flooring. In due time he received the shipment and the invoice therefor, but on examination found the flooring to be knotty and sappy.

Write a letter of complaint, making, however, some suggestions and a proposition as to a settlement of this difficulty.

17 (*b.*) Write the Great West Lumber Company's reply.

17 4. Name a line of business and state an oft-occurring event in connection therewith that would justify the use of a "form paragraph" in the correspondence. Write out a good form paragraph to be used under the circumstances.

17 5. "It is seldom that one finds a business in which some use is not made of a booklet, catalogue, or folder, and often the preparation of such material is left to the correspondent."

Describe the various considerations that enter into the issuing of a booklet or catalogue, and explain in logical order the different steps in its preparation.

Or

What is a circular letter?

Why are circular letters freely used?

State the general uses of such letters.

Describe the various points to be observed in the preparation of a circular letter.

Write a circular letter for *one* of the following purposes:—

(*a.*) Calling a meeting of the grocers of your town to discuss the question of uniform hours of opening and closing and a weekly half-holiday for employees.

(*b.*) Announcing to out-of-town customers a special sale of gloves.

(*c.*) On behalf of the law firm of Baker and Jackson, who make a specialty of collections, soliciting accounts for collection.

ECONOMICS AND CIVICS. (Time, 2 hours.)

Value.

6 1. (*a.*) Briefly outline the events as they occurred in the development of the industrial organization of England, which is known as the "Industrial Revolution."

4 (*b.*) Mention some new economic factors which appeared as a result of these changes.

2. Discuss the economic relations between Price and Value under:—

6 (i.) Considerations which determine Value.

6 (ii.) Considerations which determine Price.

3 3. (*a.*) Explain clearly what is meant by "Production."

8 (*b.*) Name the various factors which co-operate in the process of production and tell what each contributes in making the finished product.

5 (*c.*) What do you mean by the "Expenses of Production"?

3 4. (*a.*) What do Economists mean by the term "Distribution"?

6 (*b.*) Upon what principle do they advocate that distribution should be based? Explain.

5 (*c.*) How far is this principle adhered to under present economic conditions?

8 5. (*a.*) Applying your knowledge of the principles of Economics, explain as fully as you can:—

(i.) The causes of present unemployment.

(ii.) The reasons for the high rate of exchange between Canada and the United States.

10 (*b.*) Write brief explanatory notes on the following: Marginal Utility and Disutility; the Law of Diminishing Returns; Competitive Profits; Real Income; the Origin of Labour Unions.

7 6. (*a.*) Give your reasons why the Federal System of government is most suitable for Canada.

10 (*b.*) Outline the various subjects which are under the control of:—

(i.) The Federal Government.

(ii) The Provincial Government.

(iii) The Municipal Government.

5 7. (*a.*) Describe fully how the machinery of government is carried on by means of the Party Government System.

5 (*b.*) Explain fully how the revenue of the country is obtained by (i) Direct Taxation, (ii) Indirect Taxation.

3 (*c.*) What is meant by a "Protective Tariff"?

LAWS OF BUSINESS. (Time, 2 hours.)

Value.

4 1. (*a.*) Define a Contract. Give the main points requisite to a valid Contract.

(*b.*) Give your opinion on the legal points of the following transactions with reasons for your answers, quoting the Statutes where possible:—

4 (i.) A offers B a horse for $200 and agrees to give him until next evening to consider. In the meantime A sells the horse to C. B sues for breach of Contract. Will he succeed?

4 (ii.) X buys an automobile from Y for $1,300 on the understanding that he pays $100 a month. After making the first payment X returns the automobile. Can Y force him to pay?

4 (iii.) A goes with B to a bank and says, "Advance B $1,000 as a loan, and if he does not pay it I will." If B fails to pay can the bank collect from A?

4 2. (*a.*) In what respects does a Chartered Bank differ from: (i) A Private Bank; (ii) A Trust and Loan Company?

3 (*b.*) Explain how the Bank Act guards against loss to the public through banks becoming insolvent.

4 (*c.*) Compare the security given depositors with that given note holders.

4 3. (*a.*) What is meant by the Statute of Limitations? Why was it enacted?

4 (*b.*) How may a Statute-barred debt be revived? How would you use this knowledge to prevent an item in a book account being outlawed?

2 (*c.*) What debts are not affected by this Statute?

4 4. (*a.*) Define Partnership. State the two prime tests of Partnership.

8 (*b.*) Describe fully the four kinds of Partners under: (i) Name; (ii) Investment; (iii) Liability; (iv) Place in firm; (v) Share in results.

4 (*c.*) Smith, a special partner, while on a pleasure trip, takes advantage of an opportunity and buys the stock of a bankrupt firm. What effect will this have on his legal standing as a partner?

4 5. (*a.*) Henderson buys from you some household furniture for $650 and offers you a note at six months or a Chattel Mortgage. Which would you accept? Give reasons for your answer.

4 (*b.*) What steps would you take to maintain your security under a Chattel Mortgage: (i) If the Mortgagor removes the property to another district; (ii) If the Mortgagor fails to pay at maturity?

4 (*c.*) In a Mortgage on real estate explain what is meant by: (i) Foreclosure; (ii) Personal Covenant.

5 6. Adams sells Brown a typewriter for $200, which amount is to be paid in ten equal monthly payments, the first payment to be made on July 1st. Adams instructs you, as his book-keeper, to write a promissory note to meet these conditions and giving him the right to resume possession of the machine in case Brown fails to meet his payments. Write the note.

4 7. (*a.*) State the advantages that a business, which has been carried on as a Partnership, gains by incorporating as a Joint Stock Company.

8 (*b.*) Compare the Liability of: (i) A General Partner; (ii) A Special Partner; (iii) A Shareholder in a Bank; (iv) A Shareholder in any other Joint Stock Company.

Value.

5 (*c.*) Explain what is meant by: (i) Authorized Stock; (ii) Subscribed Stock; (iii) Watered Stock; (iv) Preferred Stock; (v) Stock Dividend.

5 8. (*a.*) You have completed arrangements for the purchase of a house and lot in Vancouver. State in detail what steps you would take to satisfy yourself that the vendor can give you a clear title.

3 (*b.*) Explain what is meant by: (i) An Indefeasible Deed; (ii) A Quit Claim Deed; (iii) A Tax Sale Deed.

5 (*c.*) State fully the advantages of the Torrens System of Land Transfer.

PENMANSHIP. (Time, 1 hour.)

1. Make one copy:—

"Although we interviewed many applicants, few of them seemed to possess anything but a superficial knowledge of business letter writing. Even applicants who had had considerable experience in correspondence work seemed to think that the only requirement was to dictate grammatically, to master routine quickly, and to learn the various prices, terms, adjustments, and other facts and information requested by customers. They didn't seem to comprehend the finer points of business-building letters.

"If we had been able to find a dozen top-notch correspondents with an appreciation of the true possibilities of business letters, they could practically have named their own salaries.

"Competent correspondents seemed so scarce that we finally decided to establish a systematic course of training for all new correspondents, in order to give them a clearer understanding of the broad principles of letter writing, and to teach them not to use unnecessary words, stilted expressions and rambling phrases, but to give their letters personality and a touch of human interest which would drive them straight to the mark, creating friendly feeling and good will wherever they were read.

"We had to show these people that their job was not simply to 'handle correspondence' and to clean up their desks at the end of the day, but that their task was to develop new markets, to bring back old customers who had drifted away, to collect money from accounts long past due, to keep up the fighting spirit of our salesmen on the road, and to turn complaints into orders.

"So we organized a class ——"

(System.)

2. Write one line of each of the following: (8.), %, +, @, ;, #, c, —, $, *, ?, (*a.*) &.

3. Make one copy:—

The sources and the value of Canadian imports for the year 1918 are shown in the following table:—

By Countries.	1918.
United Kingdom	$ 72,879,109
Australia	6,084,963
British East Indies	17,026,095
British Guiana	5,088,972
British South Africa	1,331,842
British West Indies	8,930,109
Hongkong	2,343,958
Newfoundland	3,287,340
New Zealand	7,014,313
Other British Empire	1,371,069
Argentine Republic	1,726,489
Brazil	1,128,616
China	1,867,405
Cuba	2,034,654
France	3,754,761
Italy	642,071
Japan	13,184,893
Netherlands	582,507
United States	738,142,064
Other foreign countries	18,533,670

4. Make one copy:—

DIRECT FOREIGN BANKING FACILITIES.

South and Central America, Cuba and the West Indies.

We have *direct* connections with the leading financial institutions in Argentina, Uruguay, Chile, and Brazil, and have, in addition, a special representative in Buenos Aires. We cover other countries of South America, Central America, and the West Indies, through our affiliated institution, the Mercantile Bank of the Americas, which has branches and connections as follows:—

COLOMBIA—Banco Mercantil Americano de Colombia: Bogota, Barranquilla, Cartagena, Medellin, Manizales, Girardot, Cali, Honda.

PERU—Banco Mercantil Americano del Peru: Lima, Arequipa, Chiclayo, Callao.

VENEZUELA—Banco Mercantil Americano de Caracas: Caracas, La Guayra.

BRAZIL—American Mercantile Bank of Brazil: Para, Pernambuco.

NICARAGUA—National Bank of Nicaragua: Managua, Bluefields, Leon, Granada.

HONDURAS—Banco Atlantida: La Ceiba, Tegucigalpa, San Pedro Sula, Puerto Cortez.

CUBA—Banco Mercantil Americano de Cuba: Havana.

Agencies in Ecuador, Bolivia, Costa Rica, Salvador, Guatemala.

SHORTHAND DICTATION.

[NOTE TO PRESIDING EXAMINER.—*Please provide candidates with plain white letter paper and No. 7 envelopes.*]

[NOTE.—*The Examiner will read each section twice; first, rapidly, and secondly, at the rate of one hundred and thirty words per minute. Candidates will write at the second reading only. When all the dictation has been given, the candidates will make either a typewritten or a pen and ink transcription of their notes and enclose each letter in a separate envelope, on which must be placed the proper address as if for mailing. The time required by each candidate for making the transcription will be noted by the Presiding Examiner. Both shorthand notes and transcription are to be handed in.*]

Value.

13 1. Victoria, B.C., June 15, 1921. Mr. J. N. Hudson, Nanaimo, B.C. Dear Sir: We have your inquiry of the 12th and are mailing to you under another cover a (32) catalogue of our various products. The prices listed in the catalogue are those at which the machines are sold to users.

Our local agent, Mr. S. E. Richards, will call upon you in (65) a short time to assist you in the selection of a machine that will meet your requirements. Yours very truly (85).

28 2. Vancouver, B.C., February 10th, 1921. Mr. Howard B. Allen, 400 Miller Ave., Calgary, Alta. Dear Mr. Allen: We are enclosing a statement against the Keystone Power Company, 1142 (32) Manitoba Street, your city, in the amount of $935, which we shall ask you to proceed to collect unless you hear from us by wire by 11 o'clock Monday (65) morning. Our reason for asking this slight delay is that a remittance may possibly come to hand Monday morning. If it does, we would not care to have the account presented to (97) them through your office. We shall wire you early Monday morning if a cheque is received. If you do not hear from us by 11 o'clock, kindly follow the matter up in the (130) usual manner.

These people were always prompt in their payments, but have repeatedly ignored our recent letters and have given no explanation whatever for their delay in remitting. Our relations with them (162) have always been most friendly, but their attitude does not leave any other course than this open to us. Very truly yours (184).

12 3. Kelowna, B.C., May 19, 1921. Miss Julia Henderson, The Jack Pines, West Bank, B.C. Dear Madam: We are informed by the Peterborough Canoe Company that you have written them (32) concerning their canoes.

We are the sole agents in this locality for their product and have just received a full line of their new canoes. We shall be pleased to have you call (65) and look them over. Kindly inquire for Mr. Shepard when you come in. Yours very truly (81).

19 4. Vancouver, B.C., October 18, 1920. Messrs. Stone and Mason, Bank of Hamilton Building, City. Gentlemen: A reinspection of the electrical equipment in premises located at 876 King Street (32) was made on October 15, 1920. Our inspector reported the equipment defective and recommended the changes noted on the attached sheet.

The hazard of electricity, when used on a defective installation, is (65) such that unless the improvements recommended are made within the next thirty days, we shall be compelled to recognize the hazard in your insurance rate.

The changes recommended should be made by (97) a responsible electrician. We trust that we shall hear from you within a few days to the effect that the changes referred to will be made without delay. Yours very truly (128).

28 5. Montreal, P.Q., June 11th, 1921. Mr. James M. Taylor, Nelson, B.C. Dear Sir: Please write frankly and let us know what you think of Municipal Bonds as an (32) investment for your own needs. Some people believe that they can afford to take speculative chances with their money.

Personally, we do not believe in investing money in a speculative security which is (65) sometimes called "a business man's investment." Why a business man should be supposed to find it desirable to lose his money any more than a widow or an executor of a trust (97) fund, we fail to understand. An investment is either safe or it is, at least to some degree, unsafe.

We are extremely desirous of establishing business relations with you because we know Municipal (130) Bonds are safe and our clients will never have occasion to reproach us in the future. You may not be in the market at present, but we would like to hear from (162) you so that we could feel that we have convinced you of the merits of Municipal Bonds. Yours very truly (182).

STATUTE LAW. (Time, 2 hours.)

Value.

5 1. (*a.*) Explain what is meant by "Holder in due Course," and tell how his title differs from that of any other holder. In what cases does this special claim not apply?

3 (*b.*) How would you word a note in order to make it: (i) Negotiable by delivery; (ii) Negotiable by endorsement; (iii) Non-negotiable?

2 (*c.*) Explain the significance of the words "Value received" on a note.

2. A draft for $300 was drawn at 30 days' sight by W. Adams on C. Brown, Calgary, favour of M. Cray, and was accepted qualified as to time. It has been endorsed by "blank" endorsement when negotiated to W. Downs; by "qualified" to H. Elliott; for waiving protest to L. Franks; for guarantee to W. Grant; and by restrictive to A. Student.

8 (*a.*) Show the draft, face and back.

3 (*b.*) Give the names of the parties liable, in the order of their liability.

5 (*c.*) If the draft is not paid on the due date, state what steps you would take to enforce collection. What would be the result if you delayed action for a day or two?

12 3. State in order the steps to be taken to complete the incorporation of a Joint Stock Company under: (i) A Dominion Charter; (ii) A British Columbia Charter.

6 4. (*a.*) Describe the documents which must be filed with the Registrar of Joint Stock Companies in order to secure incorporation in British Columbia.

6 (*b.*) Explain the three modes of forming an incorporated company in this Province.

6 (*c.*) Show clearly the difference between a "Private Company" and a "Public Company" incorporated in this Province.

15 5. State briefly the instructions contained in the Dominion Companies Act for: (i) Changing the name; (ii) Increasing or reducing the Capital Stock; (iii) Obtaining further powers; (iv) Borrowing money; (v) Commencing business.

15 6. Outline briefly the steps a company must take under the British Columbia Companies Act: (i) To allot shares; (ii) To change its name; (iii) To alter the objects of the Company; (iv) to reduce its Capital Stock; (v) to wind up the Company.

4 7. (*a.*) Outline the information which must be given in the annual report.

10 (*b.*) In the British Columbia Companies Act what is meant by the following terms: (i) Extra-provincial Company; (ii) Share warrants; (iii) Prospectus; (iv) Special resolution; (v) Extraordinary resolution.

TYPEWRITING.

[NOTE TO PRESIDING EXAMINER.—*Please provide each candidate with plain white letter paper and one sheet of carbon paper.*]

[NOTE.—*Candidates are allowed 5 minutes to read over this paper. Time allowed for Section A, 15 minutes. Section B is to be written in full and the time taken by each candidate to be recorded by the Presiding Examiner. Write each part of Section B on a separate sheet of paper, and hand in carbon copies with originals. A carbon copy of Section A is not required.*]

Value.

50 *Section A.*

ADVANTAGES OF CARD RECORDS OVER OTHER FORMS, SUCH AS BOUND BOOK AND LOOSE LEAF.

Fundamentally, the situation of Card Records versus the other forms is this:—

The bound book record is as old as modern accounting.

The loose leaf record was a logical step forward.

The card record is the evolution and the higher development of record keeping.

As is always true, the older form gives way slowly to newer ones. Arguments against the new form are being worn down, however, by the distinct superiority of the card record. It is significant that, little by little, loose leaf manufacturers are adding card records and equipment to their product, while the card record manufacturers are abandoning the sale of loose leaf records.

Be that as it may, the bulk of the records of the next business generation will be card records. Still, a legitimate field will always exist for the loose leaf.

