LEAVING CERTIFICATE, 1888.

Note as to Mathematical Papers.

A.

The scope of the Mathematical Papers that will be set is indicated in the following list:—

No. 1. Arithmetic (I.), 1½ hours.—Ordinary arithmetical questions, with optional questions on logarithmic computations of an easy kind.

No. 2. Geometry and Trigonometry (I.), 2 hours.—8 *standard* questions on the subject matter of Euclid, Books I., II., III., IV., VI., with easy riders and numerical examples; 4 *optional* questions, partly on the geometry and mensuration of solid figures, partly on modern propositions usually taught as a sequel to Euclid, on trigonometry, properties and logarithmic solution of triangles.

No. 3. Algebra and trigonometry (I.), 2 hours.—8 *standard* questions on algebra up to and including quadratic equations, taking in the elementary theory of irrational forms, surds, proportion, and the progressions; 6 *optional* questions on the higher parts of the subject usually taught in schools, and on the elementary theory of trigonometrical functions.

No. 4. Geometrical Conics (I.), 2 hours.—8 *standard* questions on the parabola and the ellipse, with easy riders. 4 *optional* questions on the general conic, the hyperbola, and the sections of the cone.

No. 5. Analytical Geometry (I.), 2 hours.—8 *standard* questions on the straight line treated by Cartesian co-ordinates. 4 *optional* questions on the simpler abridged, or trilinear methods as applied to the straight line; on polar co-ordinates, the circle, and the easier parts of the conic sections.

No. 6. Dynamics (I.), 2 hours.—8 *standard* questions on velocity, acceleration, the laws of motion, composition of forces, equilibrium, centre of gravity, the lever and its modifications, pulleys, and the inclined plane. 4 *optional* questions on work, energy, friction, machines in motion, and hydrostatics.

No. 7. Arithmetic (II.), 1½ hours.—Questions of a general kind, somewhat simpler than those set in No. 1.

No. 8. Geometry (II.), 2 hours.—12 questions on the subject matter of Euclid, Books I., II., III., with easy riders, and possibly a question in Book IV.

No. 9. Algebra (II.), 2 hours.—12 questions on Algebra up to and including equations of 1st degree, with easy quadratics of one variable, and simple questions on greatest common measure and least common multiple.

B.

The papers marked (I.) belong to the senior certificate, those marked (II.) to the junior certificate. Of those marked 1—6 for the senior certificate, 1, 2, 3 are compulsory, *i.e.*, the candidate must pass in all these to obtain the senior certificate in Mathematics. In several of these papers, the questions are divided into *standard* and *optional*. In papers 2 and 3, a candidate can pass by doing a reasonable number of the standard questions alone. Credit will, however, be given for all questions done, and candidates desiring a certificate with honours should do as many of the optional questions as they can.

In the other senior papers, 4–6, which are not compulsory for a pass, the object of the optional questions is to give enough variety to meet the professions of the schools, and the distinction between standard and optional questions is of less importance.

C.

All the papers marked (II.) are compulsory for the junior certificate, in the sense noted above. Papers 8 and 9 will be so set that it will be possible for a candidate to pass who has not professed all the subjects mentioned: *e.g.*, a pass in geometry may be obtained for a thorough knowledge either of Euclid I. and II., or of Euclid I. and III.

D.

A candidate who has failed to obtain a complete senior or junior certificate may, if he desires it, obtain records of the separate subjects in which he has passed.

E.

The use of books of mathematical tables is allowed in papers 1, 2, 3. If the school authorities do not provide books of tables, the examinees may use their own, provided they contain no manuscript notes or printed matter, other than such as is given in the introduction to Chambers' Mathematical Tables.

F.

Should any reasonable question, regarding the terminology of the paper, for example, be asked by a candidate, the head mathematical master may answer the same publicly, provided the question asked and the answer given are recorded by the representative of the Department, and a statement of them is sent up by him along with the written papers.

G.

On the days of examination, it should be explained to the candidates by the person superintending the examination that quality and style of work will be looked to as well as quantity ; and he is requested to state very particularly that it is not expected that all of the large number of questions set shall be done by each candidate, the main object in setting many questions being to give a wide freedom of choice.

Scotch Education Department,
    31 May 1888.

Supplementary Note as to Papers in Arithmetic and Mathematics.

Candidates for honours will take the same papers (1, 2, and 3) as those for the Higher Certificate, and Honours will be awarded for special excellence in these papers. The additional papers (4, 5, and 6) can be taken by Candidates either for the Higher or Honours Grade, and the result of the examination in those papers will be specially recorded on the Certificate.

If any Candidates are to be presented in any other extra subjects not mentioned in the note dated 31st of May, special application must be made to the Department without delay. The examination in such subjects will be held on the 26th of June.

Where it is desired, a separate Certificate will be issued in Arithmetic.

Scotch Education Department,
    4th June 1888.

LEAVING CERTIFICATE, 1888.

EXAMINATION PAPERS.

ENGLISH.

LOWER GRADE.

Friday, 22nd June.   10 A.M. to 12.

TEN questions ONLY to be attempted, of which at least ONE must be in Section II., and ONE in Section III.

SECTION I.

1. Write out and punctuate the passage read for dictation.

2. Paraphrase the following lines into correct and grammatical prose :
     " Ye friends to truth, ye statesmen who survey
       The rich man's joys increase, the poor's decay,
     'Tis yours to judge how wide the limits stand
       Between a splendid and a happy land.
       Proud swells the tide with loads of freighted ore,
       And shouting folly hails them from her shore ;
       Hoards, even beyond the miser's wish, abound,
       And rich men flock from all the world around.
       Yet count our gains.   This wealth is but a name,
       That leaves our useful product still the same."

3. Give some rules for grammatical analysis ; and analyse the following :
     " The general reproach with which ignorance revenges the superciliousness of learning is that of pedantry ; a censure which every man incurs who has at any time the misfortune to talk to those who cannot understand him, and by which the modest and timorous are sometimes frighted from the display of their acquisitions and the exertion of their powers."

4. Explain the terms : Voice, Mood and Tense ; and distinguish between weak and strong conjugations.

5. State the various formations of the plural in English, and explain the origin of each.

6. State the meaning and derivation of the suffixes in the following words : Business, Only, Orchard, Nostril, Kingdom, Worship, Every.

7. Give the derivations of the following words : Rather, Judge, School, Moralist, Victuals, Monk, Heresy, Fiction, Poet, History, Philosophy, Government, Secure, Burgh, Town, Sheriff, Mayor.

8. Point out any grammatical faults in the following sentences :
    (*a.*) The savage, as well as the civilized man, recognise a divine government of the world.
    (*b.*) In the one, no less than in the other, these sort of qualities are apparent.
    (*c.*) He acted in this case like he acted in similiar cases previously.
    (*d.*) I prefer to suffer every extremity of evil, than to yield to an order which I believe to be wrong.
    (*e.*) The settlement of all these complicated questions, and of difficulties so threatening, demand energy as well as wisdom.

9. Give *either*
    (1.) The plot, with a description of the characters, of any one of Shakespeare's plays.
   or (2.) The plan of Chaucer's Prologue, and a description of the characters introduced.
   or (3.) The scheme and occasion of Milton's *Lycidas*.
   or (4.) A summary of the action in the earlier books of Milton's *Paradise Lost*.

10. Name the principal authors in the reign either of (*a*) Elizabeth ; (*b*) Charles II. ; (*c*) Anne ; (*d*) George III. ; or (*e*) Victoria.

Section II.

11. Give an account, with dates, of the settlement of the Angles and Saxons in our country.

12. What do you understand by the Feudal System ?

13. State the chief events in the reign of King John, with the leading provisions of Magna Charta.

14. Give an account of the Scottish Wars of Independence down to the Battle of Bannockburn, with dates.

15. Give some account of the causes of the Wars of the Roses, and name the chief battles in those wars.

16. Describe the progress of the Reformation down to the complete establishment of Protestantism, *either* in England *or* in Scotland.

17. State what you know of the following : The Petition of Right, Shipmoney, the Grand Remonstrance, the Self-denying Ordinance, Pride's Purge, Cromwell's Scheme of Government.

18. State the immediate causes of the Revolution of 1688.

19. Give some account of the following : The Duke of Marlborough, the Earl of Peterborough, Sir Robert Walpole, Pitt (Earl of Chatham), Edmund Burke.

20. Give some account *either* of the War of the Spanish Succession, *or* of the Seven Years' War.

Section III.

21. Name six leading towns of England and Scotland, giving the situation, approximate population, and chief industries of each.

22. Trace, with an outline map, the course of one of the following rivers, naming the towns on its banks : the Thames, the Severn, the Humber, the Clyde, the Dee, and the Forth.

23. Name the chief mountain ranges in England and Scotland, stating the direction, and characteristic features in the formation, of each.

24. State the principal directions in which British Colonial enterprise has moved, and give the date of the establishment of our chief colonies.

25. Draw a map of British India, showing the different Presidencies and their chief towns.

26. Trace the routes to India, by the Cape of Good Hope and the Red Sea respectively, and state the most important points passed on each route.

ENGLISH.

LOWER GRADE.

Friday, 22nd June.   10 A.M.

Passage for Dictation.

The statesmen of whom we speak passed their youth surrounded by the incessant din of theological controversy. Opinions were still in a state of chaotic anarchy, intermingling, separating, advancing, receding. Sometimes the stubborn bigotry of the Conservatives seemed likely to prevail. Then the impetuous onset of the Reformers for a moment carried all before it. Then again the resisting mass made a desperate stand, arrested the movement, and forced it slowly back. The vacillation which at that time appeared in English legislation, and which it has been the fashion to attribute to the caprice and to the power of one or two individuals, was truly a national vacillation.

ENGLISH.

HIGHER GRADE AND FIRST PAPER FOR HONOURS GRADE.

Friday, 22nd June.   10 A.M. to 12.

TEN questions ONLY to be attempted, of which at least TWO must be in Section II. and TWO in Section III.

SECTION I.

1. Write an Essay, of not more than three pages, on *one* of the following subjects :—
    (1.) Party Government.
    (2.) The importance of Colonial enterprise in the life of a nation.
    (3.) The qualities that produce a good orator.
    (4.) The influence of the invention of Printing.

2. Analyse the following, explaining the principles upon which you base your analysis :—
    " High on a throne of royal state, which far
    Outshone the wealth of Ormus and of Ind,
    Or where the gorgeous East with richest hand

Showers on her kings barbaric pearl and gold,
Satan exalted sat, by merit raised
To that bad eminence."

3. Translate the following passages into modern English :—
"In a somer seson • whan soft was the sonne,
I shope me in shroudes • as I a shepe were,
In habite as an heremite • vnholy of workes,
Went wyde in þis world • wondres to here.
Ac on a May mornynge • on Maluerne hulles,
Me byfel a ferly • of fairy, me thou3te ;
I was *wery* forwandred • and went me to reste
Vnder a brode banke • bi a *bornes* side,
And as I lay and lened • and loked in þe wateres,
I slombred in a slepyng • it *sweyued* so merye."

or,

The busy larke, messager of daye,
Salueth in *hire* song the *morwe* graye ;
And fyry Phebus ryseth up so brighte,
That al the orient laugheth of the lighte,
And with his stremes dryeth in the greves
The silver dropes, hongyng on the leeves.
And Arcite, that is in the court ryal
With Theseus, his squyer principal,
Is risen, and loketh on the merye day.

4. Comment on the words in Italics in the above passages.

5. Explain, and comment on, the following idiomatic expressions—
Methinks : I was an hungred : they fell a-talking : he was done to death : many a thing : it is I : lack-a-day.