The chief points favouring card records are:—

1. *Elasticity.*—The bound book has no elasticity. The loose leaf is limited to a certain size, beyond which it becomes absolutely too bulky for convenience. The card record can expand to any size, without ever becoming difficult to handle.
2. *Perpetuity.*—A bound book carries dead records as long as there is a single live record left. When it is full, a new record book must be used, with constant back reference and confusion. The card record is perpetually alive, as only live records are kept on hand, dead records being removed and filed elsewhere. The loose leaf enjoys this advantage also, but is less convenient.
3. *Easier to Handle Than Other Forms.*—Any book form of record is more awkward than a card record. The leaves of bound books and loose leaf records are flimsy. The books are heavy. There are many operations wasted even in turning to accounts, where the leaves are indexed. Bound books, and especially loose leaf books, are generally bulky and thick. Large records require many books. This causes more operations and much moving and shifting of books. Card records overcome this. There is a distinct economy of energy in the use of card records.
4. *Easier to Keep in Strict Alphabetical or Other Order.*—This is impossible in a bound book without serious waste of space and awkward complications. The loose leaf is satisfactory in this regard as long as it is small. As it gets larger it becomes more and more difficult to use. A card record can be more readily arranged or rearranged than any other form of record.

Value.

5. *In a Card Record Drawer or Tray You Place Only the Cards That Are Needed.*—As only live records are kept there, it is always condensed to the minimum size. This is not true of the bound books.

A loose leaf system has the same advantage as the card record in this regard, but in a lesser degree; and it is more difficult to shift loose leaf records from one binder to another. In this connection, also, if a loose leaf record sheet becomes filled while a man is working on it, he must stop, loosen the binder, take out the old sheet, insert a new one and tighten up the binder again before going on. In a card record a new card is easily inserted—a single operation versus at least five—(generally more).

6. *Very Much More Can Be Done with Cards* than with loose leaf or bound books, in the way of indexing, classifying, cross-referencing, and signalling.

7. *More Than One Person May Work on a Card Record at the Same Time.*—This is not true of book records (bound or loose leaf), without loss of time and frequent interruptions.

8. *In a Given Office Space a Greater Number of Card Records Can Be Used* than is possible with book or loose leaf records.

9. *One Clerk Can Do More on a Card Record* than in a book or loose leaf form. A card record is a distinct time saver. This means greater accuracy and fewer clerks on a large record, and less time of one man on a small record.

10. *The Card Record Is a Definite Saver of Physical Labour.*—One of the factors of mental accuracy is freshness. Fatigue, however slight, impairs the mental efficiency of the employee. Therefore, devices that reduce the physical effort of a man employed in keeping records will increase his value to his employer.

11. *The Card Record Is Generally Actually Less Expensive* than the other forms of records, particularly the loose leaf records. Over a continued period of time the card record is especially economical in the actual dollars-and-cents cost, to say nothing of its convenience and the saving of time and labour.

(Macey.)

50 *Section B.*

Vancouver, B.C., May 25, 1921. Mr. Thomas C. King, 723 Quadra St. Victoria, B.C. Dear Sir: We are very sorry indeed to learn from your letter of the 17th that you have met with financial reverses, and also regret that through an oversight you have allowed your policy to become lapsed.

The company stands ready at any time to help a policy-holder carry his insurance. As you have already made three full premium payments on this policy, you are entitled to a loan value of $111. If you do not desire to borrow any money on the policy to pay the present year's premium, we shall be willing to take your note for the amount of the premium, to become due in thirty, sixty, or ninety days. If you have any cash available, you can send it in, and we shall forward you a note for the difference between the full annual premium and the amount of your remittance. By taking advantage of this offer, you will not need to impair the loan value of your policy. Please let us hear from you. Sincerely yours.

Specifications Model C Drill.

Length, including chuck and Screw Feed .....16 in.
Length, including chuck only .....14 in.
Weight, including chuck and Screw Feed .....22 lb.
Weight, including chuck only .....21 lb.
Weight, equipped with sleeve for No. 1 Morse taper drills .....19 lb.
Capacity in steel or similar metals .....0 to ½ in.
Capacity for tapping in cast iron or sheet steel .....0 to ½ in.
Feed of Screw Feed .....2½ in.
Speeds running idle (two speeds).....250–500 R.P.M.
Consumption under load on 110 volts .....350 watts
Wound for any voltage .....50 to 250 volts
(Carried in stock for 110 and 220 volts.)
Current from ordinary drop cord either A.C. or D.C.

Equipment.

Regular Equipment.—Regular equipment furnished with Model C Drill includes 10-foot cord and attachment plug, handle and a ½-inch chuck for S.S. drills.

Special Equipment.—A ½-inch geared chuck interchangeable with our standard chuck. A special chuck for taking square shank wood bits interchangeable with our standard chuck. The screw feed attachment. A special sleeve for attaching to drill spindle for use with No. 1 Morse Taper drills.

When ordering always *specify your voltage.*

(Copy for Daily Province.)

Union Steamship Company of B.C., Limited.

SAILINGS AS FOLLOWS:

S.S. "Cowichan"—Monday, 6 p.m., for Jonstone Strait, Loughborough Inlet.
Thursday, 6 p.m., for Campbell River, Rock Bay route.
Saturday, 2 p.m., for Homfray Channel, Cortes Island, Churchhouse route.

S.S. "Cheakamus"—Monday, 2 p.m., for Okisollo, Kingcome Inlet, Carriden Bay route.
Friday, 6 p.m., for Lewis Channel, Shoal Bay, Topaz Harbour route.

S.S. "Camosun"—Tuesday, 11 p.m., for Ocean Falls, Surf Inlet, Bella Coola.

S.S. "Chelohsin"—Friday, 9 p.m., for Swanson Bay, Prince Rupert and Anyox.

POWELL RIVER SAILINGS—Monday, Wednesday, and Friday, 9.30 a.m.; Monday, Thursday, and Friday, 6 p.m.; Tuesday, 11 p.m.; Saturday, 2 p.m.

BRITANNIA AND SQUAMISH—Daily, 9.15 a.m. (except Sunday).

For Further Particulars Apply to:

Head Office, Foot Carrall Street **Phone Seymour 306**
City Office, 407 Granville Street **Phone Seymour 6120**

Third-year Course, Household Science.

CHEMISTRY. (Time, 2 hours.)

[*All questions are of equal value. Answer any* seven.]

1. What is the source of the principal gaseous fuels? Discuss the advantages of each gas as a fuel.

2. Make a drawing of apparatus that could be used for the preparation of carbon monoxide from carbon dioxide. State what each part of the apparatus is used for. What is the action of carbon monoxide upon the human system?

3. What is the source of the ammonia water of commerce? Show by means of a drawing how ammonia may be prepared in the laboratory.

4. Iron is sometimes a bivalent element, sometimes a trivalent one. What will be the formulæ of the corresponding oxides, chlorides, and sulphates?

5. What is indicated by the terms "hydrocarbon," "acid salt," and "radicle"?

6. What do you understand by "degrees of hardness" as applied to water? How can permanently hard water be softened? Illustrate your answer by means of a chemical equation.

7. Explain fully the process known as saponification. How is this process related to that known as hydrolysis? How can a sample of soap be tested for the presence of soda ash and of sodium silicate?

8. What do you understand by an emulsifying agent? Discuss methods of removing fat-stains from fabrics. What properties should be possessed by a solvent that is to be used in this connection?

COOKERY—THEORY. (Time, 2 hours.)

Value.

4 1. (*a.*) In canning explain the difference between the *hot-pack* method and the *cold-pack* method.

4 (*b.*) Which do you recommend for canning vegetables? Give reasons.

4 (*c.*) Discuss the points leading to success in jelly-making.

6 2. Explain the use of bicarbonate of soda in *two* of the following:—

(*a.*) With molasses in ginger bread.
(*b.*) With sour milk in biscuits.
(*c.*) With tomato in cream soup.
(*d.*) With cheese in scallops.

3 3. (*a.*) What are the chief differences in the cooking of tender and tough cuts of meat?

3 (*b.*) Sketch a side of beef and mark on it in Roman notation three tough cuts and in Arabic three tender cuts.

3 (*c.*) Below the sketch name the cuts and mention how you would serve them.

5 4. How long should the following cook:—

(*a*) A beef tongue (4 lb.); (*b*) mutton stew (2 lb.); (*c*) roast sirloin (6 lb.); (*d*) tenderloin steak (¾ in. thick); (*e*) steamed salmon (3 lb.); (*f*) baked trout (4 lb.); (*g*) dumplings; (*h*) carrots; (*i*) spinach; (*j*) beets; (*k*) soft cooked eggs in the shell; (*l*) sponge cake; (*m*) scalloped rice and cheese; (*n*) bread; (*o*) plain boiled macaroni; (*p*) pumpkin; (*q*) pumpkin pies; (*r*) gems.

Value.

8 5. Give the important points (with reasons) leading to success in combining and cooking *two* of the following:—

(*a*) Baked custard puddings which contain starchy materials; (*b*) omelets; (*c*) breakfast cereals; (*d*) soup stock.

6 6. List the full market order for serving eight persons the following menu:—

Tomato Rice Consomme.
Crackers.
Biscuit Crust Meat Pie. Mashed Potatoes.
Bread.
Fruit Salad. Plain Cake.
Coffee.

4 7. Describe the changes flour undergoes in any *two* of the following:—

(*a*) Bread; (*b*) pie crust; (*c*) fruit cake; (*d*) doughnuts; (*e*) dumplings.

50 Marks for practical work.

DRAWING AND DESIGN. (Time, 2 hours.)

Value.

50 (*a.*) The drawings for the year should be placed in a folder and laid on your desk. These will be collected and marks awarded.

50 (*b.*) Make a design of triangular shape 6" wide, taking the motif from the flower provided. The design to be suitable for embroidery and to be placed on the vest of a garment. Show the stitches on the design and finish in colour.

DIETETICS. (Time, 2 hours.)

Value.

15 1. What are the chief points to be considered in the discussion of the dietetic value of any food? After each give your reasons why that point is worthy of consideration.

15 2. Discuss the food value of any *three* of the following:—

(*a.*) Rare and well-cooked meats.
(*b.*) Graham and patent white flour yeast bread.
(*c.*) Rolled oat porridge and shredded wheat.
(*d.*) Pies and fruit salad with light cake as desserts.
(*e.*) Poached eggs and fried eggs.
(*f.*) Home canned or commercially canned fruit.
(*g.*) Greens or roots as table vegetables.

9 3. Name the types of baking-powders you know and briefly discuss them as lightening agents from the standpoint of health.

5 4. (*a.*) Explain fully "The physiological energy value of 1 lb. of meat is 1,100 calories."

15 (*b.*) Discuss present standards of the food value of any *three* of the proximate principles of foods and give your authority.

15 5. (*a.*) Write out sample balanced menus for one day's meals for a high-school girl who has opportunity to get a warm luncheon.

Value.

5 (*b.*) Discuss warm and cold luncheons.

5 6. (*a.*) Discuss the value of beef tea and milk drinks for an invalid on fluid diet.

3 (*b.*) Name six ways of serving milk as a drink.

5 7. (*a.*) In choosing a dietary, why should we aim at simplicity?

3 (*b.*) What foods would you aim to include every day in all family dietaries?

5 8. What are the chief points in serving vegetables in order to obtain their greatest food value?

DRESSMAKING AND MILLINERY. (Time, 2 hours.)

TEXTILES.

Value.

12 1. (*a.*) Explain the use of the microscope in discovering the qualities and properties of silk.

(*b.*) What is meant by artificial silk, vegetable silk, waste silk, raw silk? Explain the use of each.

(*c.*) "The weave of silk is of paramount importance and ranges through all kinds of designs from plain to the most intricate Jacquard patterns." Explain this paragraph.

3 2. Give three simple tests for doubtful linen.

DRESSMAKING.

10 1. (*a.*) What measurements are required to draft a pattern of a one-piece dress by straight-line system?

(*b.*) Name ten of the most important processes in making a woollen dress with roll collar and long sleeves. Skirt 2 yards round the bottom.

(*c.*) Explain the method of applying collar to bodice and skirt to band.

8 2. (*a.*) A ready-to-wear serge suit which cost $57.50 lasted one year. Compare this as to cost and value with a suit made from cloth at $4.50 per yard and made at home by a dressmaker at $4 per day.

(*b.*) How would you alter a waist pattern that measured too small in the bust? a sleeve that was too short?

MILLINERY.

4 1. Name four of five most important stitches used in millinery and give an example of the use of each.

8 2. Describe the making of a black velvet sailor-shaped hat, using the following headings: (*a*) Drafting pattern, (*b*) making of shape, (*c*) facing, (*d*) covering, (*e*) trimming, (*f*) lining. The whole cost not to exceed $7.

5 3. (*a.*) Make a quick pencil sketch of the hat you describe.

(*b.*) How would you clean a white straw hat?

50 Marks for practical work.

Physiology, Hygiene, and Home-nursing. (Time, 2 hours.)

Value.

4 1. What special care is necessary to ensure that a child's skeletal system will be strong and well developed?

4 2. Discuss *two* of the following:—

(*a.*) Shoes for general wear.

(*b.*) The use of face creams and powders.

(*c.*) Care of the hair.

(*d.*) Sweets in the diet.

9 3. Discuss the structure and functions of *one* of the following:—

(*a.*) The digestive system.

(*b.*) The circulatory system.

(*c.*) The excretory system.

(*d.*) The nervous system.

4 4. Write as fully as you can upon *one* of the following topics relating to the hygiene of the nervous system:—

(*a*) Concentration; (*b*) worry; (*c*) sleep; (*d*) change of air and scene.

Home Sanitation.

16 1. Write upon *two* of the following:—

(*a.*) Disposal of house wastes in a city.

(*b.*) Disposal of house wastes in the country.

(*c.*) The best finishing for kitchen floors.

(*d.*) Ventilation of a house by natural means.

(*e.*) The care of the basement or cellar.

(*f.*) Disinfectants for home use.

4 2. Explain any *four* of the following: Sills, house-drain, girders, soil-pipe, trap, chemical closet, window-weights.

Home-nursing.

9 1. Write on *one* of the following:—

(*a.*) The transfer of disease and means to prevent it.

(*b.*) The reaction of the body against disease and the means that can be taken to assist such reaction.

(*c.*) Malnutrition in children and the means to prevent it.

50 Marks for practical work.

Third-year Course, Technical.

ARITHMETIC AND ALGEBRA. (Time, 2 hours.)

[N.B.—*Omit any* one *of the last* three *questions. Logarithmic tables and graph paper are provided.*]

Value.

10 1. (*a.*) Given $\frac{1}{v}-\frac{1}{u}=\frac{\mu-1}{r}$, express in simplest form each quantity separately in terms of the other quantities. If $v=5$, $u=10$, $r=10$ find μ.

(*b.*) If $A=\pi R^2$, $C=2\pi R$, express A in terms of C.

10 2. (*a.*) Express $\frac{1+\sqrt{2}}{\sqrt{3}-1}$ with a rational denominator and find its value correct to 3 decimal places.

(*b.*) Simplify $(ab^{-1})^{-2}\times(bc^{-1})^{-\frac{1}{2}}\times(ca^{-1})^{\frac{2}{3}}$.

10 3. (*a.*) Factor the following :—

$x^2+2x-120.$

$(3x+y)^2-5y(3x+y)+6y^2.$

$x^4+x^2+1.$

$x^{12}+1.$

$12x^2-13x-35.$

(*b.*) Simplify :—

$$\frac{1}{a-b}\left\{\frac{(a-b)^3+(b-c)^3}{a-c}-(a+c-2b)^2\right\}.$$

12 4. Solve the equations :—

(*a.*) $51x^2-53x=21$ (correct to 2 decimal places).

(*b.*) $x^2-20=y^2-5=xy$.

13 5. A wheel has 720 teeth and is rotated 12.6 times per second. A narrow beam of light just passes between 2 teeth, falls on a mirror 8663 metres away, and when it returns, is intercepted by one of the teeth between which it had passed. Find the speed of light.

16. 6. The following quantities seem to obey a law of the form $W=aP+w$. Find the probable values of a and w.

W	11	13.2	15.7	17.9	20.2	22.5	24.7	27.2	29.3	31.7
P	1	2	3	4	5	6	7	8	9	10

16 7. Draw a quadrant of a circle radius $3\frac{1}{2}''$ and draw the tangents at its extremities. Use Simpson's Rule (taking 10 divisions) to find the area included between the circumference and the tangents. Find the percentage error in your result.

13. 8. Find the number of gallons per minute which flow past a section of a circular pipe of diameter d inches if the speed of the water is f feet per second. How long would it take to fill a spherical vessel of diameter b feet? Complete the two calculations when $d=11.2$, $f=22.8$, $b=7.9$.

13 9. Construct a graph to give the relation between centimetres and inches (1 inch = 2.54 cm.) Thence determine the number of cm. in 3.3 inches and the number of inches in 8.2 cm.

13 10. The time of vibration of a pendulum varies as the square root of the length. If the time is 1.4 seconds when the length is 49 cm., what will be the time of vibration for a pendulum of length 100 cm.?

CHEMISTRY. (Time, 2 hours.)

[*The value of each of the first* eight *questions is 12. Answer any* six.]

(Fe = 56; S = 32; H = 1; O = 16; N = 14; Cu = 63.)

1. Write a short description, with sketches, of the commercial manufacture of nitric acid.

2. Carbon occurs in many *allotropic* modifications. What is the exact meaning of this statement?

3. By what process could you show that water is a compound? How would you proceed to ascertain its quantitative composition?

4. Dalton is often called the "Father of Quantitative Chemistry." Why? What great discoveries did he make?

5. Why is a knowledge of *valency* essential before *equations* can be used in chemistry? Write fully on this topic.

6. Carbon unites with oxygen in two definite proportions. What are the two compounds produced? Show that there are reasons for thinking that there *can* be only two such oxides of carbon.

7. "Water is the most general solvent known." How would you proceed to show that this statement is true?

8. You desire to prepare a sample of pure ammonium nitrate. Give in detail every stage of the process you would adopt.

[*The value of each of the following questions is 14. Answer any* two.]

9. Choose two of the following subjects and write clearly yet briefly on each: (*a*) The blast-furnace; (*b*) the Bessemer converter; (*c*) open-hearth process; (*d*) cementation process.

10. A manufacturer desires to produce 10 tons of 95% sulphuric acid. How much iron pyrites (FeS_2) and what weight of steam must he provide?

11. Complete the following equation and give *all* the information it conveys to you:—
$Cu + HNO_3 = Cu\ NO_3 + H_2O + NO$.

12. 32 grams of sulphur are completely burnt in pure oxygen gas and the gas collected. When measured at 17° C. and 750 mm. pressure the volume is found to be 24.04 litres. From this data calculate (correct to the nearest whole number) the atomic weight of oxygen.

DRAUGHTING. (Time, 2 hours.)

Value.

50 (*a.*) The drawings for the year should be placed in a folder and laid on your desk. These will be collected and marks awarded.

50 (*b.*) Make a freehand sketch of the machine detail supplied and mark the measurements thereon. From this sketch make a finished drawing.
(Project: Such machine parts as a lathe-dog, tool-post, or scribing-block to be used.)

ELECTRICITY. (Time, 2 hours.)

[*The value of each of the first* eight *questions is 12. Answer any* six.]

1. You may choose any *two* of the following instruments to illustrate a short essay on electrical measuring instruments: (*a*) An ammeter; (*b*) a d'Arsonval galvanometer; (*c*) a voltmeter.

2. I wish to measure the resistance of a cold carbon lamp. What instruments should I use? How should I connect up the circuits?

3. Write a full description of the *Brown and Sharpe* wire table. Show if you can how the important points in this table can be easily carried in the memory.

4. Why is A.C. used for long-distance transmission in preference to D.C.? Write fully.

5. What is a *sine curve?* What is its value to an electrical engineer? How would you proceed to obtain the *curve* of an A.C. generator?

6. Define volt, cell, ampere, series, root-mean-square.

7. Give a complete wiring diagram for a motor-generator charging set for charging *storage-batteries.*

8. Write a short essay on the three important types of D.C. generators.

[*The value of each of the following questions is 14. Answer any* two.]

9. How does the ordinary house-meter measure the power supplied to a house? Give sketches and show that you understand not only its construction but the unit it measures.

10. What is the modern conception of the term: *A current of electricity?* Write clearly as to a beginner in the subject of electricity.

11. What would be the combined resistance of three 110-ohm, two 220-ohm, and two 440-ohm carbon lamps all connected in parallel? If such a *bank* of lamps were connected to 110-volt mains, what would be the total current flowing in the circuit? Give a sketch of the *bank* and its connection to the mains.

12. Write a clear description of a *storage-cell.* How is such a cell charged? Give all chemical equations which will render your answer any clearer.

GEOMETRY. (Time, 2½ hours.)

Value.

10 1. If a straight line falling upon two straight lines makes the alternate angles equal to one another, prove that the two straight lines are parallel.

12 2. Show that equal chords of a circle are equally distant from the centre. A chord of a circle is of constant length but its position changes. A point is taken on it at a fixed distance from one of its ends. Find the locus of this point.

11 3. A lighthouse facing N. projects a beam of light covering an angle of 25°. A vessel sailing N.W. at 12 knots sees the light for 10 minutes. Find graphically the ship's shortest distance from the lighthouse. (1 knot = speed of 6,080 feet per hour.)

10 4. Prove that the angle subtended by a diameter of a circle at any point of its circumference is a right angle.

11 5. ABCD is a parallelogram. All its angles are bisected internally and the bisectors form by their intersections a figure HKLM. Prove that HKLM is a rectangle.

Value.

11 6. A man 6 feet high stands x feet from the foot of an electric-light standard. The light is 35 feet high and his shadow is 8 feet long. Find x. Show clearly your calculation and check your answer by a drawing to scale.

11 7. AB is a diameter of a circle and P is any point on its circumference. The tangent at P meets AB produced at D. DE the perpendicular to AD meets AP produced at E. Prove DP = DE.

12 8. Draw a straight line AB 2 in. long and lay off by construction the following angles: ABC = 30°, ABD = 75°, ABE = 120°, all on the same side of AB. Make BC = 3 in., BD = 3.5 in., BE = 2.75 in. Join ACDE and reduce the figure thus obtained to a triangle, vertex at D and base in AB produced. Find its area.

12 9. A regular pyramid 3 in. high stands on a pentagonal base each edge of which is 2 in. long. Using ruler, compasses, and protractor, draw (full size) one of the side faces of the pyramid.

MECHANICS. (Time, 2 hours.)

[*The value of each of the first* eight *questions is 12. Answer any* six. Eight *questions constitute a full paper.*]

1. Sketch and describe the action of: (*a*) The suction and lift pump; (*b*) the suction and force pump; and (*c*) the plunger pump.

2. The distance between the centres of two bodies is 36 inches. The weights of the two bodies being 17 and 90 lb. respectively, where is the centre of gravity of the combination? Define clearly any terms you use and show fully your calculations.

3. Explain clearly the following, giving sketches of each: (*a*) Bevel gears; (*b*) pitch circle; (*c*) worm gear; (*d*) rack and pinion; (*e*) back-lash; (*f*) driver and follower.

4. Assuming that 1 cu. ft. of water weighs 1,000 oz., what would be the total force tending to force upward a cube of wood of 2 ft. edge and specific gravity 0.5 when sunk to a depth of 30 ft. in salt water of specific gravity 1.004?

5. Explain the exact purposes served by a fly-wheel and a governor on an engine.

6. Describe clearly, with sketches, all the forms of barometers you have seen used.

7. Sketch and describe a steam-pressure gauge.

8. At the point of *cut-off* in the cylinder of an engine the volume of steam in the cylinder is 405 cu. in. The pressure as shown by the indicator diagram is 125 lb. per sq. in. What will be the pressure shown on the diagram when the piston reaches the end of its stroke if the volume of the cylinder be 1,200 cu. in.? Explain.

[*The value of each of the following questions is 14. Answer any* two.]

9. What do you understand by *absolute pressure* as used in steam-engine practice? Explain clearly how this pressure could be nearly approached in an engine. Show sketches to illustrate your answer.

10. Sketch and describe clearly a steam engine *indicator*. Give an example of an indicator card and show what information an engineer could obtain from such a diagram.

11. What do you understand by the *modulus of elasticity?* Give any example you can to show its use in mechanics.

12. Write a short essay showing why *perpetual motion* is an impossibility.

PHYSICS. (Time, 2 hours.)

[*The value of each of the first* eight *questions is 12. Answer any* six.]

1. People sometimes say that water-pipes burst when the *thaw comes*. Prove that this is not true by showing when, and why, the bursting actually takes place.

2. Sketch and describe the action of the ordinary kitchen stove and *boiler* for heating water for domestic purposes. By which of the methods of transmission is the heat transferred from the fire to the *boiler?*

3. How do you account for the fact that the furniture of a *sun-parlour* becomes distinctly warm whilst the glass of the windows remains quite cool?

4. Water-mains are being laid in the street. Both ends of the pipe are open. A workman is hammering at one end. The length of the pipe is about 500 feet. If you place your ear at the distant end and the workman gives a series of very slow blows, what could you learn about the transmission of sound?

5. Describe any *reed* instrument you have studied. Sketch and carefully show how the *reed* produces a *musical* sound.

6. Define clearly: (*a*) Mono-chromatic light; (*b*) light wave; (*c*) ray; (*d*) spectrum; (*e*) interference.

7. Motorists often use a *rear-vision* mirror of the diminishing type. Explain clearly how it is that they see everything in its true relative position and only diminished in size?

8. Sketch and describe any apparatus you have seen or used to prove the phenomenon of *refraction.*

[*The value of each of the following questions is 14. Answer any* two.]

9. Define very carefully the following terms: (*a*) Temperature; (*b*) heat; (*c*) specific heat; (*d*) latent heat; (*e*) sensible heat; (*f*) B.t.u.; (*g*) calorie; (*h*) expansion; (*i*) calorimeter; (*h*) heat transference.

10. Using as an illustrative apparatus *the siren,* explain clearly the meaning of the term *interval.*

11. Describe the production of sound by *bowing* a violin. Keep in mind the following points: (*a*) The number of strings; (*b*) tuning; (*c*) fingering; (*d*) rosin; (*e*) the harmonics; (*f*) why the violin is such a beautiful instrument of music.

12. Write a clear account of the cinematograph projection lantern, explaining how it is that we see (with a good instrument) an apparently stationary scene with movement of the figures in it.

TRIGONOMETRY. (Time, 2 hours.)

[N.B.—*Logarithmic tables are provided.*]

Value.

8 1. (*a.*) If A is an acute angle show that tan A is greater than sin A.
(*b.*) Without using tables find the numerical values of the six trigonometrical ratios of 30° and 60°.

7 2. The string of a kite is 250 feet in length. How high is the kite above the ground when the string, supposed stretched tight, makes with the ground an angle $\tan^{-1}\frac{24}{7}$?

15 3. Show that there are two triangles having the following parts: $a=6$, $b=8$, $A=34°$. Solve the triangles.

Value.

13 4. If the sides of a triangle are 297.3, 437.1, and 248.6 units respectively, find the largest angle.

15 5. (*a.*) Show that $\sin(A - B) = \sin A \cos B - \cos A \sin B$ in the case where A and B are acute angles.

(*b.*) Prove $\cos 2\theta = \dfrac{1 - \tan^2\theta}{1 + \tan^2\theta}$.

(*c.*) Prove $\dfrac{\sin\theta + \sin\phi}{\sin\theta - \sin\phi} = \tan\dfrac{1}{2}(\theta + \phi)\cot\dfrac{1}{2}(\theta - \phi)$.

15 6. A circular cylinder of radius 2 feet is lying on a horizontal plane. Leaning across it at right angles to its axis is a plank 7 feet long. If the lower end of the plank is on the plane and is 4 feet from the line of contact of the cylinder and plane, find the height of the upper end of the plank above the plane.

12 7. Calculate as accurately as your tables permit:—

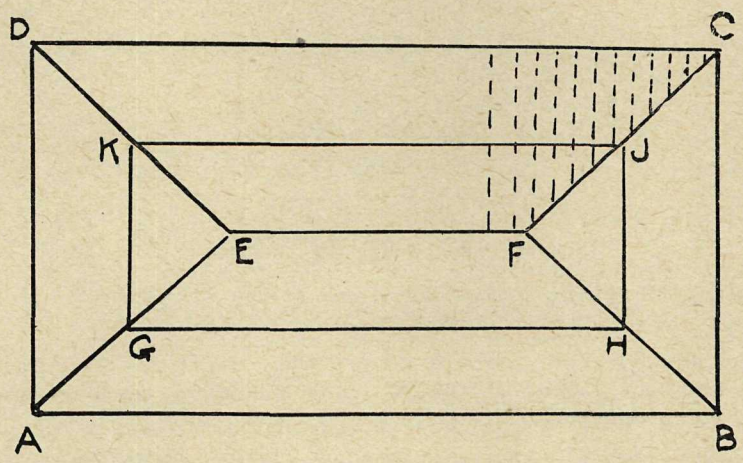
$$\frac{37.93 \times 257.1^{\frac{1}{2}}}{\sqrt[5]{7.98} \times \sqrt[4]{7.673}}.$$

15 8. A man at sea-level observes that the elevation of a mountain is 32° 11′; after walking directly towards it for a mile along a road inclined at an angle of 10° to the horizontal, he finds the elevation of the mountain to be 47° 23′. Find the height of the mountain.

WOOD AND METAL WORK—THEORY.

WOODWORK. (Time, 1½ hours.)

[*Answer* three *questions only. Nos. 1 and 2 together with either 3 or 4.*]



Value.

50 1. The plan of a hipped roof is given. The roof is 54′ long, 26′ wide, and rise ¼ span. The purlins are shown by G, H, J, K, and the jack and common rafters are indicated by dotted lines. Draw the plan and elevation of one truss to a scale of ¼″ to 1′, and from them obtain the following:—

(*a.*) The true length of the hip rafter A, E.

(*b.*) The correct bevels or "cuts" for the top and lower ends of the hip rafter.

(*c.*) The bevels for the jack and common rafters.

Value.

30 2. Place the suitable dimensions on the various roof members and name them. Prepare a list showing the quantity of timber required in the construction of the roof.

20 3. Make freehand sketches explaining the construction of three joints in one of the above trusses.

20 4. Give neat sketches showing the meaning of the following terms: Dog-legged stair; Hyperbola, Ogee, or Cyma recta moulding; Tusk tenon-joint.

METALWORK. (Time, 1½ hours.)

[*Answer* three *questions only. Nos. 1 and 2 together with either 3 or 4.*]

Value.

40 1. Mark on the blue-print provided the following parts of the lathe: Back-gear lever; head-stock; face-plate; tail-stock; apron hand-wheel; cross-feed lever-knob; lead screw; lathe-bed.

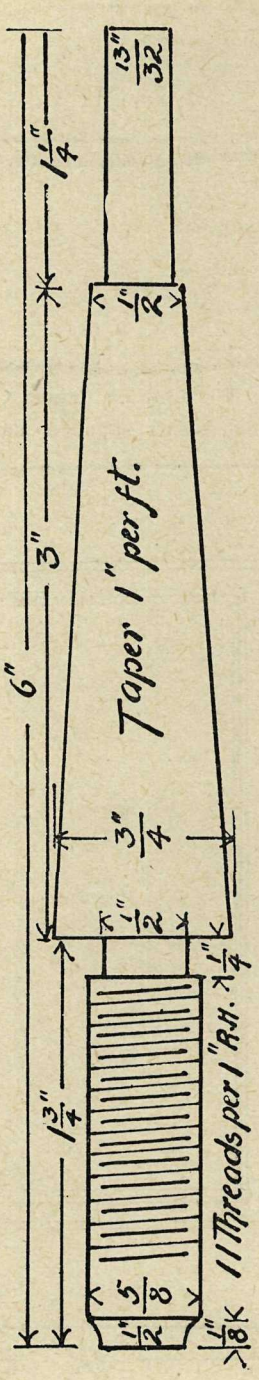
40 2. Give the rule for gearing a lathe for screw-cutting. If the lead screw has eight threads per inch and a bolt is required having eleven threads per inch, what gear would you use?

20 3. Make sketches of three seams in sheet-metal work. Explain why fluxes are used in soldering sheet metal and name those you have used.

20 4. In drawing out stock of any shape it should first be hammered square. Why is this? Explain by words and sketches how you could weld an upset-head bolt 9 inches in length.

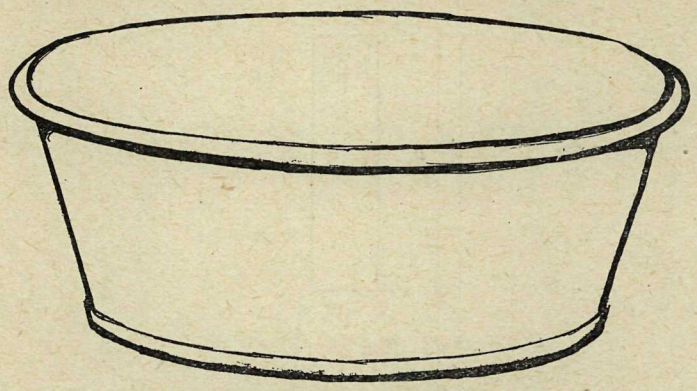
PRACTICAL MACHINE-WORK. (Time, 1½ hours.)

Problem: From stock supplied make a spindle to measurements given below.