6. Compare the proportion of the Teutonic and Classical elements in modern English. At what times and through what channels has the classical element in the language chiefly been introduced ?

7. Give the derivations of the following words : prey, doom, rule battle, shire, feudal, shall, bishop, church, woman, lady, sir, madam, churl, earl.

8. Name, and give the chief works of, any two leading writers of—
(*a.*) Drama (excluding Shakespeare).
(*b.*) Epic poetry.
(*c.*) Satiric poetry.

9. Give some account of the life, works, and chief characteristics of any one of the following : Geoffrey Chaucer, Edmund Spenser, Ben Jonson, Jonathan Swift, John Dryden, Daniel Defoe, Dr. Samuel Johnson, William Cowper, Sir Walter Scott.

Section II.

10. Give some account of the Danish Invasions of England, and of the settlement reached by King Alfred in the Peace of Wedmore.

11. Explain what you mean by the "Feudal System," and show how its influence has gradually failed.

12. Give some account of the work of Simon de Montfort.

13. Discuss the claims of Edward I. to the suzerainty of Scotland, and describe the war of Scottish independence to the battle of Bannockburn.

14. Give a short account of the relations between England and Scotland between 1542 and the execution of Queen Mary.

15. State the causes of the rising in Scotland against the government of Charles I., and summarise the course of affairs from the rising down to the battle of Dunbar.

16. Give the terms of the Legislative Union between England and Scotland, with some account of the negotiations which preceded it.

17. Give an account of the political career either of (1) Sir Robert Walpole, (2) the Earl of Chatham, (3) the younger Pitt, or (4) Edmund Burke.

Section III.

18. Trace, with an outline map, the course of one of the leading rivers in England, in Scotland, *and* in Ireland, naming in each case the towns upon its banks.

19. Name the leading industries of Britain, and show where the chief seats of each industry are to be found.

20. Indicate the course of the mountain ranges of Britain, and state the chief peculiarities of the geological formation of each.

21. Draw a map of the British colonies *either* in Africa *or* Australia, and state when each settlement was formed, and what are its chief resources.

22. Draw a map showing the course of the Rhine, and indicate the causes of its importance in European politics.

ENGLISH.

HONOURS.

ADDITIONAL TO THE HIGHER GRADE PAPER.

Friday, 22nd June.   2 P.M. to 5 P.M.

1. What do you understand by the Romance languages? State and illustrate their influence upon English.

2. Classify Shakespeare's plays, either in order of time or according to subjects.

3. Distinguish between Metre, Alliteration, and Rhyme, and show how each has entered into English poetry.

4. Give the plan and purpose of the chief works *either* (1) of Chaucer, (2) of Spenser, (3) of Milton, *or* (4) of Pope, and state what in your opinion are the chief characteristics of the author you select.

5. Discuss the leading features of the literature *either* of the reign of Elizabeth, of that of Anne, *or* of that of George III. (to the end of the eighteenth century), illustrating your answer by reference to the chief authors and their works.

6. Name our principal writers of history from the days of Clarendon to those of Macaulay.

LATIN.

Lower Grade.

Wednesday, 20th June. 10 a.m. to 12.

1. Translate :

Hunc Labienus excepit, et, quum Caesaris copias despiceret, Pompeii consilium summis laudibus efferret, Noli, inquit, existimare, Pompei, hunc esse exercitum, qui Galliam Germaniamque devicerit. Omnibus interfui proeliis, neque temere incognitam rem pronuncio. Perexigua pars illius exercitus superest, magna pars deperiit : quod accidere tot proeliis fuit necesse : multos autumni pestilentia in Italia consumsit, multi domum discesserunt, multi sunt relicti in continenti. An non exaudistis, ex iis, qui per caussam valetudinis remanserunt, cohortes esse Brundisii factas ? Hae copiae, quas videtis, ex delectibus horum annorum in citeriore Gallia sunt refectae, et plerique sunt ex coloniis Transpadanis : attamen, quod fuit roboris, duobus proeliis Dyrrhachinis interiit. Haec quum dixisset, iuravit, se, nisi victorem, in castra non reversurum : reliquosque, ut idem facerent, hortatus est. Hoc laudans Pompeius, idem iuravit. Nec vero ex reliquis fuit quisquam, qui iurare dubitaret.

(a.) Why are *devicerit* and *dubitaret* in the subjunctive mood ?

(b.) Explain the case of *Brundisii* and *roboris*.

(c.) What do you understand by *citeriore Gallia,* and *coloniis Transpadanis ?*

2. Translate into Latin :

From them he learns that at no great distance from that place was the town of Cassivelaunus, defended by woods and marshes, whither a considerable (*satis magnus*) number of men and of cattle has assembled. He sets out thither with his legions ; he finds the place admirably defended by nature and artificial works (*opere*) ; nevertheless he proceeds (*contendit*) to attack it on two sides (*partes*). The enemy after a short delay did not stand the charge of our soldiers, and hurried off (*sese ejecere*) from another side of the town. A great quantity (*numerus*) of cattle was found, and many prisoners were taken and many men slain in the flight.

3. What cases do the following verbs govern, and how do some of them differ in meaning according to the case which follows them— *convenio, consulo, invideo, plaudo, persuadeo ?*

4. Put into Latin :

No one is injured. One must obey the laws. There was a general departure from the town (*discedo*). I warn you not to do this. I warn you that the enemy is at hand.

5. Distinguish the meaning of *quo, qua, quam* (adverbs) ; *quisquam, quisque, quisquis; aliter, alio, alias, alibi.*

LATIN.

HIGHER GRADE.

Wednesday, 20th June.   10 A.M. to 12.

1. Translate into Latin prose:

Lucius Marcius, the Roman legate in the war against Perseus, King of Macedon, to gain time wherein to reinforce his army, set on foot some overtures of accommodation, with which the king being lulled asleep, concluded a cessation for certain days: by this means giving his enemy opportunity and leisure to repair his army, which was afterwards the occasion of his own ruin.   The elder sort of Senators, notwithstanding, mindful of their fore-fathers' virtue, were by no means satisfied with this proceeding ; but, on the contrary, condemned it as degenerating from their ancient practice, which, they said, was by valour and not by artifice, ambuscadoes, and deceitful treaties to overcome their enemies.

2. Tranlsate into English :

Fabius concione extemplo advocata obtestatus milites est ut, qua virtute rem publicam ab infestissimis hostibus defendissent, eadem se, cujus ductu auspicioque vicissent, ab impotenti crude-litate dictatoris tutarentur : venire amentem invidia iratum virtuti alienæ felicitatique, furere, quod se absente res publica egregie gesta esset, malle, si mutare fortunam posset, apud Samnites quam Romanos victoriam esse : imperium dictitare spretum, tamquam non eadem mente pugnari vetuerit qua pugnatum doleat : et tunc invidia impedire virtutem alienam voluisse cupid-issimisque arma ablaturum fuisse militibus ne se absente moveri possent, et nunc id furere id ægre pati, quod sine L. Papirio non inermes non manci milites fuerint, quod se Q. Fabius magistrum equitum duxerit ac non accensum dictatoris.   Quid illum facturum fuisse, si, quod belli casus ferunt Marsque communis, adversa pugna evenisset, qui sibi devictis hostibus re publica bene gesta ita ut non ab illo unico duce melius geri potuerit—supplicium magistro equitum minetur ! neque illum magistro equitum infes-tiorem quam tribunis militum quam centurionibus quam militibus esse.

Grammatical Questions.

1. Explain, and illustrate by examples, the force and uses of the ethical dative, the predicative dative, the complementary infinitive (after verbs and adjectives) the infinitive of surprise or indignation, the historical infinitive.

2. Point out the changes, in the passage set for translation, required to turn the *oratio obliqua* into *oratio directa.*

3. Point out and comment on irregularities of construction in the following :—

Quid tibi sum auctor ?—medendis corporibus—cum equidem invideor.—Non te haec pudent ?—Æternas quoniam poenas in morte timendum est—Carmina quae scribuntur aquae potoribus.

LATIN.

HONOURS.

FIRST PAPER.

Wednesday, 20th June.   10 A.M. to 1 P.M.

Translate—

1. Est procul in pelago saxum spumantia contra
    litora, quod tumidis submersum tunditur olim
    fluctibus, hiberni condunt ubi sidera Cori ;
    tranquillo silet immotaque attollitur unda
    campus et apricis statio gratissima mergis.
    Hic viridem Aeneas frondenti ex ilice metam
    constituit signum nautis pater, unde reverti
    scirent et longos ubi circumflectere cursus.
    Tum loca sorte legunt, ipsique in puppibus auro
    ductores longe effulgent ostroque decori ;
    cetera populea velatur fronde iuventus
    nudatosque umeros oleo perfusa nitescit.
    Considunt transtris, intentaque bracchia remis ;
    intenti exspectant signum, exsultantiaque haurit
    corda pavor pulsans laudumque arrecta cupido.
    Inde ubi clara dedit sonitum tuba, finibus omnes,
    haud mora, prosiluere suis : ferit aethera clamor
    nauticus, adductis spumant freta versa lacertis.
    Infindunt pariter sulcos, totumque dehiscit
    convulsum remis rostrisque tridentibus aequor.

2. Quintius fuit P. Quintii huius frater, sane ceterarum rerum pater-
    familias et prudens et attentus, una in re paullo minus consider-
    atus, qui societatem cum Sex. Naevio fecerit, viro bono, ver-
    umtamen non ita instituto, ut iura societatis et officia certi
    patrisfamilias nosse posset : non quo ei deesset ingenium : nam
    neque parum facetus scurra Sex. Naevius, neque inhumanus
    praeco est umquam existimatus. Quid ergo est ? Quum ei
    natura nihil melius, quam vocem dedisset, pater nihil praeter
    libertatem reliquisset, vocem in quaestum contulit ; libertate
    usus est, quo impunius dicax esset. Quare quod socium tibi eum
    velles adiungere, nihil erat, nisi ut in tua pecunia condisceret,
    qui pecuniae fructus esset. Tamen inductus consuetudine ac
    familiaritate Quintius fecit, ut dixi, societatem earum rerum,
    quae in Gallia comparabantur. Erat ei pecuaria res ampla et
    rustica sane bene culta et fructuosa. Tollitur ab atriis Liciniis
    atque a praeconum consessu in Galliam Naevius, et trans Alpes
    usque transfertur. Fit magna mutatio loci, non ingenii. Nam,
    qui ab adolescentulo quaestum sibi instituisset sine impendio,
    posteaquam nescio quid impendit et in commune contulit, mediocri
    quaestu contentus esse non poterat. Nec mirum, si is, qui vocem
    venalem habuerat, ea, quae voce quaesierat, magno sibi quaestui
    fore putabat. Itaque hercule haud mediocriter de communi
    quidquid poterat ad se in privatam domum sevocabat.

3. Ea tempestate Cassius ceteros praeminebat peritia legum : nam
    militares artes per otium ignotae, industriosque aut ignavos pax
    in aequo tenet. Ac tamen quantum sine bello dabatur, revocare
    priscum morem, exercitare legiones, cura proviso perinde agere

ac si hostis ingrueret: ita dignum maioribus suis et familia Cassia *ratus* per illas quoque gentes celebrata. Igitur excitis quorum de sententia petitus rex, positisque castris apud Zeugma, unde maxime pervius amnis, postquam inlustres Parthi rexque Arabum Acbarus advenerat, monet Meherdaten, barbarorum impetus acres cunctatione languescere aut in perfidiam mutari: ita urgueret coepta. Quod spretum fraude Acbari, qui iuvenem ignarum et summam fortunam in luxu ratum multos per dies attinuit apud oppidum Edessam. Et vocante Carene promptasque res ostentante, si citi advenissent, non comminus Mesopotamiam, sed flexu Armeniam petunt, id temporis inportunam, quia hiems occipiebat,

4. Quinque satis fuerant; nam sex septemve libelli
　　　est nimium: quid adhuc ludere, Musa, iuvat?
Sit pudor, et finis. Iam plus nihil addere nobis
　　　fama potest: teritur noster ubique liber:
et cum rupta situ Messallae saxa iacebunt,
　　　altaque cum Licini marmora pulvis erunt,
me tamen ora legent, et secum pluriuus hospes
　　　ad patrias sedes carmina nostra feret.
Finieram, cum sic respondit nona sororum,
　　　cui coma et unguento sordida vestis erat:
Tune potes dulces, ingrate, relinquere nugas?
　　　Dic mihi, quid melius desidiosus ages?
An iuvat ad tragicos soccum transferre cothurnos?
　　　aspera vel paribus bella tonare modis,
praelegat ut tumidus rauca te voce magister,
　　　oderit et grandis virgo bonusque puer?
Scribant ista graves nimium, nimiumque severi,
　　　quos media miseros nocte lucerna videt.
At tu Romano lepidos sale tinge libellos:
　　　agnoscat mores vita legatque suos.
Angusta cantare licet videaris avena,
　　　dum tua multorum vincat avena tubas.

LATIN.

Honours.

Second Paper.

Wednesday, 20th June, 2 p.m. to 5 p.m.

1. Translate into Latin prose:—

Never was any commander more beloved. He governed men by their reason and their affection; they knew that he was incapable of caprice or tyranny, and they obeyed him with alacrity and joy, because he possessed their confidence as well as their love. "Our Nel," they used to say, "is as brave as a lion, "and as gentle as a lamb." Severe discipline he detested, though he had been bred in a severe school; he never inflicted corporal punishment if it were possible to avoid it, and, when compelled to enforce it, he, who was familiar with wounds and death, suffered like a woman. In his whole life Nelson was never known to act unkindly to an officer. If he was asked to

prosecute one for ill behaviour, he used to answer : "that there "was no occasion for him to ruin a poor fellow, who was "sufficiently his own enemy to ruin himself." But in Nelson there was more than the easiness and humanity of a happy nature ; he did not merely abstain from injury ; his was an active and watchful benevolence, ever desirous not only to render justice, but to do good.

General Questions.

1. Discuss briefly the chief differences between English and Latin prose style, in regard to (1) the arrangement and connexion of words and clauses in a sentence, and of sentences in a continuous passage ; (2) the use of abstract and concrete, and of metaphorical and figurative, modes of expression.

2. Write, with dates, a short life of (1) Horace, or (2) Cicero, supporting and illustrating your remarks by reference to, or quotation from, their own works.

3. Distinguish between *patricii* and *nobiles*, *gens* and *familia*, *nomen*, *cognomen* and *agnomen*. Mention and distinguish some of the more eminent patrician and plebeian noble houses and families, and of the more illustrious individuals belonging to them, in the last century of the Republic.

GREEK.

Lower Grade.

Thursday, 21st June. 10 A.M. to 12.

I. Translate :

MEN. "Ηκουσα, ὦ Χείρων, ὡς θεὸς ἂν ἐπιθυμήσειας ἀποθανεῖν.

XEIP. ᾿Αληθῆ ταῦτ᾽ ἤκουσας, ὦ Μένιππε· καὶ τέθνηκα, ὡς ὁρᾷς, ἀθάνατος εἶναι δυνάμενος.

MEN. Τίς δέ σε τοῦ θανάτου ἔρως ἔσχεν, ἀνεράστου τοῖς πολλοῖς χρήματος ;

XEIP. ᾿Ερῶ πρός σε οὐκ ἀσύνετον ὄντα. Οὐκ ἦν ἔτι ἡδὺ ἀπολαύειν τῆς ἀθανασίας.

MEN. Οὐχ ἡδὺ ἦν, ζῶντα ὁρᾶν τὸ φῶς ;

XEIP. Οὔκ, ὦ Μένιππε· τὸ γὰρ ἡδὺ ἔγωγε ποικίλον τι καὶ οὐχ ἁπλοῦν ἡγοῦμαι εἶναι· ἐγὼ δὲ ἔζων ἀεὶ καὶ ἀμέλαυον τῶν ὁμοίων, ἡλίου, φωτὸς, τροφῆς· αἱ ὧραι δὲ αἱ αὐταὶ, καὶ τὰ γιγνόμενα ἅπαντα ἐξῆς ἕκαστον, ὥσπερ ἀκολουθοῦντα θάτερον θατέρῳ. ᾿Ενεπλήσθην γοῦν αὐτῶν.

MEN. Εὖ λέγεις, ὦ Χείρων· τὰ ἐν ᾅδου δὲ πῶς φέρεις, ἀφ᾽ οὗ προελόμενος αὐτὰ ἥκεις ;

ἀνέραστος, 'unloved' ; ἀπολαύειν, 'to enjoy' ; ἀκολουθεῖν, 'to follow '.

Parse fully : ἤκουσα, ἐρῶ, τέθνηκα, ἐνεπλήσθην, προελόμενος.

II. Give the gen. sing. and dat. plur. of γένος, πόλις, γυνή, ἱππεύς, πολίτης ; and the acc. plur. of ὀστοῦν, πούς, ὕδωρ.

Give the 1st pers. sing. of the fut. indic., perf. indic. act., and aor. opt. act. of πράσσω, ἀνοίγω, γιγνώσκω, ἵστημι. Also compar. and superl. of πολύς, ἡδύς, ῥᾳδίως, μέγας, σαφής.

III. Translate into Greek:

    (1.) When will you come to me at my house ?

    (2.) Do not write to me until you hear.

    (3.) The quicker (ταχύ, *quick*) you go away the quicker you will return (ἀνιέναι).

    (4.) Late (ὀψὲ) in the day he led out his army.

    (5.) I think that if they are ruined (διαφθείρειν) no one will succour (βοηθεῖν) us.

GREEK.

HIGHER GRADE.

Thursday, 21st June.   10 A.M. to 12.

I. Translate:—

Οὐκοῦν εὔδηλον ἐν τούτοις ἐστίν, ὅτι ἐκ τῆς θαλάττης ἅπασα ὑμῖν ἤρτηται ἡ σωτηρία. Οὕτως οὖν πεφυκότων, πῶς ἂν ἔχοι καλῶς ὑμῖν Λακεδαιμονίοις ἐπιτρέψαι κατὰ θάλατταν ἡγεῖσθαι, οἳ πρῶτα μὲν καὶ αὐτοὶ ὁμολογοῦσιν ἀπειρότεροι ὑμῶν τούτου τοῦ ἔργου εἶναι, ἔπειτα δ᾽ οὐ περὶ τῶν ἴσων ὁ κίνδυνός ἐστιν ἐν τοῖς κατὰ θάλατταν ἀγῶσιν, ἀλλ᾽ ἐκείνοις μὲν περὶ τῶν ἐν ταῖς τριήρεσι μόνον ἀνθρώπων, ὑμῖν δὲ καὶ περὶ παίδων καὶ γυναικῶν καὶ ὅλης τῆς πόλεως; καὶ τὰ μὲν δὴ ὑμέτερα οὕτως ἔχει· τὰ δὲ τῶν Λακεδαιμονίων ἐπισκέψασθε. πρῶτον μὲν γὰρ οἰκοῦσιν ἐν μεσογαίᾳ· ὥστε, τῆς γῆς κρατοῦντες, καὶ εἰ θαλάττης εἴργοιντο, δύναιντ᾽ ἂν καλῶς διαζῆν. ἐγνωκότες οὖν καὶ αὐτοὶ ταῦτα, εὐθὺς ἐκ παίδων πρὸς τὸν κατὰ γῆν πόλεμον τὴν ἄσκησιν ποιοῦνται. καὶ τὸ πλεῖστου δ᾽ ἄξιον, τὸ πείθεσθαι τοῖς ἄρχουσιν, οὗτοι μὲν κράτιστοι κατὰ γῆν, ὑμεῖς δὲ κατὰ θάλατταν. ἔπειτα δέ, ὥσπερ ὑμεῖς ναυτικῷ, οὕτως αὖ ἐκεῖνοι κατὰ γῆν καὶ πλεῖστοι καὶ τάχιστ᾽ ἂν ἐξέλθοιεν· ὥστε πρὸς τούτους αὖ εἰκὸς τοὺς συμμάχους εὐθαρσεστάτους προσιέναι.

Parse fully : ἤρτηται, πεφυκότων, ἐπισκέψασθε, ἐγνωκότες, ἐξέλθοιεν.

II. Translate into Greek :—

    (1.) I wish to speak before I die.

    (2.) So perish all who do such things !

    (3.) He knew that he was wiser than any of his contemporaries.

    (4.) Whenever he asked the question, What is Virtue ? he got no clear answer.

    (5.) Do you not think that they knew who you were ?

    (6.) All through his life he strove to serve his country.

III. Correct the Greek of the following sentences :—

    (1.) θαυμάζω ὅτι πάντες ὑμῶν μὴ φοβέονται τοὺς πολεμίους.

    (2.) πέμψαντες ὡς τὴν πόλιν ἔλεγον φυγάδας εἶναι.

    (3.) οὐ πάνυ καλῶς τὰ πράγματά εἰσιν οὐδ᾽ ὡς ἂν βουλόμεθα.

    (4.) ὁ βίος ἰδιωτῶν ἀσφαλέστερός ἐστι τοῦ πολιτευομένων.

Define " stem," " verb-stem," " tense-stem."

Give the stem of μάρτυς, ἀνήρ, πῦρ, γόνυ, τιμή ; and the present-stem of βλαβ-, ταφ-, ἐλπιδ-, τραπ-.

GREEK.

Honours.

First Paper.

Thursday, 21st June.　10 a.m. to 1 p.m.

I Translate:—

(1.) ῟Ων οὐδενὶ δεῖ παρακρουσθῆναι τήμερον ὑμᾶς, ἀλλ', ἀφ' ὧν ἴστε αὐτοί, τὰ πράγματα κρῖναι. οὐ γὰρ ῥητόρων οὐδὲ λόγων κρίσιν ὑμᾶς τήμερον, εἴπερ εὖ φρονεῖτε, προσήκει ποιεῖν, ἀλλ' ὑπὲρ πραγμάτων αἰσχρῶς καὶ δεινῶς ἀπολωλότων τὴν ὑπάρχουσαν αἰσχύνην εἰς τοὺς αἰτίους ἀπώσασθαι, τὰ πεπραγμένα, ἃ πάντες ἐπίστασθε, ἐξετάσαντας. τί οὖν ἐστὶ ταῦτα ; ἃ ὑμεῖς ἴστε, καὶ οὐ παρ' ἡμῶν ὑμᾶς ἀκοῦσαι δεῖ. εἰ μὲν γὰρ ἅπανθ', ὅσ' ὑπέσχονθ' ὑμῖν, ἐκ τῆς εἰρήνης γέγονε, καὶ τοσαύτης ἀνανδρίας καὶ κακίας ὑμεῖς ὁμολογεῖτε εἶναι μεστοί, ὥστε μήτ' ἐν τῇ χώρᾳ τῶν πολεμίων ὄντων, μήτ' ἐκ θαλάττης πολιορκούμενοι, μήτ' ἐν ἄλλῳ μηδενὶ δεινῷ τῆς πόλεως οὔσης, ἀλλὰ καὶ σῖτον εὐώνου ὠνούμενοι, καὶ τἆλλα οὐδὲν χεῖρον πράττοντες ἢ νῦν, προειδότες καὶ προακηκοότες παρὰ τούτων καὶ τοὺς συμμάχους ἀπολουμένους καὶ Θηβαίους ἰσχυροὺς γενησομένους καὶ τἀπὶ Θρᾴκης Φιλίππου ληψόμενον καὶ ἐν Εὐβοίᾳ κατασκευασθησόμενα ὁρμητήρια ἐφ' ὑμᾶς καὶ πάνθ' ἃ πέπρακται γενησόμενα, εἶτα τὴν εἰρήνην ἐποιήσασθε ἀλπατητῶς, ἀποψηφίσασθε Αἰσχίνου, καὶ μὴ πρὸς τοσούτοις αἰσχροῖς καὶ ἐπιορκίαν προσκτήσησθε· οὐδὲν γὰρ ὑμᾶς ἀδικεῖ, ἀλλ' ἐγὼ μαίνομαι καὶ τετύφωμαι νῦν κατηγορῶν αὐτοῦ.