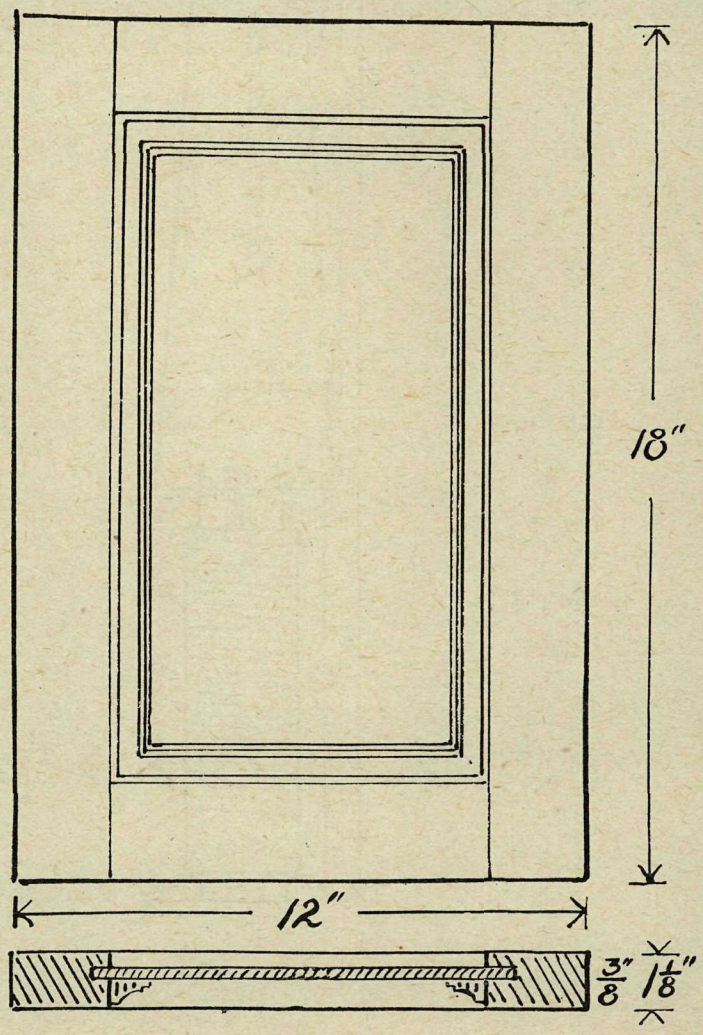
PRACTICAL SHEET-METAL WORK. (Time, 1½ hours.)

Problem: Develop the pattern and make the pan illustrated below. Diameter of top, 6¼"; diameter of bottom, 4¾"; height, 2⅝". Bottom to be burred and soldered; top to be wired.



PRACTICAL WOODWORK. (Time, 3 hours.)

Problem: From the stock and measurements supplied make a panelled door. Joints to be haunched tenons.



University Matriculation (Junior).

AGRICULTURE. (Time, 2 hours.)

[*All questions have equal value. Answer* six *questions only.*]

1. Describe some insect affecting the crops in your neighbourhood and suggest preventive methods.

2. Discuss how the best layers may be selected in a flock of pullets.

3. State, with reasons, your choice of cattle breed and give an account of its typical features.

4. What precautions should be observed in the storing and shipping of milk?

5. Mention your locality and sketch the handling, from planting to harvest, of one of its most important field crops.

6. Discuss principles of selection and the method of seed production in connection with any flower or vegetable of your own choice.

7. State what you understand by crop rotation, and explain why it should be practised.

8. Describe the planting, cultivation, and harvesting of the fruit crop which is most profitably grown in your vicinity.

ALGEBRA. (Time, 2 hours.)

Value.

9 1. (*a.*) Factor :—

(i.) $a^4 - a^2 - 9 - 2a^2b^2 + b^4 + 6a$.

(ii.) $a^3 + 3a^2b + 3ab^2 + 2b^3$.

(iii.) $a^4b - a^2b^3 - a^3b^2 + ab^4$.

4 (*b.*) Find as simply as possible the value of $\dfrac{.5433^2 - .4567^2}{.5433 - .4567}$.

6 2. (*a.*) Divide $\dfrac{2x}{x+y} + \dfrac{y}{x-y} - \dfrac{y^2}{x^2-y^2}$ by $\dfrac{1}{x+y} + \dfrac{x}{x^2-y^2}$.

5 (*b.*) Reduce $\dfrac{x^{\frac{2}{3}} - 4\sqrt[3]{x^{-2}}}{\sqrt[3]{x^2} + 4 + 4x^{-\frac{2}{3}}}$.

6 3. (*a.*) Show that $\dfrac{1}{\sqrt{16+2\sqrt{63}}} + \dfrac{1}{\sqrt{16-2\sqrt{63}}} = 3$.

4 (*b.*) Simplify $\sqrt[3]{21+7\sqrt{2}} \times \sqrt[3]{21-7\sqrt{2}}$.

5 4. (*a.*) Solve $\dfrac{6\sqrt{x}-11}{3\sqrt{x}} = \dfrac{2\sqrt{x}+1}{\sqrt{x}+6}$.

5 (*b.*) Solve $5x^2 - 15x + 11 = 0$.

13 5. The length of a field exceeds its breadth by 30 yards. If the field were square but of the same perimeter, its area would be $\frac{1}{24}$ greater. Find the sides.

10 6. (*a.*) Solve $\left.\begin{array}{l} x^2 - xy = 6 \\ y^2 + 3xy = 10 \end{array}\right\}$.

Value.

8 (*b.*) Solve $\frac{2x-27}{x-14}+\frac{x-7}{x-8}=\frac{x-12}{x-13}+\frac{2x-17}{x-9}$.

13 7. A number has three digits, the units being $\frac{1}{2}$ of the tens and $\frac{1}{3}$ of the hundreds. If 396 be substracted from the number, the digits are reversed. Find the number.

12 8. Prove that the points (3, 2), (8, 8), (−2, −4) lie on a straight line. Find its equation.

Prove algebraically and graphically that it cuts the x-axis at a distance of $1\frac{1}{3}$ from the origin. (Graph paper will be supplied.)

BOTANY. (Time, 2 hours.)

[NOTE.—*(a.) Illustrate your answers by the use of diagrams. (b.) All questions are of equal value. Answer* three *only.*]

1. Write an account of stems under the following heads, giving examples:—
   (*a.*) Structure in relation to the work of support and of food conduction.
   (*b.*) Describe three stems which are specialized as food-storage parts of the plant.

2. Give an example of an alga, a fungus, a moss, and a fern. Tell briefly how each:—
   (*a.*) Obtains its food materials.
   (*b.*) Reproduces.
   (*c.*) Tides over adverse conditions such as drought or cold.

3. Give five examples of Conifers. How would you distinguish each from the others? Describe the leaves as to their shape, structure, and arrangement, and tell how they are related to conditions of living. Describe the cones and give an account of how the seeds are produced and scattered. Write a note on the economic importance of each conifer mentioned.

4. (*a.*) Mention a plant of each of the following families: Ranunculaceæ, Rosaceæ, Ericaceæ, Labiatæ, Compositæ. Describe and compare the corollas of the five plants named.

   (*b.*) Name a plant of each of the following families: Gramineæ, Cruciferæ, Rosaceæ, Leguminosæ, Compositæ. Describe and compare the carpels and fruits of these plants.

CHEMISTRY. (Time, 2 hours.)

[*All questions are of equal value. Answer* seven *only.*]

1. Describe an experiment by means of which you could prove the statement that in any chemical reaction the total weight of the reacting substances is the same after the reaction as before.

2. Explain carefully what contributions Dalton made to the Science of Chemistry.

3. At a temperature of 22.5° C. and a pressure of 750 mm. of Hg., what volume will be occupied by the hydrogen that is set free by the action of 2.5 grams of sodium on water, the weight of a litre of hydrogen being 0.09 gm. at 0° C. and 760 mm. pressure? (H = 1.008; Na = 23.05.)

4. What acids do you know that contain the element chlorine? Describe the preparation and properties of one of these acids.

5. What significance does the number 22.4 (litres) have when applied to the volume of a gas? Upon what hypothesis does the application of this number to gas volumes depend for its usefulness?

6. Write chemical equations illustrating the interaction of manganese dioxide and hydrochloric acid, of steam and red-hot iron, and of sulphuric acid and bleaching-powder.

7. If you were given a piece of marble in the laboratory, how would you proceed to prepare a solution of calcium hydroxide?

8. Write as fully as you can regarding the occurrence and the properties of the element sulphur.

ENGLISH COMPOSITION. (Time, 2 hours.)

Value.

25 1. Write a well-constructed paragraph of about a page on *one* of the following topics:—

(*a.*) Gareth, the Scullion.

(*b.*) The Wrestling Match in "As You Like It."

(*c.*) Plans for the Summer.

60 2. Write an essay of not less than two pages on *one* of the following:—

(*a.*) An Old English Christmas ("Sketch Book").

(*b.*) Nelson's Greatest Qualities as an Admiral.

(*c.*) The Character of Silas Marner.

(*d.*) Queen Elizabeth as depicted by Scott.

5 3. (*a.*) Punctuate the following sentence:—

There is one pursuit commerce one type the business man one idea that of increasing wealth.

10 (*b.*) With as few changes as possible, rearrange in an effective paragraph the following passage concerning the life of a peasant:—

Fourteen hours of sun and labour and hard fare—now tell him what to do—to go straight to his plank bed in the cowhouse—to eat a little more dry bread, borrow some cheese or greasy bacon—munch it alone, and sit musing until sleep came—he who had nothing to muse about—I think it would need a very clever man indeed to invent something for him to do, some way for him to spend his evenings—read—to recommend a man to read after fourteen hours of burning sun is a mockery—darn his stockings would be better.

ENGLISH LITERATURE. (Time, 2 hours.)

[*Candidates will answer Section A, and* either *Section B* or *Section C.*]

SECTION A. POEMS OF THE ROMANTIC REVIVAL.

Value.

20 1. Discuss, in about two pages, three characteristic qualities of Tennyson's poetry as illustrated by the selections studied in this course.

14 2. Write on any *two* of the following (about a page on each):—

(*a.*) The ideas that most appeal to you in "Intimations of Immortality."

(*b.*) Keats' style in "The Eve of St. Agnes."

(*c.*) The spirit of revolt in the poems of Shelley.

Value.

16 3. Make a brief note of explanation on any *four* of the following quotations, naming the author and poem from which each is taken:—

(*a.*) "Yet the will's somewhat—somewhat, too, the power—
And thus we half-men struggle."

(*b.*) "The Moon of Mahomet
Arose, and it shall set:
While, blazoned as on heaven's immortal noon
The cross leads generations on."

(*c.*) "Have sight of Proteus rising from the sea;
Or hear old Triton blow his wreathèd horn."

(*d.*) "It may be we shall touch the Happy Isles,
And see the great Achilles, whom we knew."

(*e.*) "Lest you should think he never could recapture
The first fine careless rapture."

SECTION B. "THE MERCHANT OF VENICE."

21 1. In about three pages discuss the character of Portia. Use short quotations whenever possible.

14 2. Write on *two* of the following (about a page on each):—

(*a.*) The meaning of the song beginning, "Tell me where is fancy bred."

(*b.*) The purpose served by the introduction of the Prince of Morocco and the Prince of Arragon.

(*c.*) The character of Antonio.

15 3. Give the context of each of the following and explain:—

(*a.*) "We freely cope your courteous pains withal."

(*b.*) "For the close night doth play the runaway
And we are stay'd for at Bassanio's feast."

(*c.*) "Give him a livery
More guarded than his fellows: see it done."

(*d.*) "With purpose to be dress'd in an opinion
Of wisdom, gravity, profound conceit."

(*e.*) "A golden mind stoops not to shows of dross."

SECTION C. "HENRY V."

21 1. Discuss, in about three pages, the character of Henry V. as revealed to you in the following long speeches delivered by him in the course of the play:—

(*a.*) The address to the army before Harfleur, beginning:—
"Once more unto the breach, dear friends, once more."

(*b.*) The lines on ceremony, beginning:—
"O ceremony, show me thy worth."

(*c.*) The reply to Westmoreland, beginning:—
"No, my fair cousin,
If we are mark'd to die, we are enow
To do our country loss."

In the course of your answer quote a passage of about ten lines from one of these extracts.

14 2. Write on *two* of the following (about a page on each):—

(*a.*) Falstaff's connection with the play.

(*b.*) The purpose and dramatic effectiveness of the chorus.

(*c.*) The best drawn humorous figure in the play.

Value.

15 3. Give the context of each of the following and explain:—

(*a.*) "I stay but for my guidon: to the field."

(*b.*) "For indeed these three antics do not amount to a man."

(*c.*) "Each battle sees the other's umber'd face."

(*d.*) "I have no cunning in protestation."

(*e.*) "For, hearing this, I must perforce compound
With mistful eyes, or they will issue too."

HISTORY. (Time, 2 hours.)

[*Answer* four *questions only.* Two *are to be selected from Part A and* two *from Part B. All questions have equal value.*]

A.

1. Estimate the contribution of Egypt to the civilization of mankind during the period 4000–3000 B.C. and also during the Empire.

2. Sketch the leading features of Athenian civilization during the Empire.

3. Under the following heads, trace the history of the Roman Republic from its foundation to the end of the Punic wars:—

(*a.*) Political Struggles.

(*b.*) Conquests.

4. Account for the decline of Roman civilization during the Empire and outline the chief causes of its fall.

B.

5. What were the chief characteristics and activities of the Mediæval Church?

6. Write on the origin and results of the Crusades, and give an account of the First Crusade.

7. Discuss the Renaissance in Europe under the following heads:—

(*a.*) Art and Literature.

(*b.*) Explorations and Discoveries.

(*c.*) Religious Movements.

8. Show how Absolute Monarchy triumphed in France under Louis XIV. and failed to triumph in England under the Stuarts.

GEOMETRY. (Time, 2½ hours.)

[*N.B.—Draw neat diagrams, use printed capitals, and give authorities.*]

Value.

10 1. (*a.*) Enunciate two theorems in each of which, from data given relating to the angles of a triangle, a conclusion is drawn regarding the sides of the triangle.

(*b.*) Prove *one* of these in full.

10 2. If two triangles are equal in area, and stand on the same base and on the same side of it, they are between the same parallels.

Value.

16 3. ABC is a given triangle and X is a given point. Draw a triangle equal in area to ABC, having its vertex at X and its base in the same straight line as BC. State your construction and give a theoretical proof.

14 4. The angles made by a tangent to a circle with a chord drawn from the point of contact are respectively equal to the angles in the alternate segments of the circle.

18 5. From any external point P two tangents are drawn to a given circle touching it at A and B. A and B are joined and P is joined to the centre of the circle, X. PX cuts the chord AB at Y. Prove that the rectangle contained by PX and XY is equal to the square on XB.

14 6. To draw an isosceles triangle having each of the angles at the base double of the vertical angle.

18 7. AB is a fixed chord of a circle and AC is a movable chord passing through A. If the parallelogram CB is completed, find the locus of the intersection of its diagonals.

FRENCH GRAMMAR. (Time, 2 hours.)

Value.

10 1. Put the following sentences in the plural (*all parts* of the sentence are to be given in the plural as far as the sense permits) :—
Ce beau bateau traverse la Manche.
Le cheval qui galopait au loin était effrayé.
Pourquoi ne répondis-tu pas?
Il accrocha son fusil à un clou.

10 2. Put the following sentences in the plural :—
Qu'est-il devenu?
Il l'a vu.
S'est-il blessé?
Son frère s'en est repenti.
Il s'est coupé le doigt.

10 3. Substitute in the following a personal pronoun for the portions printed in italics :—
Parlez *de la littérature française.*
Va *à l'école.*
Il a envoyé *la lettre à son frère.*
Il m'a donné *la pomme.*
Vous l'avez vu *au match de football.*
Voici *la Tour Eiffel.*
Parlez *à votre père de mes ennuis.*

25 4. Give :—

(*a.*) The imperfect indicative of *ressembler à son frère* (possessive of the same person and number as the subject).

(*b.*) The future of *concevoir une mauvaise idée de leur hospitalité.*

(*c.*) Present subjunctive of *choisir, voir, devenir, s'en aller, s'y attendre.*

(*d.*) Present indicative, first person singular and first person plural only of *voir, dire, descendre, dormir, se repentir, couvrir.*

(*e.*) Past participle of *concevoir, aller, couvrir, dormir, mourir, dire, souffrir, voir, vivre.*

Value.

10 5. Reply in French in complete sentences to the following questions:—

(*a.*) Où demeurez-vous?

(*b.*) Qu'avez-vous fait pendant les vacances de Paques?

(*c.*) Combien de frères et de soeurs avez-vous?

(*d.*) Quel sport préférez-vous?

(*e.*) N'aimez-vous pas le français?

10 6. (*a.*) Give the comparative and superlative of une bonne mère; un mauvais moment.

(*b.*) Give the adverbs corresponding to vif, brusque, fier, parfait, majestueux, naturel.

10 7. Put the word for this (or that) before the following words: Mur, oiseau, homme, femme, oiseaux, hommes, femmes, horloge, murs, horloges.

15 8. Make the necessary changes in the following verbs printed in italics:—

(*a.*) Il est malade depuis qu'il *être* rentré à la maison.

(*b.*) J'ai arrosé les fleurs afin qu'elles *être* plus fraîches.

(*c.*) Je le lui ai donné de crainte qu'il *revenir*.

(*d.*) Il avait dix ans lorsqu'il *perdre* sa mère.

(*e.*) Pour qu'on vous *obéir*, obéissez aux lois.

(*f.*) Quoi qu'il *faire* froid je dois sortir.

(*g.*) Je le punirai à moins qu'il ne le *faire*.

(*h.*) Elle s'amusait pendant que les vaches *brouter* l'herbe.

(*i.*) Quand j'*avoir* de l'argent je vous payerai.

(*j.*) Je lui demande s'il *venir*.

(*k.*) Je serais venu si j'en *avoir* eu le temps.