(2.) Πέμπουσι δὲ καὶ ἐς τὴν Σάμον δέκα ἄνδρας, παραμυθησομένους τὸ στρατόπεδον, καὶ διδάξοντας ὡς οὐκ ἐπὶ βλάβῃ τῆς πόλεως καὶ τῶν πολιτῶν. ἡ ὀλιγαρχία κατέστη, ἀλλ' ἐπὶ σωτηρίᾳ τῶν ξυμπάντων πραγμάτων, πεντακισχίλιοί τε ὅτι εἶεν, καὶ οὐ τετρακόσιοι μόνον, οἱ πράσσοντες· καί τοι οὐ πώποτε Ἀθηναίους, διὰ τὰς στρατείας καὶ τὴν ὑπερόριον ἀσχολίαν, ἐς οὐδὲν πρᾶγμα οὕτω μέγα ἐλθεῖν βουλεύσοντας, ἐν ᾧ πεντακισχιλίους ξυνελθεῖν. καὶ τἆλλα ἐπιστείλαντες τὰ πρέποντα εἰπεῖν, ἀπέπεμψαν αὐτοὺς εὐθὺς μετὰ τὴν ἑαυτῶν κατάστασιν, δείσαντες μή, ὅπερ ἐγένετο, ναυτικὸς ὄχλος οὔτε αὐτὸς μένειν ἐν τῷ ὀλιγαρχικῷ κόσμῳ ἐθέλῃ, σφᾶς τε μὴ ἐκεῖθεν ἀρξαμένου τοῦ κακοῦ μεταστήσωσιν.

(3.) Αὐτὰρ ὅγ' οὐ μετὰ δηρὸν ἐελδομένη ἐφαάνθη
　　ὑψόσ' ἀναβρώσκων, ἅτε Σείριος Ὠκεανοῖο,
　　ὅς ῥά τοι καλὸς μὲν ἀρίζηλός τ' ἐσιδέσθαι
　　ἀντέλλει, μήλοισι δ' ἐν ἄσπετον ἧκεν ὀιζύν·
　　ὣς ἄρα τῇ καλὸς μὲν ἐπήλυθεν εἰσοράασθαι
　　Αἰσωνίδης, κάματον δὲ δυσίμερον ὧρσε φαανθείς.
　　ἐκ δ' ἄρα οἱ κραδίη στηθέων πέσεν, ὄμματα δ' αὔτως
　　ἤχλυσαν· θερμὸν δὲ παρηίδας εἷλεν ἔρευθος.
　　γούνατα δ' οὔτ' ὀπίσω οὔτε προπάροιθεν ἀεῖραι
　　ἔσθενεν, ἀλλ' ὑπένερθε πάγη πόδας. αἱ δ' ἄρα τείως
　　ἀμφίπολοι μάλα πᾶσαι ἀπὸ σφείων ἐλίασθεν.
　　τὼ δ' ἄνεῳ καὶ ἄναυδοι ἐφέστασαν ἀλλήλοισιν,
　　ἢ δρυσὶν ἢ μακρῇσιν ἐειδόμενοι ἐλάτῃσιν,

αἵ τε παρᾶσσον ἔκηλοι ἐν οὔρεσιν ἐρρίζωνται
νηνεμίῃ· μετὰ δ' αὖτις ὑπὸ ῥιπῆς ἀνέμοιο
κινύμεναι ὁμάδησαν ἀπείριτον· ὣς ἄρα τώ γε
μέλλον ἅλις φθέγξασθαι ὑπὸ πνοιῇσιν Ἔρωτος.
γνῶ δέ μιν Αἰσονίδης ἄτη ἐνιπεπτηυῖαν
θευμορίη, καὶ τοῖον ὑποσαίνων φάτο μῦθον.

Y.—

(1.) What are the chief points of difference between a Greek
πόλις and a modern State? Illustrate the relations of a
Greek colony to the mother country.

(2.) What were the functions (i) of the βουλή, (ii) of the Areo-
pagus at Athens?

GREEK.

Honours.

Second Paper.

Thursday, 21st June.   2 p.m. to 5 p.m.

I. For Greek prose:—
This letter somewhat disconcerted Elizabeth's plan, but did
not divert her from the prosecution of it. She laid the matter
before the privy council, and it was there determined, notwith-
standing the entreaties and remonstrances of the Scottish queen,
to go on with the inquiry into her conduct; and until that were
finished, it was agreed that Elizabeth could not, consistently with
her own honour, or with the safety of her government, either
give the assistance which she demanded, or permit her to retire
out of the kingdom. Lest she should have an opportunity of
escaping, while she resided so near Scotland, it was thought
advisable to remove her to some place at a greater distance from
the borders.

ROBERTSON.

II. Distinguish between Attic and Homeric usage in regard to (1)
prepositions, (2) the subjunctive mood, (3) conditional sentences.

III. Trace historically the meaning of the words δῆμος, δίκη, τιμή,
πιεικής, λειτουργία, αὐθέντης, σοφιστής.

FRENCH.

Lower Grade.

Tuesday, 19th June.   10 a.m. to 12.

1. Translate into English :—
Le prince[1] Eugène conserva[2] toujours sa supériorité sur le
maréchal de Villeroi. Enfin, au cœur de l'hiver, un jour que ce
maréchal dormait[3] avec sécurité dans Crémone, ville[4] assez forte,
et munie d'une très grande garnison, il est réveillé au bruit des

décharges de mousqueterie. Il se lève[5] en toute hâte, monte à cheval ; la première chose qu'il rencontre[6], c'est un escadron ennemi. Le maréchal aussitôt est fait prisonnier[7] et conduit hors de la ville, sans savoir[8] ce qui s'y passait, et sans pouvoir[8] imaginer la cause d'un événement si étrange. Le prince Eugène était déjà à Crémone. Un prêtre[9], nommé Bozzoli, avait introduit[10] les troupes allemandes[11] par un égout (gutter, drain). Quatre cents[12] soldats, entrés par cet égout dans la maison du prêtre, avaient sur-le-champ égorgé la garde des deux portes ; les deux portes ouvertes[13], le prince Eugène entre avec quatre mille[14] hommes. Tout cela s'était fait avant que le gouverneur, qui était Espagnol, s'en fût douté[15], et avant que[16] le maréchal de Villeroi fût éveillé. Le secret, l'ordre, la diligence, toutes les précautions possibles avaient préparé l'entreprise.

VOLTAIRE.

2. Grammatical questions on the above passage :—

(1.) Give feminine of *this*. (2.) 3rd sing. and 3rd plur. imperfect subj. (3.) 3rd sing. present, preterite (or past) definite, and future. (4.) Why not *une ville?* (5.) 3rd plur. present, preterite definite, preterite indefinite, and future of *se lever*. (6.) Put this in the preterite indefinite (—' which he has ' . . .). (7.) Turn "*est fait prisonnier*" into the feminine. (8.) 3rd sing. and plur. present, preterite definite and future of *savoir* and *pouvoir*. (9.) Feminine of *prêtre*. (10.) 3rd plur. present and imperfect subjunctive. (11.) Give name of country in French. (12.) Give rule regarding this sign of plural. (13.) 1st sing. and plur. present and preterite definite indicative. (14.) Why not *milles?* When does it take the *s?* (15.) Give the negative form and the feminine of *il s'en fût douté ;* also the plural of both. (16.) Give three other conjunctions which require the subjunctive.

3. Translate into French :—

In 1356 the Black Prince won a glorious victory near Poitiers. He had only twelve thousand men, while the French had sixty thousand. John, the King of France, fell into the hands of the English knights. The prince treated him with the greatest politeness, and sent him to London. During his sojourn in England he was shown (*trsl.* one showed him) all the respect due to a crowned head. At last having renounced the portion of his country which Edward had conquered, he was set at (*en*) liberty. Before setting out for France, he promised, however, to send a large sum of gold as ransom (*rançon*). But when he found that his subjects could not raise this money he returned to England, and died there.

FRENCH.

HIGHER GRADE.

Tuesday, 19th June. 10 A.M. to 12.

1. Translate into English :—

a. Au milieu de ces petitesses et de cette corruption parut à la cour de France une figure gigantesque, et que semblait grandir

encore son aspect à demi barbare : c'était Pierre le Grand, le
créateur de la Russie.   Il y fut reçu avec magnificence et les
plus délicates attentions, mais ne se laissa point séduire par ces
brillants dehors.   Pierre premier ne pouvait, on le pense bien,
se plier à toutes les règles de l'étiquette.   Quand on lui présenta
le jeune roi, il l'enleva de terre et l'embrassa sur les deux joues
à la grande stupéfaction des seigneurs.   Il lui fallut de la bière
dans sa loge à l'Opéra.   Ce fut le régent lui-même qui lui offrit
le verre et la serviette.   Aux Invalides,* il goûta la soupe des
soldats, but à leur santé, leur frappant sur l'épaule et les appelant
camarades.   Il vit à la Sorbonne† la statue de Richelieu sculptée
par Girardon, et saisissant ce marbre dans ses bras : " Grand
homme," s'écria-t-il, " je t'aurais donné la moitié de mes États
" pour apprendre de toi à gouverner l'autre ! "   Ainsi tout ce
qu'il trouva à admirer ici, ce fut le passé ; le reste lui sembla si
pauvre qu'il annonça la décadence et la ruine prochaine du peuple
français.   Il ne l'avait vu qu'à la surface, et le jugeait d'après la
cour.   Mais pour celle-ci il avait prédit juste, noblesse et royauté
se mouraient.

<div align="right">V. DURUY.</div>

> b. Infâme paresseux ! tu ne veux donc rien faire ?
>   Dit un jour un maître en colère
>   À son valet sous un arbre endormi.
>   Au lieu de travailler, dormir en plein midi !
>   Tu ne mérites pas que le soleil t'éclaire.
>   Vous avez bien raison, ma foi,
>   Dit le dormeur, et mes torts sont sans nombre ;
>   Le soleil n'est pas fait pour moi :
>   Voilà pourquoi je me suis mis à l'ombre.

II. Translate into French :—
It was at a supper with Prince Menzikoff that the Emperor
saw Catherine for the first time, and fell in love with (*trsl.*
became amorous of) her : he married her secretly in 1707, not
charmed by female artifices, but because he found in her a firm-
ness of soul capable of seconding his undertakings, and even of
continuing them after him.   He had already repudiated long
since his first wife Ottokefa, a boyard's daughter, who was
accused of opposing the changes which he made in his domi-
nions.   This crime was the greatest in the eyes of the Czar ; he
would have in his family only persons who thought as he (did).
He believed he discerned in this foreign slave the qualities of a
sovereign, though she had none of the virtues of her sex.   For
her sake he disdained the prejudices which would have restrained
an ordinary man : he caused (*trsl.* by *faire*) her to be crowned
Empress.   The same talents which made her the wife of Peter
Alexiowitz, gave her the empire after the death of her husband.
Europe has beheld with surprise this woman, who could neither
read nor write, repairing her education and her weaknesses by
her courage, and filling with glory the throne of a legislator.

<div align="right">VOLTAIRE.</div>

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* *Les Invalides*, the Paris hospital for disabled soldiers.
† *La Sorbonne*, a building containing part of the Paris University.

III.—

(1.) Give the plural and meaning of : *quel nouveau détail, son bel œil, ce ciel bleu, celui du monsieur, madame votre grand'mère.*

(2.) Give the feminine and meaning of *un prince étranger, ce gros paysan, mon neveu lui-même, plusieurs lions furieux, tous leurs fils.*

(3.) Distinguish between :—des, dès, dés ; plutôt, plus tôt ; mur, mûr ; la tache, la tâche ; il vit, il vît.

(4.) *a.* Third singular and plural present and preterite (or past) definite indicative of : *decevoir, paraître, prévoir, s'en aller, pouvoir.*

    b. Second singular and plural preterite (or past) definite, future, and imperative of : *voir, savoir, écrire, s'asseoir, s'en aller.*

    c. Third singular and plural pluperfect of *se fâcher* (masculine and feminine), (1) negatively, (2) interrogatively.

(5.) Give the French for :—(*a*) I have just dined ; (*b*) I am about to go ; (*c*) You ought to go ; (*d*) I doubt that this is true ; (*e*) I fear he will come.

FRENCH.

HONOURS.

Tuesday, 19th June.   10 A.M. to 1 P.M.

Translate into English :—

(*a.*) On avait besoin d'un grand génie pour corriger les fautes de politique qu'on n'avait cessé de commettre.   Il existait, ce puissant génie, dans la personne du favori de la reine mère, Richelieu évêque de Luçon, dont nous avons déjà parlé, et à qui il était réservé de changer la face de l'Europe.   On verra bientôt ce prélat ambitieux maîtriser un monarque faible, soumettre la noblesse au joug des lois et de sa volonté, et ne pas regarder au mal qu'il lui faudra faire à la France pour parvenir à l'accomplissement de ses vues.   La reine mère, depuis sa réconciliation avec son fils, était rentrée au conseil, et désirait d'y introduire Richelieu, qui, d'abord créature de Concini, était ensuite devenu cardinal par l'entremise de De Luynes.   Il força bientôt tous les obstacles qui arrêtaient sa fortune ; car les ministres craignant son ambition, et surtout la supériorité de ses lumières, l'avaient décrié dans l'esprit de Louis.   Les galanteries dont on l'accusait ne pouvaient manquer de choquer ce prince dévot, trop soupçonneux d'ailleurs, et trop jaloux de l'autorité, pour ne pas craindre celui qu'on peignait comme le plus ambitieux des courtisans.   Marie de Médicis ne se rebuta point ; elle parvint à faire disgracier les ennemis du cardinal, qui, à leur grande mortification, fut enfin admis au ministère en 1624.   Plus il désirait cette place, plus il affecta de répugnance à l'accepter.   Sa mauvaise santé, disait-il, le rendait incapable d'un long travail ; tout ce qu'il pouvait faire, était d'assister au conseil de temps en temps, sans se mêler d'affaires d'État.

<div align="right">L'Abbé Millot.</div>

(b.) Au bout de quinze jours nous étions sans un sou
      J'avais passé ce temps à marcher comme un fou
      Seul, allant devant moi, tout droit, parmi la foule.
      Car le bruit des cités vous endort et vous soûle,
      Et, mieux que l'alcool, fait oublier la faim.
      Mais, comme je rentrais, une fois, vers la fin
      D'une après-midi froide et grise de décembre,
      Je vis ma femme assise en un coin de la chambre,
      Avec les deux petits serrés contre son sein ;
      Et je pensais : " C'est moi qui suis leur assassin ! "
      Quand la vieille me dit, douce et presque confuse :
      " Mon pauvre homme, le Mont-de Piété refuse
      Le dernier matelas, comme étant trop 'mauvais,
      Où vas-tu maintenant trouver du pain ? "—" J'y vais,"
      Répondis-je, et, prenant à deux mains mon courage,
      Je résolus d'aller me remettre à l'ouvrage.
              FRANÇOIS COPPÉE, " La grève des forgerons."

II. Translate into French :—
      As she uttered these words, she went to take the candle from
      the table ; she ran over all the rooms, one after the other, and
      saw there neither her maids nor her sister ; she even observed
      that they had carried off all their clothes. Her suspicions now
      appeared to her but too well founded ; she came to me, and said
      to me with much emotion, " Perfidious man, add not dissimula-
      " tion to treachery ! It was by no means chance that caused thee
      " to come in here : thou art one of Don Fernando's suite, and hast
      " a share in his crime. But do not hope to escape : people enough
      " still remain to me to seize thee." " Madam," I answered, " do
      " not confound me with your enemies ! I do not at all know Don
      " Fernando ; I do not even know who you are. I am an unfor-
      " tunate man whom an affair of honour obliges to leave Madrid ;
      " and I swear, by all that is sacred, that, but for (trsl., without)
      " the storm which surprised me, I would not have entered your
      " house ! Judge, therefore, more favourably of me : instead of
      " believing me an accomplice (complice) in the crime which offends
      " you, think me rather disposed to revenge you ! " These last
      words, and the tone in which I pronounced them, appeased the
      lady, who seemed to look upon me no longer as her enemy ; but if
      she lost her anger, it was only to give herself up to her grief.
                                                    LE SAGE.

III.—
  1. Give the plural and meaning of chef-lieu, chef-d'œuvre, chou-fleur,
      tire-bouchon, passe-partout, gentilhomme, arc-en-ciel, franc-
      tireur, pince-nez.
  2. State the rule regarding the treatment of adjectives qualifying the
      noun gens, illustrating it by the following examples :—a, these
      good people are tiresome (ennuyeux) ; b, all old people ; c, all
      black people ; d, all honest people ; e, these people are all very
      happy.
  3. Exemplify the adverbial use of tout, by making each of the follow-
      ing sentences—
                      il était tout prêt ;
                      il fut tout étonné ;
                      tout heureux qu'il est ;
                      tout honteux qu'il était—
      a. plural ; b. feminine singular ; c. feminine plural.

4. Distinguish between :—
    le mémoire—la mémoire.
    un brave homme—un homme brave.
    je n'en veux plus—je ne lui en veux plus.
    il me tarde de la voir—il ne tardera pas à la voir.
    ils ne font que sortir—ils ne font que de sortir.

5. Show by one or two examples what tenses (and moods) are used in conditional clauses with *si*.

6. Give the English, or French, equivalents of any *three* of *each* of the following two sets of idiomatic phrases :—
    a. nous l'avons échappé belle.
    b. il riait sous cape.
    c. il gagne à être connu.
    d. il se mettrait en quatre pour moi.
    e. en venir aux mains.

    a. no sooner said than done.
    b. to make one's self at home.
    c. we heard from him yesterday.
    d. it is not worth while.
    e. I cannot help it.

GERMAN.

Lower Grade.

Tuesday, 19th June.   2 P.M. to 4 P.M.

I. Translate into English :—

Zur Zeit Alexanders des Großen lebte in Korinth ein sehr merkwürdiger Mann, namens Diogenes. Der wollte zeigen, wie wenig der Mensch bedürfe, um glücklich zu leben; er ging in einem zerrissenen Mantel, trug einen Sack auf dem Rücken und wohnte in einem Faß. Einen hölzernen Becher hatte er weggeworfen, als er einen Knaben aus der hohlen Hand trinken sah. Alexander, der von ihm gehört hatte, kam zu ihm. Er lag gerade vor seiner Tonne, um sich an der Sonne zu erwärmen. Kaum richtete er sich ein wenig in die Höhe, um den König näher zu betrachten. Alexander redete lange mit ihm und fand seine Antworten so klug und treffend, daß er freundlich zu ihm sagte : „Kann ich dir eine Gunst erweisen ? " „O ja," erwiderte Diogenes, „geh mir ein wenig aus der Sonne ! " Die Begleiter des Königs wurden zornig über diese Verachtung seiner Gnade. Alexander aber sprach : „Wenn ich nicht Alexander wäre, so möchte ich Diogenes sein."

<div align="right">After J. E. Andrä.</div>

II. Translate into German :—

Mary, have you seen my brother ?—Yes, Miss, he is in the garden. What is he doing there ?—He is playing with another boy. Tell him he must come in. It is five o'clock. He has to work now. Here he comes already. Where is your (*translate* thy) friend, Charles ?—He has gone home. Who was it ?—It was Henry, the son of our neighbour. Is he *not* much older than you (*translate* thou) ?—Only one year ; and h is not quite so tall as I.

III.—

(1.) Give the German words—in the nominative and genitive singular, and nominative plural, with the definite article—of any ten of the following:—house, dog, book, flower, woman, letter, hand, stick, ship, roof, pen, star, town, country, king.

(2.) Decline (singular and plural): dieſer Baum; and the third personal pronoun.

(3.) Write out the cardinal numbers from 1 to 20; and the ordinals from 1st to 5th.

(4.) Give the third person singular present, imperfect, and perfect indicative active of:—finden, ſehen, eſſen, ſagen, ſprechen, ſchreiben, wiſſen, können.

(5.) Write out the perfect indicative active of gehen; and the present indicative passive of loben.

GERMAN.

Higher Grade.

Tuesday, 19th June. 2 P.M. to 4 P.M.

I. Translate into English :—

    a. Friedrich Barbaroſſa war ein und dreißig Jahre alt, als er den Thron beſtieg (1152). Zu jener Zeit gab es in Deutſchland Hader und Zwieſpalt genug. Die Fürſten ſtritten unter einander und verlangten vom Kaiſer, er ſolle regieren, wie es ihnen gefiele. Da beſchloß Friedrich, das Kaiſertum wieder ſtark zu machen, und reich an Macht und Ehren, wie es zu Karls des Großen Zeit geweſen war. Die Raubritter am Rhein ließ er ſeinen Arm fühlen. Sechs und ſechzig ihrer Burgen legte er in Trümmer und ſchaffte Ruhe und Sicherheit im deutſchen Reich. Unbeſtritten war er das Haupt der ganzen Chriſtenheit. Geſandte aus allen Ländern Europas huldigten ihm im Namen ihrer Fürſten. Gegen die lymbardiſchen Städte Norditaliens, die ſeine Oberhoheit lange nicht anerkennen wollten, unternahm er fünf Kriegszüge; und beſonders die Stadt Mailand mußte für ihren Trotz und Widerſtand ſchwer büßen. Jedoch verſöhnte er ſich endlich auch mit ihnen, und als er im Jahre 1184 zum letzten Male nach Italien zog, wurde er überall mit Freude und Jubel empfangen.

    b. Es war im Dorfe Hochzeit,
      Die Gäſte ſchmauſten und ſprangen;
      Da kam zu dem frohen Feſte
      Auch ein alter Sänger gegangen.

      Hei! was man dem jungen Paare
      Für reiche Geſchenke beſchied!
      Der Sänger brachte zum Feſte
      Nichts als ein kleines Lied.