(*l.*) Il est sorti parce qu'il *faire* beau temps.

(*m.*) Il y a huit ans que Jean *être* élève au Lycée.

(*n.*) Il y a longtemps qui je le *désirer*.

French Translation. (Time, 2 hours.)

[N.B.—*Candidates should work slowly and revise carefully. Every sentence is framed to illustrate some point of grammar or syntax. Careless work entails serious loss of marks.*]

Value.

40 1. Translate into good English:—

Ce jour-là plus d'un Parisien a dû dire en rentrant chez lui le soir pour se mettre à table: "Quel singulier petit bonhomme j'ai rencontré aujourd'hui."

C'était justement une journée de la fin de l'hiver, une de ces journées tièdes et lumineuses qui, à Paris, souvent sont plus le printemps que le printemps lui-même. Il y avait beaucoup de monde dehors. Un peu étourdi par le va-et-vient bruyant de la rue, j'allais devant moi, timide, et le long des murs. Je me gardais bien de m'arrêter devant les magasins, et pour rien au monde je n'aurais demandé ma route.

Je marchai ainsi près d'une heure jusqu'à un grand boulevard. Il y avait là tant de bruit, tant de gens, tant de voitures, que je m'arrêtai presque effrayé. Comment me tirer d'ici? pensai-je en moi-même. Comment rentrer à la maison? Je risquais fort de rester là jusqu'au grand coup de trompette du jugement dernier, quand soudain Jacques parut à mes côtés. Il était aussi étonné que moi.

(N.B.—Tiède—mild, warm.)

Value.

60 2. Put into French :—

Louis—How long have you been in Bordeaux?

Harry—We have been here three weeks. We did not expect to stay so long when we left Paris. We are on the way to Pauillac.

Louis—You find the city so beautiful that you have decided to stay longer.

Harry—That was scarcely the reason. As our train was going along the banks of the Loire it was derailed. We were not injured, but very many others were less fortunate. Madame Dubois was so much agitated by the accident that she was long in recovering.

Louis—I hope she is better to-day.

Harry—Yes, she is in quite good health at last. But her illness was far from being the last of our misfortunes. The day after we arrived, Jean, Marcel, and I went walking to see the sights of Bordeaux. We were in the park. The weather was very hot. Marcel was hot and tired. He sat down on the grass. He did not notice that it had just been watered. He took a bad cold and has been very ill for a fortnight. The Bordeaux doctors are scarcely so good as the Paris ones.

Louis—Did you expect that?

Harry—You are laughing at me because I say what I think.

Louis—We have become accustomed to it. Parisians always think themselves superior to the inhabitants of any other city in the world. I hope that little Marcel is better.

Harry—Oh, yes, but we shall not be able to leave for Pauillac before Thursday. To-day is Monday. We have only four weeks' vacation. It would have been better to stay in Paris. We could have visited the Zoo every day, which would have been at once instructive and amusing.

GERMAN GRAMMAR. (Time, 2 hours.)

Value.

10 1. Add the correct case endings after the prepositions in the following :—

Mein Freund ist mit sein — Frau und sein — Kind — (plural) auf d — Land gegangen. Er wird da während d — Sommer wegen sein — Gesundheit bleiben. Ihr Haus liegt an — See neben ein — Wald. Die Kinder laufen durch d — Wald ohne ihr — Eltern und kommen nur zu ihr — Mahlzeiten nach d — Haus zurück.

6 2. (*a.*) Make a complete sentence out of each of the following pairs of sentences :—

(1.) Sie neckten ihn. Er war so klein. (weil.)

(2.) Sie kamen alle zusammen. Sie schrieen und pfiffen. (Als.)

(3.) Sie wurden lange nicht einig. Sie setzten einen Tag zum Wettfliegen fest. (Da.)

(*b.*) Turn the second sentence into a relative clause :—

(1.) Die Vögel hielten eine Versammlung. Sie wollten einen König wählen.

(2.) Er versteckte sich in die Federhosen des Adlers. Dieser bemerkte es nicht.

(3.) Die Jüngere bestand auf ihrem Entschluß. Ihre Geduld ging zu Ende.

Value.

15 3. Change the infinitives in the following sentences to 3rd person singular—present, imperfect and perfect :—

(1.) Der Mann tragen das Kind.

(2.) Der Knabe essen sein Butterbrot.

(3.) Das Mädchen verstehen die Lehrerin.

(4.) Sein Vater ankommen heute.

(5.) Das Buch gefallen ihm.

12 4. (*a.*) Translate :—

Thank you. Give it to me. He showed it (masc.) to her. They introduced (vorstellen) him to us.

(*b.*) Rewrite in the passive :—

Der Kutscher holt den Wagen, Der Sohn erschoß den Sperber.

(*c.*) Write the comparative and superlative forms of : Der hohe Baum. Er läuft schnell.

25 5. Complete the following sentences by inserting appropriate articles, giving correct endings to the adjectives and making the verbs agree—the verbs of the first sentence to be present tense ; second, imperfect ; third, perfect ; fourth, pluperfect ; fifth, future. Then rewrite the sentences in the plural throughout :—

(1.) — gut — Kutscher holen — schön — Pferd und groß — Wagen.

(2.) — klein — Zaunkönig verkriechen in — dick — Federhosen — stolz — Adler—.

(3.) — klug — Reisender wünschen — bequem — Platz an — warm — ofen zu haben.

(4.) Sein jünger — Bruder bitten um sein — freundlich — Rat sein — arm — Freund — halber.

(5.) — alt — Professor zubringen — ganz — Sommer bei sein — deutsch — Verwandt — in Berlin.

32 6. Translate :—

(1.) He must go to Victoria on Sunday at the latest.

(2.) The farmer, whose son shot the hawk, was angry.

(3.) Your book is larger than hers, but mine is the largest.

(4.) You may go home if you want to. (singular.)

(5.) It happened on Monday, the first of January, nineteen hundred and twelve, at half-past six.

(6.) He likes to play, but he prefers to read.

(7.) There are many beautiful pictures on the walls.

(8.) One morning, a farmer found that his horse had been stolen.

GERMAN TRANSLATION. (Time, 2 hours.)

Value.

48 1. Translate :—

(*a.*) Ein Reisender kam zitternd vor Kälte und ganz naß in ein Wirtshaus. Er wünschte einen Platz am warmen Ofen zu haben, um sich zu wärmen und seine Kleider zu trocknen. Dieser aber war besetzt. Da wandte er sich an den Wirt und sagte: Bringen Sie meinem Pferd ein Dutzend "Austern!" Der Wirt sah ihn erstaunt an und tat was der Reisende verlangt hatte. Zugleich verließen alle Gäste das Zimmer, um zu sehen, ob das Pferd die Austern fressen würde. Nun nahm er den besten Platz am Ofen und machte es sich bequem.

(*b.*) Da beschaut er sich der Menschen Tun und Treiben und liebt es wohl, sie auf allerlei Weise zu necken und sein Spiel mit ihnen zu treiben; denn das müßt ihr wissen, Rübezahl ist ein eigner Kauz, launisch, schadenfroh, heftig, wankelmütig; manchmal aber auch sehr gutmütig und edel; in einem Augenblick ganz weich von Herzen und im andern so hart wie Stein; heute ist er dein Feind, morgen dein Freund, wie's ihm gerade einfällt.

(*c.*) Und siehe, wie sie um eine Biegnng des Weges kamen, stand da — sie trauten ihren Augen kaum — ein Wirtshaus am Wege. An einem langen, kunstvoll geschmiedeten Arme, der über der Tür angebracht war, hing ein grüner Kranz und in seiner Mitte eine herrliche Traube, die schon, von ferne dem durstigen Wanderer entgegenlachte und ihn zur Einkehr einlud. In der Tür des Wirtshauses aber stand der dicke Wirt; eine rote Weste mit großen, blanken Knöpfen bedeckte sein stattliches Bäuchlein; die kurzen, dicken Beine staken in glänzend schwarzen Kniehosen, von denen die schönen roten Strümpfe recht säuberlich abstachen.

(*d.*) Als das Brautpaar aber freudeftrahlend aus der Kirche trat, kam ihnen plötzlich der gute Kräutersammler entgegen, wünschte den beiden von Herzen Glück nnd gab der Braut eine blanke Münze in die Hand, indem er sprach: ,,Beschau sie oft, liebe Susi, und nimm dir dabei vor, stets deine guten Eigenschaften zu bewahren, so wirst du sicherlich das wahre unde echte Glück finden." — Kaum hatte er ausgeredet, so wuchs seine Gestalt riesengroß, um dann plötzlich in den Lüften zu verschwinden. ,,Rübezahl!" erscholl es plötzlich von aller Munde; denn alle wußten, daß es kein andrer gewesen war, als der Herr der Berge.

12 2. Translate (at sight) :—

Einst gab es große Not unter den Mäusen; denn die Katze war schlau, und es schien, als habe sie ihnen allen den Tod geschworen. Da kamen die Mäuse zusammen und hielten einen Rat. ,,Was fangen wir an?" sprach die älteste unter ihnen, ,,unsere Zahl wird täglich kleiner. Bald werden wir von der Erde verschwunden sein. Wie retten wir uns vor der Katze?" — ,,Nichts ist leichter als das," sprach eine junge Maus, ,,ich wüßte wohl zu helfen. Wir hängen der Katze eine Schelle an, dann mag sie kommen. Wir haben alle feine Ohren, und ehe sie uns erblickt, haben wir uns schnell verkrochen."

24 3. Translate :—

A poor robin came one day in winter to a farmer's window and pecked upon it because it was so cold outside. When the farmer's son noticed the little bird he opened the window and the robin flew into the warm room. They gave it something to eat, for it was hungry, and the bird soon became quite tame. It remained happily all winter in the house, but, when spring came and the sun shone bright, it became sad. Then the farmer opened the window again and the robin quickly flew out into the garden where it sat in a tree and sang.

16 4. Write in German a short description of the room you are sitting in.

Greek. (Time, 2 hours.)

Value.

12 1. Decline in agreement: ὁ ἀγαθὸς ἄνθρωπος; πλοῖον μακρόν; ἡ μικρὰ σκηνή.

9 2. Decline in full: οὗτος (all genders), ἐγώ, σύ.

10 3. Illustrate by short sentences in Greek the common meanings of the prepositions διά and περί.

20 4. Give the principal parts of the following verbs: γράφω, βοάω, βούλομαι, πράττω, ἀκούω, φεύγω, ἐθέλω, λαμβάνω, δοκέω, ἡγέομαι.

7 5. How is a "prohibition" expressed in Greek? Give examples.

12 6. Conjugate in full:—

(*a.*) The present optative passive of τιμάω.

(*b.*) The present subjunctive middle of δηλόω.

(*c.*) The first aorist subjunctive active of λύω.

(*d.*) The pluperfect indicative passive of λείπω.

12 7. Translate into Greek:—

(*a.*) I fear they will destroy the bridges.

(*b.*) If he had done this, it would have been well.

(*c.*) We are leading him away that he may not do our friends harm.

(*d.*) I myself shall offer sacrifice in that village.

18 8. Translate into English:—

καὶ δή ποτε ἐν στενῷ καὶ πηλῷ ταῖς ἁμάξαις δυσπορεύτῳ ἔταξεν ὁ Κῦρος δύο ἄρχοντας τῶν Περσῶν λαμβάνειν τοῦ βαρβαρικοῦ στρατεύματος καὶ συνεκβιβάζειν τὰς ἁμάξας. ἐπεὶ δ' ἐδόκουν αὐτῷ σχολαίως ποιεῖν, ὥσπερ ὀργῇ ἐκέλευσε τοὺς περὶ αὐτὸν Πέρσας τοὺς καλοὺς κἀγαθοὺς συνεπισπεύδειν τὰς ἁμάξας. ἔνθα δὴ μέρος τι τῆς εὐταξίας ἦν θεᾶσθαι.

Latin Authors and Sight Translation. (Time, 2½ hours.)

A.

Value.

12 1. Translate:—

Huic imperat, quas *possit, adeat* civitates horteturque, ut populi Romani fidem sequantur, seque celeriter eo venturum nuntiet. Volusenus perspectis regionibus omnibus, quantum ei *facultatis* dari potuit, qui navi egredi ac se barbaris committere non *auderet*, quinto die ad Caesarem revertitur quaeque ibi *perspexisset* renuntiat.

(*a.*) Account for the mood of *possit, adeat, auderet, perspexisset*, and for the case of *facultatis*.

11 2. Translate:—

Nam quod omni ex reliquis partibus demesso frumento pars una erat reliqua, suspicati hostes huc nostros esse venturos noctu in silvis *delituerant;* tum *dispersos* depositis armis in *metendo* occupatos subito adorti paucis interfectis reliquos incertis *ordinibus* perturbaverant, simul equitatu atque essedis circumdederant.

(*a.*) Parse *dispersos, metendo, ordinibus*, and give the principal parts of *delituerant*.

Value.

9 3. Translate:—

Caesar exposito exercitu et loco castris idoneo capto, ubi ex captivis cognovit quo in loco hostium copiae consedissent, cohortibus decem ad mare relictis et equitibus trecentis, qui *praesidio* navibus essent, de tertia vigilia ad hostes contendit, eo minus veritus navibus, quod in litore molli atque aperto deligatas ad ancoram relinquebat; et praesidio *navibus*que Q. Atrium praefecit.

(*a.*) Explain the case of *praesidio* and *navibus.*

8 4. Translate:—

Sed ea *celeritate* atque eo impetu milites ierunt, cum *capite* solo ex aqua *exstarent,* ut hostes impetum legionum atque equitum sustinere non *possent,* ripasque dimitterent ac se fugae mandarent.

(*a.*) Account for the case of *celeritate* and *capite,* and for the mood of *exstarent* and *possent.*

B.

14 1. Translate:—

'o socii, neque enim ignari sumus ante malorum,
o passi graviora, dabit deus his quoque finem.
vos et *Scyllaeam* rabiem penitusque sonantes
accestis scopulos, vos et *Cyclopea* saxa
experti: revocate animos, maestumque timorem
mittite; forsan et haec olim meminisse iuvabit.
per varios casus, per tot discrimina rerum
tendimus in Latium, sedes ubi fata quietas
ostendunt; illic fas regna resurgere Troiae.
durate, et vosmet rebus servate secundis.'

(*a.*) Write notes (not more than two lines) on *Scyllaeam* and *Cyclopea.*

10 2. Translate:—

Aeolus haec contra: 'tuus, o *regina,* quid *optes,*
explorare labor; mihi iussa capessere fas est.
tu mihi quodcumque hoc *regni,* tu sceptra Iovemque
concilias, tu das epulis accumbere *divom,*
nimborumque facis tempestatumque potentem.'

(*a.*) Write notes (not more than two lines) on *Aeolus, regina,* and explain the mood of *optes,* the case of *regni* and the form *divom.*

7 3. Translate:—

'parce metu, *Cytherea:* manent inmota tuorum
fata tibi; cernes urbem et promissa *Lavini*
moenia, sublimemque feres ad sidera caeli
magnanimum *Aenean;* neque me sententia vertit.

(*a.*) Write notes (not more than two lines) on *Cytherea, Lavini,* and *Aenean.*

9 4. Translate:—

constitit, et lacrimans 'quis iam locus,' inquit, '*Achate,*
quae regio in terris nostri non plena laboris?
en *Priamus!* sunt hic etiam sua praemia laudi;
sunt lacrimae rerum et mentem mortalia tangunt.
solve metus; feret haec aliquam tibi fama salutem.'

(*a.*) Write notes (not more than two lines) on *Achate, Priamus.*

(*b.*) Scan lines 1 and 2.

C.

20 Translate:—

Erat inter Labienum atque hostem difficili transitu flumen ripisque praeruptis. Hoc neque ipse transire habebat in animo neque hostes transituros existimabat. Augebatur auxiliorum cotidie spes. Loquitur in concilio palam, quoniam

Germani appropinquare dicantur, sese suas exercitusque fortunas in dubium non devocaturum et postero die prima luce castra moturum. Labienus noctu tribunis militum convocatis quid sui sit consilii proponit et, quo facilius hostibus timoris det suspicionem, majore strepitu et tumultu quam populi Romani fert consuetudo castra moveri jubet.

Palam—openly, publicly: Quoniam = cum causal. In dubium devocare—to risk. Fert—is.

Latin Grammar and Composition. (Time, 2 hours.)

Value.

20 1. Write the ablative singular and the genitive plural of *hoc animal, quae vis, eadem navis, major res, totus exercitus.*

5 2. Compare *audax, acriter, diu, parum, similis.*

5 3. Write all the infinitives and participles of *fero.*

8 4. Write:—

(*a.*) The second singular future indicative of *eo.*

(*b.*) The third plural future indicative of *possum.*

(*c.*) The first singular present subjunctive of *volo.*

(*d.*) The first singular imperfect subjunctive passive of *capio.*

(*e.*) The first singular imperfect subjunctive of *fio.*

(*f.*) The third plural perfect subjunctive active of *jubeo.*

(*g.*) The second singular present imperative of *hortor.*

(*h.*) The second singular future indicative of *sequor.*

10 5. Write the principal parts of *consisto, accido, opprimo, desilio, adorior, ignosco, frango, adjuvo, meto, consuesco.*

10 6. Translate into Latin:—

By night; leap down (second plural imperative); on all sides; in a loud voice; it is best to do; at great risk; for what reason; according to custom; as bravely as possible; we are of good courage.

42 7. Translate into Latin:—

(*a.*) Obtaining suitable weather, he set out at dawn.

(*b.*) He used the same material for refitting the ships.

(*c.*) He showed what he wished to be done.

(*d.*) If they send hostages, we shall make peace.

(*e.*) So great a storm suddenly arose that we could not hold our course.

(*f.*) I shall leave you on the mainland to find out what is going on.

(*g.*) He thought it would be of great use to him if he only visited the island.

(*h.*) Learning his design, they promised to collect reinforcements.

(*i.*) Let us urge the neighbouring states to come to treat for peace.

PHYSICS. (Time, 2 hours.)

Value.

5 1. (*a.*) Distinguish clearly the terms *relative density* and *specific gravity.*

5 (*b.*) The specific gravity of platinum is 21.5, of iridium 22.4. Find the volume of 1 Kg. of an alloy containing 9 parts of platinum to 1 part of iridium.

10 2. Describe fully an experiment to find the relative density of a solid that is lighter than water.

5 3. (*a.*) Discuss the two common types of wave-motion. Upon what does the intensity of a sound depend? Explain fully.

5 (*b.*) A man standing before a cliff shouts, and 3 seconds later hears the echo. How far is he from the cliff? (Temperature 10° C.)

10 4. Show clearly (use drawings) the difference in construction, working, and use of lift-pumps and force-pumps.

10 5. Describe an experiment to show the effect of pressure on the boiling-point. What practical applications are made of this in manufacturing? In high altitudes how do we overcome the difficulties which this change in the boiling-point creates?

10 6. How much heat is required to change 20 gm. of ice at — 10° C. into steam at 100° C.? (Specific heat of ice = 0.5.)

10 7. Explain fully what you understand by refraction and mention various phenomena which can be explained by this principle. (Make drawings.)

5 8. (*a.*) An object is placed in front of a convex mirror. Illustrate and describe the position and relative size of the image.

5 (*b.*) What is a lens? Draw and name the principal classes.

4 9. (*a.*) What is meant by electrical potential? What is the unit for measuring it and what is taken as the standard or zero?

6 (*b.*) What are the uses of a step-up and a step-down transformer? Where and why is each used?

5 10. (*a.*) Describe fully the apparatus necessary to decompose water by an electric current.

5 (*b.*) A constant current is passed through a silver voltameter for 15 minutes, and it is found that 5.031 gm. of silver have been deposited. What is the strength of the current?

University Matriculation (Senior).

ALGEBRA. (Time, 3 hours.)

Value.

7 1. If a, b, c, d are in continued proportion, show that $b+c$ is a mean proportional between $a+b$ and $c+d$.

8 2. Find two numbers in the ratio $1\frac{1}{2}$ to $2\frac{2}{3}$ such that when each is increased by 15, they shall be in the ratio $1\frac{2}{3}$ to $2\frac{1}{2}$.

9 3. The pressure of the wind on a plane area varies jointly as the area and the square of the velocity of the wind. If the pressure on 3 sq. ft. is 4 lb. when the velocity of the wind is 16 miles an hour, find the velocity of the wind when the pressure on 2 sq. yd. is 54 lb.

8 4. Find the quadratic equation each of whose roots exceeds by 2 the roots of the equation $2x^2+3x+5=0$.

10 5. In the following series find the sum to $2n$ terms and, where possible, to infinity :—

(a.) $3-2+\frac{4}{3}-\ldots.$

(b.) $1\frac{1}{4}-1\frac{1}{5}+1\frac{7}{12}-\frac{4}{5}+1\frac{11}{12}-\frac{2}{5}+\ldots.$

10 6. The digits of a number which lies between 400 and 500 are in A.P., and the number is 70 times the sum of its digits. Find the number.

12 7. (a.) Simplify and express with positive indices :—

$$\sqrt[3]{\frac{(2a)^{-2}\,b^{\frac{3}{2}}}{a^{-\frac{1}{2}}(6b)^{-3}}}.$$

(b.) Find n when $\sqrt[3]{9^n\times 3^{n-1}}=6^n\times 2^{-n}\times 3^{n+1}$.

12 8. (a.) Find in simplified form the coefficient of x^{-7} in the expansion of

$$\left(2x^2-\frac{1}{3x^3}\right)^9.$$

(b.) Use the binomial theorem to evaluate $(1004)^{\frac{2}{3}}$ correct to 4 places o deci mals

10 9. (a.) Prove that $\log(\mathrm{MN})=\log \mathrm{M}+\log \mathrm{N}$.

(b.) Given $\log 2=.30103$, $\log 3=.47712$, $\log 7=.84510$:—

(i.) Find x if $\log x=\bar{4}.47712$.

(ii.) Find the number of digits in $6^{37}\times 21^{14}$.

14 10. How many numbers of 5 digits can be formed, using the digits 0, 1, 2, 3, 4, 5, 6, 7 : (a) if repetitions are allowed; (b) if no repetitions are allowed? In how many of the latter numbers will the digit 0 occur?

CHEMISTRY. (Time, 3 hours.)

[*All questions are of equal value. Answer* ten *only.*]

1. Describe three methods of preparing hydrogen. Illustrate these methods by means of chemical equations and line drawings. What volume of this gas measured at 748 mm. Hg. pressure and 22° C. can be obtained by acting on sulphuric acid with 14.5 grams of zinc? (Zn = 65.4; H = 1.008; S = 32.06; O = 16.00.)

2. Explain fully what is indicated by the terms "sublimation," "hydrolysis," "reversible action," and "exothermic reaction." Give examples.

3. Compare the physical and chemical properties of hydrogen chloride, hydrogen bromide, and hydrogen iodide.

4. Describe two methods for the preparation of chlorine and illustrate by means of chemical equations. How can you prove that the formula of chlorine is Cl_2? What is the result of the action of chlorine upon methane?

5. Write as fully as you can regarding the solubility under varying conditions of the sulphides of the common metals.

6. If 35.5 cc. of ammonia, measured at a pressure of 748 mm. Hg. and a temperature of 22.5° C., were entirely decomposed at 750° C., what volume would the resulting gases occupy under a pressure of two atmospheres?

7. Describe a method for the preparation of sodium carbonate. Show by means of chemical equations the various stages of the reactions involved. What are the characteristic properties and chief uses of sodium carbonate?

8. In what form does aluminium occur in nature? How can the metal be isolated on a commercial scale? What properties render the metal useful industrially?

9. What reaction takes place when ethyl alcohol and acetic acid are mixed? What effect will the addition of concentrated sulphuric acid have on this reaction? Show by means of equations how the above reaction is related to the process known as saponification.

10. What is the usual method of preparing a solution of hypochlorous acid? Discuss the properties of this acid and its application to the process of bleaching.

11. How can ethylene be prepared? Give its structural formula and explain the reaction between ethylene and iodine.

(A maximum of fifteen marks will be given for laboratory exercise-books.)

ENGLISH COMPOSITION. (Time, 3 hours.)

Value.

16 1. Write a full, coherent, and effective *paragraph* on *one* of the following topics:—

(*a.*) A character from Chaucer *or* Spenser.

(*b.*) An aspect of Spenser's allegory.

(*c.*) Classical influence upon English Literature in the age of Shakespeare (1564–1616).

Value.

16 2. Apply the principles of (*a*) paragraph coherence and (*b*) exposition in an examination of the following paragraph:—

"There was in Goldwin Smith that note, characteristic of the prophet, that you could not argue with him, for, like other prophets, he was eventually a solitary soul, and did his thinking alone, brooding in silence over all he read or saw, seldom influenced by others. When he began to deliver himself, it would hardly have startled one if the first sentence had been 'Thus saith the Lord.' Without the glowing intensity of Mazzini, he gave the same impression of unshakable conviction. The weakness of this splendid independence is that it often disables a man from following the movements of opinion in the world around him. As Mazzini would never admit that Italy could be free and prosperous except under a republic, Goldwin Smith continued to cling to the ideals and doctrines of his early manhood. Some of those doctrines have been proved to be sound. It would have been well for the British people if they had taken the advice he gave them forty years ago to reconstruct their House of Lords in a deliberate way before a party crisis arrived. But even before old age overtook him he had lost touch with British politics, though he continued to write about them with the old confidence. About seventeen years ago I had from him one letter after another urging that English Liberals should unite themselves and find a live political issue in a campaign for the disestablishing of the Church of England. That was just the time when every careful observer in England had begun to perceive that the sentiment for disestablishment was becoming weaker, because other questions had begun to fill the public mind, and that to raise the issue would bring no strength to any party that raised it. Aversion to ecclesiastical power had been always among the principles he most cherished. It was the only thing he had in common with Froude, whom he heartily distrusted and disliked. Though he had dropped all dogmas, he was of a profoundly religious temper, and held that religion had suffered and would continue to suffer from any connection with the civil power, whether as ruled or as ruler."

18 3. State definitely what is wrong with the following passages and rewrite them correctly:—

(*a.*) Nelson now met the Spanish fleet off Cape St. Vincent, and in the engagement that followed he saw that the Spanish showed signs of retreating, so he disobeyed orders and engaged four of the enemy at once, and the English were victorious.

(*b.*) The opposing side scatters its men so that each one has a certain part of the field to guard, and in order to be in a position to catch the ball when it is kicked.

(*c.*) Chaucer began to write at an early age, and he was a page for some court lady and went to France when she did, and we may presume that his stay there gave him an acquaintance with French literature which was later of service to him.

(*d.*) By placing on file with us a description of your present position, salary, opportunities, evidences of your work, and a few strong references, and also under what conditions you would make a change, this agency feels confident it can be of service to you.

50 4. Write an essay on *one* of the following subjects:—

(*a.*) City (or Town, or Village) Beautifying.

(*b.*) Why Read Spenser?

(*c.*) Effort, the Condition of Success.

ENGLISH LITERATURE. (Time, 3 hours.)

Value.

24 1. Write as fully as you can on each of the following:—

(*a.*) Early Celtic Literature.

(*b.*) Anglo-Saxon War-Poetry.

(*c.*) Confessio Amantis.

(*d.*) Sir Philip Sidney's contribution to English Literature.

(*e.*) Gorboduc and Ralph Roister Doister.

(*f.*) Shakespeare's dramatic contemporaries and their work (Marlowe and Jonson may be omitted for the purposes of this question).

12 2. What were the chief literary, historical, and social influences upon the poetry of: (*a*) Chaucer; (*b*) Spenser; and (*c*) Milton?

Support your statements by definite references to their works.

Answer any *two* of the parts (*a*), (*b*), and (*c*).

20 3. Write on the first book of the "Faerie Queene" under *one* of the following heads:—

(*a.*) A Religious Poem.

(*b.*) A Poem for its Age.

12 4. Quote a passage of at least sixteen consecutive lines from "The Prologue to the Canterbury Tales."

Give some directions for the scansion of Chaucer's lines with suitable illustration from the passage quoted.

14 5. To whom do the following passages allude?

(*a.*) "With scaled browes blake and piled berd."

(*b.*) "And ever he rood the hyndreste of our route."

What traits of character do the lines suggest?

Give full illustration from "The Prologue" of Chaucer's skill in thus *hinting* at the characteristics of his pilgrims.

18 6. Set forth the substance of the scene in "Comus" in which the Lady sits in the enchanted chair. Suggest interpretations of the symbolism of the scene.

FRENCH LANGUAGE. (Time, 3 hours.)

Value.

40 1. Put into French:—

Seeing that I was resolved to risk everything, bursting into tears and taking me into his arms, he cried: "Go, child of nature, regain man's independence of which Lopez would not deprive thee. If I were younger I would go with thee into the wilderness and would restore thee to thy mother's arms. When thou art in thy forests think sometimes of this old Spaniard who gave thee hospitality and recall, that thou mayst love thy neighbour, that thy first experience of the human heart has been all in its favour."

Value.

20 2. Put into French:—

(*a.*) When he comes back he will come and see you.

(*b.*) I have not seen his brother or his sister. No more have I.

(*c.*) He asks for *something to eat.*

(*d.*) Yes, Colonel, replied the old soldier, *I* took this flag.

(*e.*) I had known him for twenty years.

(*f.*) English was the only language he spoke.

(*g.*) It is possible that it is too late.

(*h.*) She never takes more than one small piece of cake; she eats no more than a sparrow.

(*i.*) Don't you remember what I told you?

(*j.*) The more difficult a thing is, the more it is worth while doing.

10 3. Change the principal sentences in the way indicated and make any other changes thus rendered necessary:—

(*a.*) Cette femme ne parle pas mieux qu'elle écrit. (Take the negative out.)

(*b.*) Je vous assure qu'il a été reçu. (Make negative.)

(*c.*) J'ignorais que vous fussiez arrivé. (Make negative.)

(*d.*) Récitez-moi la poésie que vous savez par coeur. (Substitute *quelque* for *la.*)

10 4. Give the primary tenses of falloir, lire, mourir, concevoir, boire, manger, ouvrir, aller, vivre, voir.

10 5. Give the plural of: un jeu nouveau; un vent glacial; le carnaval de Venise; un beau cheval.

Siepmann asks in one of the exercises for the plural of: *un conseil amical.* Now the masculine plural of *amical* is not used. How would you express this idea (the plural of: *un conseil amical*) in every-day French?

7 6. Make the necessary changes in the verbs in italics:—

(*a.*) Ils se sont *sauver.*

(*b.*) Ils *courir* aux sports qui auront lieu la semaine prochaine.

(*c.*) Il *descendre* (past indefinite) les malles.

(*d.*) Il *naître* (past indefinite) à Paris.

(*e.*) Il *devenir* (pluperfect) riche.

(*f.*) Il *changer* (past definite or preterite) d'habits.

(*g.*) Vous *aller* (past indefinite) trop vite.

3 7. Substitute demonstrative pronouns for the parts printed in italics:—

Quand a-t-il écrit *ces lettres-là?*

Ces champs là sont *les champs* de mon oncle.

Ce qu'il a dit n'est pas vrai.

FRENCH LITERATURE. (Time, 3 hours.)

Value.

10 1. Why is Molière regarded as a great writer of comedy?

10 2. Sometimes reference is made to the dramatic talent of La Fontaine. Why?

10 3. Who were the great prose writers of the eighteenth century? Give some account of their work.

10 4. What do you understand by the term *Romantic Movement?* Who took part in it?

5. Translate the following passages and comment on the words or expressions in italics:—

15 (*a.*)

Mourir sans tirer *ma* raison!
Rechercher un trépas si mortel à ma gloire!
Endurer que l'Espagne impute à ma mémoire
D'avoir mal soutenu l'honneur de ma maison!
Respecter un amour dont mon âme égarée
Voit la perte assurée!
N'écoutons plus ce *penser suborneur*,
Qui ne sert qu'à ma peine
Allons, mon bras; sauvons du moins l'honneur,
Puisqu'après tout il faut perdre Chimène.

15 (*b.*) DON CARLOS (SEUL). Charlemagne, pardon! ces voûtes solitaires
Ne devraient répéter que paroles austères.
Tu t'indignes sans doute à ce bourdonnement
Que nos ambitions font sur ton monument.
—Charlemagne est ici! Comment, sépulcre sombre,
Peux-tu sans éclater contenir si grande ombre?
Es-tu bien là, géant d'un monde créateur,
Et t'y peux-tu coucher de toute ta hauteur?
—Ah! c'est un beau spectacle à ravir la pensée
Que l'Europe ainsi faite et comme il l'a laissée!
Un édifice, avec *deux hommes* au sommet,
Deux chefs élus, auxquels tout roi né se soumet.
Presque tous les états, duchés, fiefs militaires,
Royaumes, marquisats, tous sont héréditaires,
Mais le peuple a parfois son pape ou son césar,
Tout marche, et le hasard corrige le hasard.
De là vient l'équilibre, et toujours l'ordre éclate.

10 (*c.*) Tu ne nous as point donné un coeur pour nous haïr, et des mains pour nous égorger; fais que nous nous aidions mutuellement à supporter le fardeau d'une vie pénible et passagère; que les petites différences entre les vêtements qui couvrent nos débiles corps, entre tous nos langages insuffisants, entre tous nos usages ridicules, entre toutes nos lois imparfaites, entre toutes nos opinions insensées, entre toutes nos conditions si disproportionnées à nos yeux, et si égales devant toi; que toutes ces petites nuances qui distinguent les atomes appelés hommes ne soient pas des signaux de haine et de persécution.

20 (*d.*) Grandet alla, muni de sa fortune liquide et de la dot, muni de deux mille louis d'or, *au district*, où, moyennant deux cents doubles louis offerts par son beau-père au farouche républicain qui surveillait la vente des domaines nationaux, il eut *pour un morceau de pain*, légalement, sinon légitimement, les plus beaux vignobles de l'arrondissement, une vieille abbaye et quelques *métairies*. Les habitants de Saumur étaient peu révolutionnaires; le père Grandet passa pour un homme hardi, un républicain, un patriote, pour un esprit qui donnait dans les nouvelles idées, tandis que le tonnelier donnait tout bonnement dans les vignes.