      Das Hochzeitspaar und die Gäſte
      Sind längſt im Grabe verdorrt,
      Verwittert ſind alle Geſchenke;
      Das Lied lebt immer noch fort.

                                  Bodenſtedt.

II. Translate into German :—

    One of the knights rode one day too far from the camp, and lost his way. He got (*translate* came) into a great wood, and feared he might meet a band of enemies. At last he saw a young herdsman (Hirt) who sat under a tree; and he said, "My boy, "I will give thee this horse, if thou wilt lead me back to my "friends." The lad replied, "It is too late now. Come home "with me, and I will go with you as your guide to-morrow "morning." The knight went with the boy, and slept the whole night in his father's hut. Next day he was led back to the camp. The youth, whose name was Godwin, remained with him. He was clever and brave, and rose (steigen) afterwards to high rank at the Danish court.

III.—

    (1.) Give the German words—in the nominative and genitive singular, and nominative plural, with the definite article—of any ten of the following :—people, week, month, virtue, pain, disease, heart, eye, quality, art, pleasure, castle, passion, prince, sea.

    (2.) Decline (singular and plural) : — mein guter Freund, and (singular) Kaiſer Karl der Große.

    (3.) Distinguish between :—
        der Heide, die Haide ; der See, die See ; der Verdienſt, das Verdienſt ; ſchlecht, ſchlicht ; reiſen, reißen.

    (4.) Give the third singular present, imperfect, and perfect indicative active (with the meanings) of : behalten, annehmen, weggehen, zerbrechen, beſehen, verlieren, kennen, können.

    (5.) Translate :—
        a. I know that you know him.
        b. A man came running.
        c. It is half-past seven o'clock.

    (6.) State what cases are governed by the prepositions : bei, wegen, durch ; giving one example for each.

GERMAN.

Honours.

Tuesday, 19th June. 2 P.M. to 5 P.M.

I. Translate into English :—

    a. Etwa zwei Monate nach der Zurückkunft Karls aus Rom öffnete Pavia ihm die Thore. Die Stadt hatte während der langen Belagerung viel gelitten durch Krankheit und Mangel ; die Franken aber machten noch immer eine große Beute, und Karl überließ dieſelbe gern ſeinen Kriegern als ermunternden Lohn. Der König Deſiderius wurde Karl, der einſt ſein Schwiegerſohn geweſen war, gefangen überliefert, nebſt ſeiner Gemahlin Anſa. Karl ließ die Unglücklichen über die Alpen führen. Deſiderius ward, wie es heißt, in ein Kloſter geſteckt, wo er ſein Leben als Mönch endigte. Das Schickſal ſeiner Gemahlin iſt gänzlich unbekannt. Seiner Tochter Deſiderata, die einſt Karls Gemahlin geweſen war, wird auch nicht gedacht. Vielleicht war ihr das Herz ſchon gebrochen vor dieſen Tagen der Trübſal. Sein Sohn

Avalgis hatte sich in Verona tapfer verteidigt; als aber Pavia gefallen und sein Vater in die Hände des Siegers geraten war, da konnte auch er sein Schicksal voraussehen. Demselben zu entgehen, entschloß er sich zur Flucht, um sich für bessere Tage zu erhalten, und entkam glücklich über Pisa nach Konstantinopel, wo er eine gastfreundliche Aufnahme fand.

<div align="right">H. Luden, „Geschichte des Deutschen Volks."</div>

    b. Zwei Seelen wohnen, ach! in meiner Brust,
        Die eine will sich von der andern trennen;
        Die eine hält, in derber Liebeslust,
        Sich an die Welt, mit klammernden Organen;
        Die andre hebt gewaltsam sich vom Dust
        Zu den Gefilden hoher Ahnen.
        O, giebt es Geister in der Luft,
        Die zwischen Erd' und Himmel herrschend weben,—
        So steiget nieder aus dem goldnen Duft
        Und führt mich weg, zu neuem buntem Leben!
        Ja, wäre nur ein Zaubermantel mein,
        Und trüg' er mich in fremde Länder,
        Mir sollt' er um die köstlichsten Gewänder,
        Nicht feil um einen Königsmantel sein!

<div align="right">Goethe, „Faust."</div>

II. Translate into German :—

    The Swede Gustavus Wasa was persecuted by King Christian the Second of Denmark, because he opposed the Danish rule. He therefore fled, disguised as a peasant, to the Dalecarlian mines, where he was for a long time sheltered from his pursuers. One day, however, his stay at a farm-house had been betrayed to the Danes. The farmer put him at once on a cart (waggon) filled with straw, and drove him to the nearest village. On the way he was stopped by Danish horsemen, who searched the cart, and pierced the straw with their swords in all directions. Thereby Gustavus was wounded in the leg; but he remained lying quiet, and did not betray himself by a sound. When the peasant saw that the blood from the wound was trickling through the cart upon the snow, he quickly cut one of the two horses in the leg, in order that the soldiers should think that the blood came from the poor beast. Thus he arrived safely in the village, where he handed over his *protégé* (Schützling) to some friends.

III.—

    (1.) Decline the German of "His Majesty King William of Prussia."

    (2.) Form abstract nouns (with definite article, and meaning) from any eight of the following adjectives :—gut, fromm, sanft, jung, gesund, reich, heiß, hoch tapfer, lang, frei, werth.

    (3.) Give five adjectives (with meanings) that govern the genitive, and five that govern the dative.

    (4.) Give the meaning of any eight of the following reflective verbs, and state what prepositions are required after them :—sich wundern, sich fürchten, sich verlassen, sich besinnen sich hüten, sich bewerben, sich weigern, sich verlieben, sich gewöhnen, sich fügen, sich begeistern, sich richten.

(5.) State the cases in which the *past participle* is used in German :—*a.* instead of the present participle ; *b.* instead of the infinitive.

(6.) Give the English or German equivalents of any *three* of *each* of the following two sets of idiomatic phrases :—

    a. mit dem blauen Auge davonkommen.
    b. aus freien Stücken.
    c. so wie so.
    d. ein gefundenes Fressen.
    e. einem einen Possen spielen.

    a. And so forth.
    b. Now and then.
    c. As far as I know.
    d. I could not help it.
    e. For my sake.

No. 7.—ARITHMETIC (II.).

Lower Grade.

Monday, 18th June.   10 A.M. to 11.30 A.M.

Give your working in full.

Endeavour rather to answer a moderate number of Questions accurately and fully than to answer a large number imperfectly.

1. Explain the rule for the addition of vulgar fractions.

    Simplify $\dfrac{6756}{6193} - \dfrac{4114}{4488}$.

2. Find the total of the following bill :—

		£	s.	d.
35 articles at - - - -	-	1	6	3
15¼ ,, - - - -	-	0	11	3½
6⅜ ,, - - - -	-	0	17	6
4⅖ ,, - - - -	-	3	15	7½

3. Express as a single decimal

$$3\cdot 164 \times 2\cdot 013 + \cdot 0163 \div \cdot 0084 - 1\cdot 305 \times 2\cdot 006.$$

4. Calculate the simple interest on £3,468 4s. 6d. for 4·25 years at 3·168 per cent.

5. A grocer sells his best quality of tea at 3s. 6d. per lb., and thereby gains a profit of 4 per cent. ; he sells his second quality at 2s. 6d per lb., gaining a profit of 6 per cent. At what prices must he sell a mixture composed of two parts of the second quality to one of the first, so as to gain a profit of 5 per cent. ?

6. A wall is covered with plaster 1¼ inches thick ; how many square yards will be covered by a cubic yard of plaster ?

7. Which is the greatest of the three sums $\frac{1}{19}$ of £1, $\frac{1}{20}$ of a guinea, $\frac{1}{16}$ of half-a-crown ?

8. Express
  (1.) 17294544 square inches in acres, and
  (2.) 2½ lbs. troy, in lbs., oz., drs. avoirdupois, 7,000 grains
     going to an avoirdupois lb., and 5,760 grains to a
     troy lb.

9. One man can do a piece of work in 12 hours, another in 16, another
  in 48. How long would all three working together take to
  finish it?

10. If £1,095 lying at interest for 117 days becomes £1,118 8s., what is
  the rate of interest per cent. per annum?

11. A person owning £1,000 3 per cent. stock, has to sell out as much
  as will pay a debt of £105 15s. If the 3 per cents. are at 94,
  how much stock has he to sell out?

12. Simplify $\dfrac{2\cdot03+1\cdot21}{2\cdot03-1\cdot21}$, giving the answer in decimals.

   Reduce every term in this to a fraction, and compare the
  results.

No. 1.—ARITHMETIC (I.).

HIGHER GRADE AND HONOURS.

Monday, 18th June. 10 A.M. to 11.30 A.M.

Give your working in full.
*Endeavour rather to answer a moderate number of Questions
accurately and fully than to answer a large number imperfectly.*

1. Explain the principle of the process for converting a vulgar into a
  decimal fraction; and indicate the conditions that the decimal
  terminate.
  Express—

$$\frac{(\frac{3}{4}+\frac{1}{5}-\frac{1}{3})\ (\frac{3}{4}+\frac{1}{5}+\frac{1}{3})+(1-\frac{3}{4}-\frac{1}{5})\ (1+\frac{3}{4}+\frac{1}{5})}{\frac{7}{2\cdot3}\ (\frac{1}{2}+\frac{3}{5})}$$

  as a decimal (to 4 places).

2. Express in English money to the nearest penny the amount of the
  following bill in French money:—3·35 articles, at 6·37 fr.;
  23·63 articles, at 1·34 fr.; 15·37 articles, at 7·15 fr.; allowing
  25·42 fr. for £1.

3. A certain sum of money put out at 4½ per cent., simple interest, for
  10 years, amounted to £1,356 after income tax was deducted
  from the interest at the rate of 5d. in the pound. What was the
  sum?

4. I bought 25 shares of a certain Company for £135 each, the paid-
  up capital for each share being £100. During the year I got a
  dividend of 5½ per cent. on the paid-up capital, and a bonus
  of £35 on my 25 shares. What rate of interest did my invest-
  ment bring me?

5. For how much should a house, worth £5,122, be insured at 2½ per
  cent. so that in case of loss the value of the house and the
  insurance premium may be repaid?

6. What is the difference between simple interest and true discount on a bill for £400 due in 9 months, when interest is at 4 per cent. per annum?

7. A locomotive engine making 162 strokes per minute, travels 90 miles in two hours; how many strokes per minute must the same engine make to do 200 miles in 4½ hours?

8. From 9·6 of a £ take 5·037 of a guinea, and express the result in decimals of a shilling.

OPTIONAL QUESTIONS.

(In these Questions the Candidate may use Logarithms.)

9. The population of a country was 4,314,000 to begin with, and increased by 3·168 per cent. every year for 5 years. What was the population at the end of the 5 years?

10. A square pond is surrounded by a strip of lawn whose breadth is the same on all the four sides. If the side of the pond be 32 yds. 2 ft., and the breadth of the lawn 25 yds. 1 ft., find the area of the lawn.

11. An estate, which consists of a circular piece of ground 1¼ miles in diameter, is left to 5 sons, 4 of whom get each what is equivalent to a circle 400 yards in diameter, while the fifth gets the remainder. If the area of a circle is $\frac{355}{452}$ of the square on the diameter, what per-centage of the estate goes to each son?

12. A person walks from Rugby to London in 4 days, and back in 5 days. Each day he walks one mile less than on the preceding day. What is the distance between the two places?

No. 8.—GEOMETRY (II.).

LOWER GRADE.

Monday, 18th June. 12 to 2 P.M.

Give your working in full.

Endeavour rather to answer a moderate number of Questions accurately and fully than to answer a large number imperfectly.