GEOMETRY. (Time, 3 hours.)

Value.

10 1. (*a.*) Show how to divide a given straight line internally and externally in the ratio of 3 to 2. Give proof.

(*b.*) Construct a square having an area of 6 sq. in. Omit proof.

8 2. Prove that the areas of similar triangles are proportional to the squares on corresponding sides.

12 3. Prove that the rectangle contained by the diagonals of a quadrilateral inscribed in a circle is equal to the sum of the two rectangles contained by its opposite sides.

14 4. O is the centre and OD a radius of a circle. E is any point in OD, and F is taken in OD produced such that OF is a third proportional to OE and OD. If P is any point on the circumference of the circle, prove that the angles FPD and DPE are equal.

14 5. A piece of paper is cut in the form of a triangle ABC having AB = 5 in., BC = 12 in., and AC = 13 in. The triangle is folded so that A and C coincide. Find the length of the crease.

12 6. AB and CD are two given skew lines and P is a given point not on AB or CD. Show how to draw a straight line from P which shall cut the two given skew lines.

12 7. Prove that the sum of any two face angles in a trihedral angle is greater than the third.

8 8. (*a.*) Prove that two skew lines have a common perpendicular.

10 (*b.*) Given two skew lines, show how to draw a straight line from one line to the other so as to make equal angles (not right angles) with each.

GERMAN GRAMMAR AND COMPOSITION. (Time, 3 hours.)

Value.

25 1. Translate :—

Some American students who had been attending the University at Leipzig, wanted to take a vacation trip and see all they could of the country. So they got a map and arranged a tour, which conducted them through the Black Forest to the Rhine. From there they took the beautiful steamer trip to Cologne and saw the picturesque old castles on both banks of the historic river. Arrived at Cologne, they admired the wonderful cathedral, one of the most famous monuments of Gothic architecture in the world. Their return trip to Leipzig was equally interesting, as they took a walking tour through the Harz mountains and so were able to see the places made familiar to them by Heine's charming Harzreise.

40 2. Translate :—

(1.) The professor asked them if they wished to take a long trip.

(2.) The farther they went the more things occurred to them.

(3.) They preferred to take the street car because the Wienhold family was to accompany them.

(4.) Here, waiter, please give us two cups of coffee and fifty pfennigs' worth of rolls and sausages.

(5.) We should enjoy the scenery more, if the window were open.

Value.

(6.) I told the old gentleman that we were not too proud of our pronunciation.

(7.) They took a room at five marks, and asked the porter to have their things brought up.

(8.) Luther is said to have thrown his inkwell at the devil.

(9.) When he had read their letter, he asked for his old friend and was pleased to learn that he was well.

(10.) After introducing them to his wife and daughters, he proposed that they should have coffee together in the garden.

20 3. Translate (at sight) :—

I received a letter a few days ago from my friend in Leipzig, in which he says he intends to spend next term at the University in Breslau because there are too many Americans and English in Leipzig. He declares he has been forced to put off his examination, because it is impossible to become master of German in such a crowd of English-speaking students. I suppose, of course, he understands the language when spoken, and can express himself very well in ordinary conversation, for he wrote me that he had been introduced into a good many refined families in Leipzig. What he wanted, however, was a closer acquaintance with German students, and that seemed quite impossible in Leipzig.

15 4. Write in German, a geographical description of Germany *or* the story of the polite Dutchman.

GERMAN TRANSLATION. (Time, 3 hours.)

Value.

1. Translate :—

8 (*a.*) Er hatte seit Jahren, wo er deren habhaft werden konnte, die im Volke lebenden Reime und Lieder gesammelt, und ging nun daran, seinen Schatz zu ordnen und womöglich mit neuen Aufzeichnungen aus der Umgegend zu vermehren.— Elisabeth war zu allen Zeiten sanft und freundlich; Erichs immer gleichbleibende Aufmerksamkeit nahm sie mit einer fast demütigen Dankbarkeit auf, und Reinhardt dachte mitunter, das heitere Kind von ehedem habe wohl eine weniger stille Frau versprochen.

8 (*b.*) Draußen auf der Straße war es tiefe Dämmerung; er fühlte die frische Winterluft an seiner heißen Stirn. Hie und da fiel der helle Schein eines brennenden Tannenbaums aus den Fenstern, dann und wann hörte man von drinnen das Geräusch von kleinen Pfeifen und Blechtrompeten und dazwischen jubelnde Kinderstimmen. Scharen von Bettelkindern gingen von Haus zu Haus, oder stiegen auf die Treppengeländer und suchten durch die Fenster einen Blick in die versagte Herrlichkeit zu gewinnen.

Value.

2. Translate :—

8 (*a.*) Eine bittere Wehmut umfing sie, das Gefühl, als ob sie aus einer schöneren Welt ausgestoßen wäre und jetzt als ein glückloser Schatten in der Öde herumirre; denn wenn das Bild auch zu einem Ideal erhoben war, so stellte es gerade dadurch das ursprüngliche innere Wesen Eugenias dar, das durch ihre Schulfuchserei nur verhüllt wurde, und er war ein edleres Gefühl als Eitelkeit, durch welches sie ihr besseres Selbst in dem magischen Mondglanz nun erkannte. Das machte ihr eben zu Mute, wie wenn sie die unrechte Karte ausgespielt hätte, um modern zu reden, da es damals keine Karten gab.

8 (*b.*) „Gieb mir diese Dinge wieder und du kannst wohl mein Weib dafür haben!" erwiderte Gebizo bitter lachend, und jener rief blitzschnell: „Es gilt! Suche unter dem Kopfkissen deiner Frau, dort wirst du finden, was für deine ganze Lebenszeit ausreicht, alle Tage ein Kloster zu bauen und tausend Menschen zu speisen, und wenn du hundert Jahre alt würdest! Dafür bringe mir dein Weib hier zur Stelle, unfehlbar am Abend vor Walpurgistag!"

3. Translate :—

9 (*a.*) — Und all das Unheil, hat der böse Geist Journalismus angerichtet. Alle Welt klagt über ihn und jedermann möchte ihn für sich benutzen. Mein Oberst hat so lange die Zeitungsschreiber verachtet, bis er selbst einer geworden ist, und Senden läßt keine Gelegenheit vorüber, auf meine guten Freunde von der Feder zu schelten, nur um selbst an ihre Stelle zu treten. Ich sehe kommen, daß Piepenbrink und ich auch noch Journalisten werden und zusammen ein kleines Blatt unter dem Titel: „Der unartige Bolz" herausgeben.

9 (*b.*) Es ist möglich, daß, wie jetzt Sie, auch eine spätere Zeit unsern politischen Hader, unsere Parteibestrebungen und was damit zusammenhängt, sehr niedrig schätzen wird. Es ist möglich, daß unser ganzes Arbeiten resultatlos bleibt; es ist möglich, daß vieles Gute, das wir ersehnen, sich, wenn es erreicht ist, in das Gegenteil verkehrt, ja es ist höchst wahrscheinlich, daß mein eigner Anteil an dem Kampfe oft peinlich, unerquicklich und durchaus nicht das sein wird, was man eine dankbare Thätigkeit nennt; aber das alles darf mich nicht abhalten, dem Kampf und Ringen der Zeit, welcher ich angehöre, mein Leben hinzugeben; denn es ist trotz alledem dieser Kampf das Höchste und Edelste, was die Gegenwart hervorbringt.

8 4. Translate :—

Derr Herr kommt siegesbewußt — statt der Skalpe der erschlagenen Feinde trägt er einige Medaillons mit braunen und blonden Locken an der Uhrkette.— Er kommt also und sagt einige gewöhnliche Worte. Man empfängt ihn kalt—sieht ihm scharf in das Auge — und sagt herablassend: „Sehr erfreut." Dann schweigt man und läßt ihn reden — ab und zu ein Wort und ein Blick von der Seite. Je länger er redet — desto eher wird er eine Torheit herausbringen — dann zuckt man die Achseln — lächelt etwas höhnisch — wieder ein Seitenblick — etwa so — als wenn man sagen wollte „Sie machen ja entsetzliche Anstrengungen." Das setzt ihn in Verlegenheit — man winkt ihm gnädig und er geht — um bald wieder an unserer Seite zu sein.

14 5. Discuss briefly the above passages in their proper context.

5 6. Translate :—

(*a.*) Um den Frack ist mir nicht. Das geht nicht. Das wird sich finden Wollen Sie mich zum Besten haben? Dafür kann man nicht.

Value.

5 (*b.*) Es handelt sich um deine Ehre. Ich habe es satt bei dem Koriolan. Dem geschieht recht. Es ist zum Tollwerden. Sie müssen uns schon etwas zu gute halten.

18 7. Write briefly, in German, the story of Immensee, *or* one of Keller's Legenden.

GREEK AUTHORS. (Time, 3 hours.)

Value.

24 1. Translate:—

μέχρι μὲν δὴ τούτων γελάσιμα καὶ μειρακιώδη τὰ εἰρημένα· τὰ μετὰ ταῦτα δὲ οὐκέτι εὐκαταφρόνητα, ὦ ἄνδρες, ἀκούσεσθε, ἀλλὰ καὶ πάνυ φιληκόων ἀκροατῶν δεόμενα· ἵνα γὰρ καθ' Ὅμηρον εἴπω

θεός μοι ἐνύπνιον ἦλθεν ὄνειρος
ἀμβροσίην διὰ νύκτα

ἐναργὴς οὕτως, ὥστε μηδὲν ἀπολείπεσθαι τῆς ἀληθείας. ἔτι γοῦν καὶ μετὰ τοσοῦτον χρόνον τά τε σχήματά μοι τῶν φανέντων ἐν τοῖς ὀφθαλμοῖς παραμένει καὶ ἡ φωνὴ τῶν ἀκουσθέντων ἔναυλος· οὕτω σαφῆ πάντα ἦν. δύο γυναῖκες λαβόμεναι ταῖν χεροῖν εἷλκόν με πρὸς ἑαυτὴν ἑκατέρα μάλα βιαίως καὶ καρτερῶς· μικροῦ γοῦν με διεσπάσαντο πρὸς ἀλλήλας φιλοτιμούμεναι· καὶ γὰρ ἄρτι μὲν ἂν ἡ ἑτέρα ἐπεκράτει καὶ παρὰ μικρὸν ὅλον εἶχέ με, ἄρτι δ' ἂν αὖθις ὑπὸ τῆς ἑτέρας εἰχόμην. ἐβόων δὲ πρὸς ἀλλήλας ἑκατέρα, ἡ μέν, ὡς αὐτῆς ὄντα με κεκτῆσθαι βούλοιτο, ἡ δέ, ὡς μάτην τῶν ἀλλοτρίων ἀντιποιοῖτο. ἦν δὲ ἡ μὲν ἐργατικὴ καὶ ἀνδρικὴ καὶ αὐχμηρὰ τὴν κόμην, τῷ χεῖρε τύλων ἀνάπλεως, διεζωσμένη τὴν ἐσθῆτα, τιτάνου καταγέμουσα, οἷος ἦν ὁ θεῖος, ὁπότε ξέοι τοὺς λίθους· ἡ ἑτέρα δὲ μάλα εὐπρόσωπος καὶ τὸ σχῆμα εὐπρεπὴς καὶ κόσμιος τὴν ἀναβολήν. τέλος δ' οὖν ἐφιᾶσί μοι δικάζειν, ὁποτέρᾳ βουλοίμην συνεῖναι αὐτῶν.

(*a.*) Explain the construction of *ἂν - - - ἐπεκράτει, βούλοιτο, τὴν κόμην, τύλων, ξέοι.*

(*b.*) Give the principal parts of *ἀκούσεσθε, ἀπολείπεσθαι, φανέντων, παραμένει.*

18 2. Translate:—

διελθόντες δὲ καὶ τούτους ἐς τὸ πεδίον ἐσβάλλομεν τὸ Ἀχερούσιον, εὑρίσκομέν τε αὐτόθι τοὺς ἡμιθέους τε καὶ τὰς ἡρωΐνας καὶ τὸν ἄλλον ὅμιλον τῶν νεκρῶν κατὰ ἔθνη καὶ κατὰ φῦλα διαιτωμένους, τοὺς μὲν παλαιούς τινας καὶ εὐρωτιῶντας καὶ ὥς φησιν Ὅμηρος, ἀμενηνούς, τοὺς δ' ἔτι νεαλεῖς καὶ συνεστηκότας, καὶ μάλιστα τοὺς Αἰγυπτίους αὐτῶν διὰ τὸ πολυαρκὲς τῆς ταριχείας. τὸ μέντοι διαγιγνώσκειν ἕκαστον οὐ πάνυ τι ἦν ῥᾴδιον· ἅπαντες γὰρ ἀτεχνῶς ἀλλήλοις γίγνονται ὅμοιοι τῶν ὀστῶν γεγυμνωμένων· πλὴν ἀλλὰ μόγις τε καὶ διὰ πολλοῦ ἀναθεωροῦντες αὐτοὺς ἐγιγνώσκομεν. ἔκειντο δ' ἐπ' ἀλλήλοις ἀμαυροὶ καὶ ἄσημοι καὶ οὐδὲν ἔτι τῶν παρ' ἡμῖν καλῶν φυλάττοντες. ἀμέλει πολλῶν ἐν ταὐτῷ σκελετῶν κειμένων καὶ πάντων ὁμοίων φοβερόν τι καὶ διάκενον δεδορκότων καὶ γυμνοὺς τοὺς ὀδόντας προφαινόντων ἠπόρουν πρὸς ἐμαυτόν, ᾧτινι διακρίναιμι τὸν Θερσίτην ἀπὸ τοῦ καλοῦ Νιρέως ἢ τὸν μεταίτην Ἶρον ἀπὸ τοῦ Φαιάκων βασιλέως ἢ Πυρρίαν τὸν μάγειρον ἀπὸ τοῦ Ἀγαμέμνονος.

(*a.*) Explain the construction of *διαιτωμένους, ὀστῶν, διακρίναιμι.*

(*b.*) Explain the allusions in the last sentence.

Value.

18 3. Translate:—

ΜΙΚ. Ω Ζεῦ τεράστιε καὶ Ἡράκλεις ἀλεξίκακε, τί τὸ κακὸν τοῦτ ἐστίν; ἀνθρωπικῶς ἐλάλησεν ἀλεκτρυών.

ΑΛΕΚ. Εἶτά σοι τέρας εἶναι δοκεῖ τὸ τοιοῦτον, εἰ ὁμόφωνος ὑμῖν εἰμι;

ΜΙΚ. Πῶς γὰρ οὐ τέρας; ἀλλ' ἀποτρέποιτε, ὦ θεοί, τὸ δεινὸν ἀφ' ἡμῶν.

ΑΛΕΚ. Σύ μοι δοκεῖς, ὦ Μίκυλλε, κομιδῇ ἀπαίδευτος εἶναι μηδὲ ἀνεγνωκέναι τὰ Ὁμήρου ποιήματα, ἐν οἷς καὶ ὁ τοῦ Ἀχιλλέως ἵππος ὁ Ξάνθος μακρὰ χαίρειν φράσας τῷ χρεμετίζειν ἔστηκεν ἐν μέσῳ τῷ πολέμῳ διαλεγόμενος ἔπη ὅλα ῥαψῳδῶν, οὐχ ὥσπερ ἐγὼ νῦν ἄνευ τῶν μέτρων, ἀλλὰ καὶ ἐμαντεύετο ἐκεῖνος καὶ τὰ μέλλοντα προεθέσπιζε καὶ οὐδέν τι παράδοξον ἐδόκει ποιεῖν, οὐδὲ ὁ ἀκούων ἐπεκαλεῖτο ὥσπερ σὺ τὸν ἀλεξίκακον ἀποτρόπαιον ἡγούμενος τὸ ἄκουσμα. καίτοι τί ἂν ἐποίησας, εἴ σοι ἡ τῆς Ἀργοῦς τρόπις ἐλάλησεν ἢ Δωδώνη αὐτόφωνος ἐμαντεύσατο, ἢ εἰ βύρσας εἶδες ἐρπούσας καὶ βοῶν κρέα μυκώμενα, ἡμίεφθα, περιπεπαρμένα τοῖς ὀβελοῖς;

(*a.*) Explain the construction of ἀποτρέποιτε, ἀνεγνωκέναι, εἶδες.

(*b.*) Give the principal parts of δοκεῖ, ἀνεγνωκέναι, εἶδες.

(*c.*) Explain the allusions in the last sentence.

19 4. Translate:—

ΧΟΡ. τί ποθ' ἡσυχία πρόσθεν μελάθρων;
τί σεσίγηται δόμος Ἀδμήτου;
ἀλλ' οὐδὲ φίλων πέλας οὐδείς,
ὅστις ἂν εἴποι πότερον φθιμένην
χρὴ βασίλειαν πενθεῖν, ἢ ζῶσ'
ἔτι φῶς λεύσσει Πελίου τόδε παῖς
Ἄλκηστις, ἐμοὶ πᾶσί τ' ἀρίστη
δόξασα γυνὴ
πόσιν εἰς αὐτῆς γεγενῆσθαι.
κλύει τις ἢ στεναγμὸν ἢ
χειρῶν κτύπον κατὰ στέγας
ἢ γόον ὡς πεπραγμένων;
οὐ μὰν οὐδέ τις ἀμφιπόλων
στατίζεται ἀμφὶ πύλας.
εἰ γὰρ μετακύμιος ἄτας,
ὦ Παιάν, φανείης.

(*a.*) Scan the first line and name the metre.

(*b.*) Explain the construction of φανείης.

21 5. Translate:—

ΗΡ. οὗτος, τί σεμνὸν καὶ πεφροντικὸς βλέπεις;
οὐ χρὴ σκυθρωπὸν τοῖς ξένοις τὸν πρόσπολον
εἶναι, δέχεσθαι δ' εὐπροσηγόρῳ φρενί.
σὺ δ' ἄνδρ' ἑταῖρον δεσπότου παρόνθ' ὁρῶν,
στυγνῷ προσώπῳ καὶ συνωφρυωμένῳ
δέχει, θυραίου πήματος σπουδὴν ἔχων.
δεῦρ' ἔλθ', ὅπως ἂν καὶ σοφώτερος γένῃ.
τὰ θνητὰ πράγματ' οἶδας ἣν ἔχει φύσιν;
οἶμαι μὲν οὔ· πόθεν γάρ; ἀλλ' ἄκουέ μου.
βροτοῖς ἅπασι κατθανεῖν ὀφείλεται,
κοὐκ ἔστι θνητῶν ὅστις ἐξεπίσταται
τὴν αὔριον μέλλουσαν εἰ βιώσεται·
τὸ τῆς τύχης γὰρ ἀφανὲς οἷ προβήσεται,
κἄστ' οὐ διδακτὸν οὐδ' ἁλίσκεται τέχνῃ.

(*a.*) Scan the next to the last line and name the metre.

(*b.*) Explain the construction of οὗτος, σεμνόν, προσώπῳ, ἔχει, θνητῶν.

(*c.*) Explain the situation, and discuss the character of the speaker and its appropriateness in the play.

(*d.*) Would the play have been improved, if, instead of having one of the characters tell the audience that Admetus begged his friends to die for him the poet had represented this in a separate scene?

GREEK COMPOSITION, SIGHT TRANSLATION, AND HISTORY. (Time, 3 hours.)

A. COMPOSITION.

Value.

50 Translate into Greek :—

(1.) Lucian's father sent him to his uncle so that he might become a sculptor.

(2.) By hard toil they became so famous that people came from all around to see them.

(3.) After Lucian became wealthy (use participial construction), his uncle was glad to see him.

(4.) Alexander fought the Persians for two years before he went to Egypt.

(5.) If Charon takes Menippus in his boat, he will get no fare.

(6.) Hermes said that Menippus was a philosopher.

(7.) Alexander knew that he was greater than the other generals.

(8.) Whoever came to this river was carried over by Charon in a small boat.

(9.) I did not know why he had not come the day before.

(10.) This general saw to it that his soldiers had food.

B. SIGHT TRANSLATION.

A DISASTROUS CAPTURE.

30 Μάλα δὲ πιεζόμενοι οἱ Θηβαῖοι σπάνει σίτου διὰ τὸ δυοῖν ἐτοῖν μὴ εἰληφέναι καρπὸν ἐκ τῆς γῆς, πέμπουσιν ἐπὶ δυοῖν τριήροιν ἄνδρας εἰς Παγασὰς ἐπὶ σῖτον δέκα τάλαντα δόντες. Ἀλκέτας δὲ ὁ Λακεδαιμόνιος φυλάττων Ὠρεόν, ἐν ᾧ ἐκεῖνοι τὸν σῖτον συνεωνοῦντο, ἐπληρώσατο τρεῖς τριήρεις, ἐπιμεληθεὶς ὅπως μὴ ἐξαγγελθείη. ἐπεὶ δὲ ἀπήγετο ὁ σῖτος, λαμβάνει ὁ Ἀλκέτας τόν τε σῖτον καὶ τὰς τριήρεις, καὶ τοὺς ἄνδρας ἐζώγρησεν οὐκ ἐλάττους ὄντας ἢ τριακοσίους. τούτους δὲ εἷρξεν ἐν τῇ ἀκροπόλει, οὗπερ αὐτὸς ἐσκήνου.

NOTE.—ζωγρεῖν = take prisoners.

C. HISTORY.

20 1. The relations of Athens and Sparta, 479-431 B.C.

2. Causes other than outside military pressure that contributed to the defeat of Athens in the Peloponnesian War.

HISTORY. (Time, 3 hours.)

[*All questions are of equal value. Answer* five *only.*]

1. Trace the development of the English parliamentary system during the 17th and 18th Centuries.

2. What were the leading features of the Old Régime in Europe? Illustrate your answer by reference to 18th Century France.

3. Outline the rôle played by the Jacobins in the French Revolution.

4. Was Napoleon Bonaparte greater in statesmanship than in war?

5. Outline the effects of the Industrial Revolution on 19th Century England.

6. State the problems confronting the Congress of Vienna. To what extent was its solution of the problems satisfactory?

7. "The middle years of the 19th Century witnessed a great revival of nationalism." Discuss with especial reference to Italy and Germany.

8. Sketch the relations between Church and State in France under the Third Republic.

9. To what extent has the history of England since 1832 been a "progress towards democracy"?

10. What is your explanation of the origin of the World War?

LATIN AUTHORS. (Time, 3 hours.)

Value.

13 1. Translate:—

Nam si id *culpa* senectutis accideret, eadem mihi usu *venirent* reliquisque omnibus maioribus *natu*, quorum ego multorum cognovi senectutem sine querella, qui se et libidinum *vinculis* laxatos esse non moleste *ferrent* nec a suis despicerentur. Sed omnium istius modi querellarum in moribus est culpa, non in aetate. Moderati enim et nec difficiles nec inhumani senes tolerabilem senectutem agunt, importunitas autem et inhumanitas omni *aetati* molesta est.

(*a.*) Account for the mood of *venirent, ferrent;* the case of *culpa, natu, vinculis, aetati.*

9 2. Translate:—

Non facit ea, quae iuvenes: at vero *multo* maiora et meliora facit. Non viribus aut velocitate aut celeritate corporum res magnae geruntur, sed consilio auctoritate sententia *quibus* non modo non orbari, sed etiam augeri senectus solet; nisi forte ego vobis, qui et miles et tribunus et legatus et consul versatus sum in vario genere bellorum, cessare nunc videor, cum bella non gero. At senatui quae sint gerenda praescribo et quo modo; Carthagini male iam diu cogitanti bellum multo ante denuntio, de qua vereri non ante desinam quam illam exscisam esse cognovero. Quam palmam utinam di immortales, Scipio, tibi *reservent*, ut avi reliquias *persequare*, cuius a morte tertius hic et tricesimus annus est, sed memoriam illius viri omnes excipient anni consequentes.

(*a.*) Account for the mood of *reservent, persequare;* the case of *multo, quibus.*

8 3. Translate:—

Itaque adulescentes mihi mori sic videntur, ut cum aquae multitudine flammae vis opprimitur senes autem sic, ut cum sua sponte, nulla adhibita vi, consumptus ignis exstinguitur, et quasi poma ex arboribus, cruda si sunt, vix evelluntur, si matura et cocta, decidunt, sic vitam adulescentibus vis aufert, senibus maturitas; quae quidem mihi tam iucunda est, ut, quo propius ad mortem accedam, quasi terram videre videar aliquandoque in portum ex longa navigatione esse venturus.

Value.

4 4. Translate:—

Haec habui de senectute quae *dicerem*, ad quam utinam veniatis, ut ea, quae ex me audistis re experti probare possitis!

(*a.*) Account for the mood of *dicerem.*

6 5. What four charges does Cato say are brought against old age? Set forth his answer to any *one* of them.

7 6. Translate:—

Psittacus, Eois imitatrix ales ab Indis,
occidit: *exequias* ite frequenter, aves;
ite, piae volucres, et plangite pectora pinnis
et rigido teneras ungue notate genas;
horrida pro maestis lanietur pluma capillis,
pro longa *resonent* carmina vestra tuba!

(*a.*) Account for the case of *exequias;* the mood of *resonent.*

7 7. Translate:—

quilibet hanc saevo vitam mihi finiat ense,
me tamen extincto fama superstes erit,
dumque suis septem victrix de montibus orbem
prospiciet domitum Martia Roma, legar.
tu quoque, quam studii maneat felicior usus,
effuge venturos, qua potes, usque rogos!

(*a.*) Account for the mood of *finiat.*

8 8. Translate:—

Ecquid ab impressae cognoscis imagine cerae
haec tibi Nasonem scribere verba, Macer?
auctorisque sui si non est anulus index,
cognitane est nostra littera facta manu?
an tibi notitiam mora temporis eripit horum,
nec repetunt oculi signa vetusta tui?
sis licet oblitus pariter gemmaeque manusque,
exciderit tantum ne tibi cura mei.

(*a.*) Name the metre. Scan lines 1, 2.

6 9. Translate:—

Ter quater evolvi signantes tempora *fastos,*
nec Sementina est ulla reperta dies:
cum mihi...sensit enim...'Lux haec *indicitur,*'
inquit
Musa 'quid a fastis non *stata sacra* petis?'

(*a.*) Write a note on *fastos, indicitur, stata sacra.*

5 10. Name Ovid's chief works. Give a brief sketch of his life.

12 11. Translate:—

verum ubi ductores acie revocaveris ambo,
deterior qui visus, eum, ne prodigus obsit,
dede neci; melior vacua *sine regnet* in aula.
alter erit maculis auro squalentibus ardens;
nam duo sunt genera: hic melior, insignis et ore
et rutilis clarus squamis; ille horridus alter
desidia, latamque trahens inglorius alvum.

(*a.*) Write a grammatical note on *sine regnet.*

Value.

9 12. Translate:—

verum ubi nulla fugam reperit fallacia, victus
in sese redit atque hominis tandem ore locutus:
'nam quis te, iuvenum confidentissime, nostras
iussit adire domos? quidve hinc petis?' inquit. at ille:
'scis, Proteu, scis ipse; neque est te fallere quicquam
sed tu desine velle. deum praecepta secuti
venimus, hinc lassis quaesitum oracula rebus.'

6 13. Name Virgil's works. Give a brief sketch of his life.

Latin Composition, Sight Translation, and History. (Time, 3 hours.)

Value.

1. Translate into Latin:—

6 (*a.*) We were informed that our soldiers had been ordered not to spare the captives.

12 (*b.*) They tried to persuade me to take up arms against my country: I replied, however, that as a young man I had always served my king and that I would not desert him in my old age.

14 (*c.*) If our forefathers had been afraid that a Roman general would one day become king, they would never have obeyed Cicero when he urged them to make Pompey their general in the war with Mithridates.

8 (*d.*) Cicero was so skilled in speaking that he could make his hearers believe whatever he wished.

40 2. Translate into English:—

It may be Expedient, but is it Honourable?

Athenienses cum Persarum impetum nullo modo possent sustinere statuerentque ut urbe relicta coniugibus et liberis Troezene depositis naves conscenderent libertatemque Graeciae classe defenderent, Cyrsilum quendam suadentem, ut in urbe manerent Xerxemque reciperent, lapidibus cooperuerunt. Themistocles post victoriam eius belli, quod cum Persis fuit, dixit in contione se habere consilium rei publicae salutare, sed id publice sciri non opus esse: postulavit ut aliquem populus daret, quicum communicaret. Datus est Aristides. Huic ille dixit, classem Lacedaemoniorum, quae subducta esset ad Gytheum, clam incendi posse, quo facto frangi Lacedaemoniorum opes necesse esset. Quod Aristides cum audisset, in contionem magna expectatione venit dixitque perutile esse consilium, quod Themistocles adferret, sed minime honestum.

cooperio—cover, overwhelm. quicum = quocum.

20 3. Write on *three* of the following:—

(*a.*) The Tribunate.

(*b.*) Licinian Rogations.

(*c.*) First Punic War.

(*d.*) Camillus, Fabricius, Marcellus, Flamininus, Cato.

PHYSICS. (Time, 3 hours.)

Value.

8 1. (*a.*) Write out in full: (1) Pascal's law regarding fluid pressure; (2) laws of transverse vibration of strings; (3) laws of electrolysis; (4) Ohm's law.

7 (*b.*) What is the *molecular theory?* Discuss fully, giving reasons for its acceptance.

5 2. (*a.*) Define: pound-weight, pound-mass, pound-force, foot-pound and poundal.

5 (*b.*) Find the weight of a pound-mass on the surface of the planet Mars, assuming the density of Mars to be seven-tenths that of the earth, its diameter 4,230 miles and the diameter of the earth 7,918 miles.

5 3. (*a.*) Define the unit of: (1) current strength; (2) resistance; (3) E.M.F.

5 (*b.*) The resistance of the filament of an incandescent lamp is 200 ohms, and it carries a current of 6 amperes. Find the amount of heat (in calories) developed in this filament per minute.

5 4. (*a.*) Explain the terms intensity, pitch, and quality as applied to sounds, mentioning upon what each depends and describing the devices for determining or explaining pitch and quality.

5 (*b.*) The wave length of a sound at 59° Fahrenheit is 5 inches. Find its frequency.

5 5. (*a.*) Describe an experiment for finding the specific heat of brass.

5 (*b.*) The weight of a litre of air at standard temperature and pressure is 1.293 gm. Find the weight of 800 c.c. of air at 37° C. and 70 cm. pressure.

5 6. (*a.*) Describe a laboratory method of showing that, when a magnetized steel needle is broken in pieces, each piece becomes a magnet.

5 (*b.*) Show how to electrify positively a piece of metal by friction.

5 7. (*a.*) Discuss the meaning of the dark lines in the solar spectrum.

5 (*b.*) Make a diagram to show how an object is viewed through a compound microscope.

5 8. (*a.*) Write a note on radiant energy, mentioning source, mode of transmission, and effects.

5 (*b.*) A stone is dropped down a deep mine and one second later another stone is dropped. How many feet apart will they be when the first stone has been falling five seconds?

15 9. Laboratory exercise-book, for which a maximum of fifteen marks will be allowed.

TRIGONOMETRY. (Time, 3 hours.)

Value.

1. Prove :—

4 (*a.*) $\tan^2 60° - 2 \tan^2 45° = \cot^2 30° - 2 \sin^2 30° - \frac{3}{4} \operatorname{cosec}^2 45°$.

6 (*b.*) $\dfrac{\cot (90° - A) \sec A \cot^3 A}{\operatorname{cosec}^2 A \sin^2 (90° - A)} = \sqrt{1 + \tan^2 A}$.

10 2. A ship steaming due E. sights at noon a lighthouse bearing N.E., 15 miles distant. At 1.30 p.m. the lighthouse bears N.W. How many knots a day is the ship making? Given 60 knots = 69 miles.

3. Solve for all the positive angles less than four right angles :—

5 (*a.*) $3 \tan \theta + \cot \theta = 5 \operatorname{cosec} \theta$.

7 (*b.*) $\sin 7 \theta = \sin 4 \theta - \sin \theta$.

5 (*c.*) $\tan x - \sqrt{3} \cot x + 1 = \sqrt{3}$.

6 4. (*a.*) Prove geometrically that $\sin (A - B) = \sin A \cos B - \cos A \sin B$.

6 (*b.*) Prove geometrically that $\sin (270° - A) = -\cos (360° - A)$.

5. In any triangle prove :—

6 (*a.*) $\sin \dfrac{A}{2} = \sqrt{\dfrac{(s-b)(s-c)}{bc}}$.

6 (*b.*) $\tan \dfrac{A - B}{2} = \dfrac{a-b}{a+b} \cot \dfrac{C}{2}$.

14 6. In the triangle ABC, $a = 9$, $b = 12$, $A = 30°$, find c, given :—

log 9 = .95424. L sin 30° = 9.69897.
log 12 = 1.07918. L sin 11° 48′ 39″ = 9.31108.
log 171 = 2.23301. L sin 41″ 48′ 39″ = 9.82391.
log 368 = 2.56635. L sin 71° 48′ 39″ = 9.97774.

13 7. Find the greatest angle of the triangle whose sides are 183, 195, 214 feet, given
log 82 = 1.9138139. L tan 34° 26′ = 9.8360513.
log 101 = 2.0043214. L tan 34° 27′ = 9.8363221.
log 113 = 2.0530784.
log 296 = 2.4712917.

8. In any triangle prove :—

6 (*a.*) $\sin A + \sin B + \sin C = 4 \cos \dfrac{A}{2} \cos \dfrac{B}{2} \cos \dfrac{C}{2}$.

6 (*b.*) $\dfrac{b^2 - c^2}{a} \cos A + \dfrac{c^2 - a^2}{b} \cos B + \dfrac{a^2 - b^2}{c} \cos C = 0$.

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