1. If two triangles have three sides of the one respectively equal to three sides of the other, they are equal in every respect.

    The triangles ABC, $A'B'C'$ are right angled at C and C'. CD and $C'D'$ are the perpendiculars from C and C' on AB and $A'B'$ respectively; if $BC = B'C'$ and $CD = C'D'$, shew that the triangles are equal in every respect.

2. The complements of the parallelograms about the diagonal of a parallelogram are equal to each other.

    If two points be taken in the diagonal through which parallel lines are drawn to the sides, show that the two corner figures remote from the diagonal are equal.

3. In the triangles ABC, $A'B'C'$, $AB = A'B'$, $AC = A'C'$, and $\angle A > \angle A'$, show that $BC > B'C'$.

    If D and D' be the middle points of BC and $B'C'$, shew that $AD < A'D'$.

4. Shew that parallelograms on the same base and between the same parallels are equal in area.

Deduce the ordinary rule for computing the area of a parallelogram.

5. Shew that the area of an equilateral triangle on the hypotenuse of a right-angled triangle is equal to the sum of the areas of the equilateral triangles on the sides.

6. O is the middle point of AB, D any other point whatever in AB, Show that the sum of the squares on AD and BD is double the sum of the squares on OA and OD.

Given two points, A and B, find a point D in AB such that $AD^2 + BD^2 - 2\,AD.BD$ shall be equal to a given square.

7. Shew that the angle in a circular segment is less than, equal to, or greater than a right angle according as the segment is greater than, equal to, or less than a semicircle.

A and B are fixed points, AL, BM two variable straight lines which are always parallel and like directed. PA and PB bisect the angles LAB and MBA respectively; find the locus of P.

8. When are two circles said to touch?

If two circles touch, shew that the straight line through their centres passes through the point of contact?

AL and BM are parallel. The circle C touches AL and AB, its point of contact with the former being P. The circle D touches BM and AB, the former at Q. If the circles C and D touch other, show that PQ passes through the point of contact.

9. If four points A, B, C, D are in order on the same straight line, $AC.BD = AB.CD + BC.AD$.

10. Three times the sum of the squares on the three sides of a triangle is equal to four times the sum of the squares on the three medians.

11. Show that the three circles which each go through two angles of a triangle and the intersection of its perpendiculars are each equal to the circumscribing circle of a triangle.

12. If any hexagon be inscribed in a circle, the sum of its first, third and fifth angles is equal to four right angles.

No. 2.—GEOMETRY (I.).

HIGHER GRADE AND HONOURS.

Monday, 18th June.   12 to 2 P.M.

Give your working in full.

Endeavour rather to answer a moderate number of Questions accurately and fully than to answer a large number imperfectly.

1. Prove that two right-angled triangles are equal in every respect when two sides of the one, or a side and an angle of the one, are respectively equal to the corresponding parts in the other. Indicate carefully the different fundamental propositions on which your demonstration rests.

ABC, $A'B'C'$ are two triangles each right-angled at A, AD' and $A'D'$ are the perpendiculars from A and A' on BC and $B'C$ respectively. If $BC = B'C'$ and $AD = A'D'$, show that the two triangles are equal in every respect.

2. Prove that the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on its sides.

In any acute-angled triangle ABC squares are described externally on the sides, viz., $BLMC$ on BC, $CPQA$ on CA, $ARSB$ on AB. AD, BE, CF are perpendiculars on LM, PQ, RS respectively. Prove that the following pairs of rectangles are equal: AE and AF; BF and BD; CD and CE.

What important theorem of Euclid's may be deduced from this result?

3. Prove (without assuming any theorem of a similar kind for the circle) that the rectangle under the segment of a chord through P is equal to the difference between the squares of the radius of the circle and the distance of P from the centre.

Point out the various important particular cases of this theorem.

A and B are two fixed points on a given straight line L. P is a point on a variable circle C through A and B such that the part of the tangent to C at P intercepted between P and the given line L is of constant length: find the locus of P.

4. Prove that the bisectors of the external and internal angles of a triangle divide the base in the ratio of the sides.

L is a given straight line, A and B two points on opposite sides of it: find a point P in L such that L bisects the angle APB.

5. Show how to inscribe a circle in any given equilateral and equiangular polygon, and prove that the same construction enables you to describe a circle about it.

6. If the diagonals of a quadrilateral cut each other at right angles, the four feet of the perpendiculars on the sides from the intersection of the diagonals are on the circumference of a circle.

7. On a given straight line describe a rectilineal figure similar to a given rectilineal figure, so that the given line may be homologous to an assigned side of the given figure.

If the given figure be a right-angled triangle, and each of its three sides be taken in turn as the assigned side, what would be the relation between the areas of the three figures thus described?

8. If a triangle have 27, 24, and 7 as its sides, find (1) what sort of triangle it is, (2) what is the length of the perpendicular to any one of the sides, (3) what is the length of the radius of the inscribed circle.

OPTIONAL QUESTIONS.

9. Prove the fundamental property of the radical axis of two circles; and deduce the existence of the radical centre.

$ABCD$ is a quadrilateral which can be circumscribed about a circle. The circle E touches DA in P and AB in Q; the circle F touches AB in Q and BC in R; the circle G touches BC in R and CD in S; the circle H touches CD in S and also touches

DA. Show that the circles *E* and *G* and the circles *F* and *H* (if they intersect) intersect on points which lie on the diagonals of the quadrilateral.

10. If any straight line meet the sides of the triangle *ABC* in the points *D, E, F* respectively, shew that, with a certain convention as to algebraic sign, the product of the three ratios *AD : BD, BE : CE, CF : AF* is + 1 ; and conversely.

     If the tangents at *ABC* to the circle circumscribed about the triangle *ABC* meet the sides *BC, CA, AB* in *D, E, F* respectively, prove that *D, E, F* are collinear.

11. Find the angles of a triangle with sides 27, 24, 7 ; also of a triangle with sides 25, 24, 7.

12. Prove that the volume of a pyramid is one-third the volume of a prism having the same base and the same altitude.

     A solid is composed of a right circular cylinder surmounted by a right circular cone. The heights of the cone and cylinder are the same, viz., 3 feet ; and they have a common radius, viz., 2 feet. Calculate to 2 places of decimals, the whole volume and the whole surface of the solid.

No. 9.—ALGEBRA (II.).

Lower Grade.

Monday, 18th June. 3 p.m. to 5 p.m.

Give your working in full.

Endeavour rather to answer a moderate number of Questions accurately and fully than to answer a large number imperfectly.

1. Expand and arrange according to powers of *x*

$$(3x-2)^4 \dots\dots\dots\dots\dots\dots (\alpha) ;$$
$$(x-2)\ (x+2)\ (x^2+4)\ (x^4+16) \dots\dots (\beta).$$

  Simplify—
$$\frac{2x^4+4x^3-3x^2+x+1}{x^2+3x+1}.$$

2. Resolve the following into factors as far as you can :

$$x^2+(a-b)\ x-ab \dots\dots\dots (\alpha) ;$$
$$(x-1)^2-(2x-3)^2 \dots\dots\dots (\beta) ;$$
$$8x^3+27 \dots\dots\dots\dots\dots (\gamma).$$

3. Express each of the following as the simplest possible single fraction :

$$\frac{a+b}{a-b}-\frac{a^2+b^2}{a^2-b^2}+\frac{4a^2b^2}{a^4-b^4}\dots\dots (\alpha) ;$$

$$\frac{\dfrac{x+1}{x^3+1}+\dfrac{x-1}{x^3-1}}{\dfrac{x^3+1}{x+1}+\dfrac{x^3-1}{x-1}}\dots\dots\dots\dots (\beta).$$

4. Solve the following equations :—

$$\frac{ax+b}{a+b} + \frac{ax-b}{a-b} = 2 \dots \dots (\alpha) ;$$

$$\left.\begin{array}{l} \frac{2}{5}(x+y) - 5 \ (x-y=1) \\ x+y = 2 \ (x-y) \end{array}\right\} \dots (\beta).$$

5. Find the two roots of the equation

$$(x-1) \ (x-2) + (x-1) \ (x-3) + (x-1) \ (x-4) = 0.$$

A certain sum of money, lent out for a number of years at 4 per cent., simple interest, amounted to £280. If the same sum had been lent out for twice as long at 5 per cent. simple interest, it would have amounted to £400 ; find the sum and the number of years.

6. Show that, if two integral functions of x have any common factor, it will be a factor in their sum or difference ; and exemplify the theorem.

Hence show that $x^2 - x + 1$ and $x^2 + x + 1$ have no factor in common.

Find the G.C.M. of

$$x^4 + 2x^3 - 2x^2 + 2x - 3 \text{ and } x^4 - 2x^3 - 2x^2 - 2x - 3.$$

7. Reduce to its simplest form $2\sqrt{243} - \frac{7}{3}\sqrt{\frac{1}{3}}$.

8. If $x+y$ varies as $x-y$, show that $x^2 + y^2$ varies as xy.

9. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, &c., show that each of these fractions is equal to

$$\frac{pa + qc + re + \&c.}{pb + qd + rf + \&c.} ;$$

where p, q, r, &c. are any numbers. Is there any restriction on p, q, r, &c. in the case where negative values of a, b, c, &c. are allowed ?

10. Two men set out at the same time to walk, one from Glasgow to Inverness, 180 miles apart, at the rate of m miles an hour, the other from Inverness to Glasgow, at the rate of n miles per hour. Where will they meet ?

11. Solve—

(1) $3x^2 = x + 1$,

(2) $x^2 - x + \frac{72}{x^2 - x} = 18$,

12. Find the cube root of

$$x^3 - 9x + \frac{27}{x} - \frac{27}{x^3}.$$

No. 3.—ALGEBRA (I.).

Higher Grade and Honours.

Monday, 18th June.   3 p.m. to 5 p.m.

Give your working in full.

Endeavour rather to answer a moderate number of Questions accurately and fully than to answer a large number imperfectly.

1. Expand and arrange according to powers of x

$$\{(b+c-a)\ x^2+\ (c+a-b)\ x+\ (a+b-c)\}\ \{x^2+x+1\}.$$

   Expand, simplify and arrange symmetrically

$$(b+c-a)^2\ (b-c)+(c+a-b)^2\ (c-a)+(a+b-c)^2\ (a-b).$$

   Find an integral function of x of the first degree whose value is doubled when x is doubled and which has the value 9 when $x=3$.

2. If $px^3+qx^2+rx+s=0$, prove from first principles that px^3+qx^2+rx+s contains the factor $x-\alpha$.

   Resolve the following into factors of the first degree:—

$$22x^2+109x+45\ldots\ldots\ldots(\alpha).$$
$$(x+1)^3+(2x+1)^3\ldots\ldots(\beta).$$
$$x^3+xy+x-y-2\ldots\ldots(\gamma).$$

3. What is meant by a proper algebraic fraction ? Show that the sum of two proper algebraic fractions is always a proper algebraic fraction.
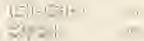
   Simplify $\dfrac{(x^2+x+1)^2-(x^2-x+1)_2}{(x^2+x+1)^3-(x^2-x+1)^3}.$

   If $\dfrac{x^3+3x}{(x^2-1)^2}=\dfrac{Ax+B}{(x+1)^2}+\dfrac{Cx+D}{(x-1)^2}$, where A, B, C, D, are mere numbers, determine the values of A, B, C, D.

4. Explain carefully what is meant by a solution of a conditional equation involving one or more variables.

   Show that, if all the solutions of $Ax+By+C=0$ be also solutions of $A'x+B'y+C'=0$, then, in general $A/A'=B/B'=C/C'$.

   Find as many solutions as you can of the following :—

5. If three simultaneous equations, $ax+by+cz=0,$
$$a'x+b'y+c'z=0,$$
$$a''x+b''y+c''z=0,$$

   are consistent with any simultaneous values of x, y, z, except zeroes, find the relation that must exist between the constants.

6. Solve $(x+a)\ (y+b)=c^2$, $(y+b)\ (z+c)=a^2$, $(z+c)\ (x+a=)b$

7. Reduce to their simplest expressions:

$$\frac{1}{\sqrt{6}+\sqrt{21}-\sqrt{10}-\sqrt{35}} \text{ and } \frac{1}{2^{\frac{2}{3}}+1}+\frac{1}{2^{\frac{1}{3}}-1}.$$

8. If α and β be the roots of the quadratic equation $x^2+px+q=0$, find the equation whose roots are α $(\alpha-\beta)$, $\beta(\beta-\alpha)$.

Discuss, by drawing a curve or otherwise, the variation in the value of $(x^3-x+1) / (x-1)^2$ when x varies from $-\infty$ to $+\infty$; and find whether this function has a maximum or a minimum value.

Optional Questions.

9. Find the number of permutations of n things taken r at a time, 1st, when each thing may be repeated as often as we please; 2nd, when there is no repetition.

In how many different ways can sixteen school girls pair themselves for a walk so that one of the eight elder girls always walks with one of the eight younger ones? No attention is to be paid to the order of the pairs in the procession.

10. Show that the co-efficient of x^n in the expansion of $(1+x)^{2n}$ is double the co-efficient of x^n in the expansion of $(1+x)^2{}_n{}^{-1}$.

11. The equation

$$x^3+3x^2+mx-13=0 \text{ has } -2+3i \text{ for a root (where } i^2=-1),$$

what are the other roots and what is the value of m?

12. The sides of a triangle being 107 and 119, and the included angle $50°\,6'$, find the other angles and the third side.

13. State, without proof, the formulae for expanding $\sin (A+B)$ and $\cos (A+B)$ in terms of the sines and cosines of A and B; and deduce an expression for $\tan 3A$ in terms of $\tan A$.

Prove that

$$\cot^2\frac{A}{2}+\tan^2\frac{A}{2}-2=\frac{4}{1-2\tan A \cot 2A}.$$

14. If R be the radius of the circle circumscribing the triangle ABC, express R in terms of b, c and A.

Shew that

$$a \cos A+b \cos B+c \cos C=4\,R \sin A \sin B \sin C.$$

No. 4.—GEOMETRICAL CONICS.

Monday, 25th June.   10 A.M. to 12 A.M.

Give your working in full.

Endeavour rather to answer a moderate number of questions accurately and fully than to answer a large number imperfectly.

1. Define a parabola, a tangent, a normal.

Prove that any tangent to a parabola bisects the angle between the line drawn from the focus to the point of contact and the perpendicular from that point on the directrix.

2. If S be the focus of a parabola, A the vertex, and PN the perpendicular drawn from P, a point in the parabola, to AN the axis, prove that $PN^2 = 4$ AS·AN.

   If SP be bisected in Q, show that the locus of Q is a parabola. Determine its vertex and latus rectum.

3. If the tangent to a parabola at P meet the axis in T, then $NT = 2$ AN.

   If PN be produced to meet the parabola again in Q, show that the centre of the circle described about the triangle PQT is the same for all positions of P.

4. The tangents at the extremities of a focal chord of a parabola intersect at right angles in the directrix.

   PQ is a focal chord, and the tangents at its extremities meet in R.   Proves that $RP^2 : RQ^2 = SP : SQ$.

5. Define an ellipse both from its focus and directrix property, and from the property of its two focal distances.

   Assuming one of these definitions, show how the other may be derived from it.

6. If C be the centre of an ellipse, and the tangent at a point P meet the axis-major AA′ in T, and N be the foot of the perpendicular drawn from P to the axis, then $CT \cdot CN = CA^2$.

7. From S and H, the foci of an ellipse, SY and HZ are drawn perpendicular to the tangent.   Prove that $SY \cdot HZ = CB^2$.
   Show that SZ and HY intersect on the normal.

8. The area of the parallelogram formed by drawing tangents to an ellipse at the extremity of a pair of conjugate diameters is equal to the rectangle contained by the axes of the ellipse.

   The normal at P meets the axis-minor in Q.   Show that a circle may be described through the points PSQH.

OPTIONAL QUESTIONS.

9. The section of a cone made by a plane touching a given sphere about which the cone is circumscribed is a parabola, ellipse, or hyperbola, of which the point of contact is a focus.

   Show that in each of the two latter cases the given plane touches a second inscribed sphere at a second focus.

10. The rectangle contained by the perpendiculars drawn from any point in a hyperbola to the asymptotes is constant.

    Having given the asymptotes and one point in the curve, find the vertex.

11. Show that in *any* conic section, if the tangent at P meet the directrix in R the angle PSR is a right angle.

    If PS be produced to meet the conic in Q, and the directrix in T, prove that $SP : SQ = PT : QT$.

12. Give mechanical methods of describing the parabola, the ellipse, and the hyperbola.

No. 5.—ANALYTICAL GEOMETRY.

Monday, 25th June.   12.30 to 2.30 P.M.

Give your working in full.

Endeavour rather to answer a moderate number of questions accurately and fully than to answer a large number imperfectly.

1. Explain how the position of a point in a plane is determined by rectangular coordinates.

   Find the length of the line joining the points whose coordinates are $(2, 2)$ and $(-2, -1)$.

2. Show that the equation $2x + 3y = 5$ represents a straight line, and find the points where it cuts the coordinate axes.

3. Find the equation to the straight line mentioned in the first question and reduce it to the form $y = mx + c$.   What do m and c represent ?

4. Find the tangent of the angle between the lines

   $$Ax + By + C = 0,$$
   $$A'x + B'y + C' = 0.$$

   What is the condition that these lines be at right angles ?

5. Find the length of the perpendicular drawn from the point $x'y'$ to the line $Ax + By + C = 0$.

6. Find the area of the triangle contained by the straight lines

   $$x + 2y = 5,$$
   $$2x + y = 7,$$
   $$y - x = 1 ;$$

   and draw the figure.

7. Show that the lines

   $$2y = 3x + 4,$$
   $$4y = 4x + 3,$$
   $$6y = 5x + 2$$

   meet in a point.

8. If the distance of a point from the origin bear a fixed ratio to its distance from the axis of x, find its locus.

OPTIONAL QUESTIONS.

9. Show that the equation

   $$x^2 + y^2 + ax + by + c = 0,$$

   represents a circle.   Find its centre and radius.

   If this circle passes through the points $(2, 0), (0, 2)$, and $(2, 2)$, find a, b, and c.

10. If r and θ be the polar coordinates of a point, determine what loci are represented by the equations

    (1) $r = c$,

    (2) $r \sin \theta = c$,

    (3) $r \sin (\theta - \alpha) = c$.

11. If $y^2 = 4ax$ be the equation to a parabola and (h, k) be a point on the curve, find the equations to the tangent and normal at that point.

12. If α, β, and γ be the perpendicular distances of a point P from the sides of a triangle, investigate the meaning of the equations $\alpha - \beta = 0$, $\beta - \gamma = 0$, $\gamma - \alpha = 0$, $\alpha + \beta = 0$, $\alpha + \beta + \gamma = 0$.

No. 6.—DYNAMICS.

Monday, 25th June. 3 P.M. to 5 P.M.

Give your working in full.

Endeavour rather to answer a moderate number of questions accurately and fully than to answer a large number imperfectly.

1. Define Velocity. How is Uniform Velocity measured?
    Two men ride along two roads at right angles, at the rates of five miles an hour and 12 miles an hour. Find the velocity of one relatively to the other.

2. A body falls from rest with uniform acceleration g. Find the equations of motion.
    If $g = 32 \cdot 2$, find the length moved in $4\frac{1}{2}$ seconds.

3. State Newton's three Laws of Motion.

4. Forces acting at a point are represented in magnitude and direction by three sides of a quadrilateral figure taken in order. Find their resultant. Show whether your proof holds good if the angular points are not all in one plane.

5. Find the resultant of two parallel forces acting in similar directions at two points of a rigid body.
    A rod, two feet long, weighs one pound, and has masses of one and three pounds hanging from its extremities. Where must it be supported so as to balance?

6. Define Centre of Gravity, and find that of a parallelogram.
    What other names have been given to the Centre of Gravity?
    Part of a parallelogram is cut off by joining the middle points of two adjacent sides. Find the centre of gravity of the remainder.

7. Describe one form of steel-yard.

8. A mass of one ton rests on a smooth plane which rises 2 in 5. What horizontal force is required to keep the mass from slipping?

OPTIONAL QUESTIONS.

9. Define work. How is it measured?
    How much work is done by a man of 12 stone (1) in climbing a hill 800 feet high, (2) in walking a mile along a level road? What considerations are neglected in your calculation?

10. Give the laws of Statical Friction.
    What is the Angle of Repose? Give any instance of its occurrence in Nature.

11. Define a liquid.

Prove that the surface of a liquid at rest is horizontal.

12. A body A, weighing one pound, is found to float with half its volume under water. It is then attached to a body B, weighing two pounds, and the combined mass is found to float with $\frac{4}{5}$ths of its volume under water. Find the specific gravity (1) of A, (2) of B.

DIFFERENTIAL CALCULUS.

Tuesday, 26th June.   10 A.M. to 12 A.M.

Give your working in full.

Endeavour rather to answer a moderate number of Questions accurately and fully than to answer a large number imperfectly.

1. When is one quantity said to be a function of another ?

Define a differential coefficient, and prove that, if y be a function of x, and x be a function of t, $\dfrac{dy}{dt} = \dfrac{dy}{dx} \times \dfrac{dx}{dt}$.

2. Find $\dfrac{dy}{dx}$, $\dfrac{d^2y}{dx^2}$, and $\dfrac{d^3y}{dx^3}$ in each of the following cases :—

(1.) $y = (x+a)^3$,   (2.) $y = a^x$,   (3.) $y = \sin x + \cos x$.

3. Obtain the differential coefficients of the following functions :—

$$y = \frac{1-x}{\sqrt{1+x^2}}, \qquad y = \cos^{-1} \frac{b+a \cos x}{a+b \cos x}.$$

4. State and prove Leibnitz's Theorem for the differentiation of a product of two functions.

Find $\dfrac{d^4 x^2 \cos x}{dx^4}$.

5. Enunciate Taylor's Theorem.

Deduce Maclaurin's Theorem, and apply it to expand $\sin x$ in ascending powers of x.

6. If $\dfrac{f(x)}{\phi(x)}$ be a fraction such that both numerator and denominator vanish when $x = a$, find the limit to which the fraction tends as x approaches the value a.

Find the limiting values of

(1.) $\dfrac{2-7x+8x^2-3x^3}{3-8x+7x^2-2x^3}$ when $x = 1$.

(2.) $\dfrac{1-x^2}{2x} \log \dfrac{1+x}{1-x}$ when $x = 0$.

7. If the equation to a curve be of the form

$$u = f(x, y) = 0,$$

show that

$$(X-x)\frac{du}{dx} + (Y-y)\frac{du}{dy} = 0$$

s the equation to the tangent at the point (x, y).

Find the equations to the tangent and normal at any point in the curve $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$.

8. Define a pedal curve.

Show that the equation to the parabola

$$y^2 - 4ax = 4a^2$$

may be put into the form $p^2 = ar$, and deduce the equation to its pedal curve.