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Admission Examination, 1908

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THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

ALGEBRA

[Time allotted to this examination, 2 hours.]

(Omit one question.)

1. Simplify: $\frac{a^3 - b^3}{a^2 - b^2} \times \frac{(a - b)^3}{a^2(a + b)} \times \frac{a^3 + b^3}{a^4 + a^2b^2 + b^4}$.

2. Solve:
$$\begin{cases} 2x - 3y - 2z = -1 \\ 3x + z = 6 \\ x + y + z = 3 \end{cases}$$

3. Simplify: $\left[\left(x - \frac{y^2}{x} \right) \div (x - y) \right] \frac{x^2}{x + y}$

4. Solve: $\frac{x^3 + 2}{x + 1} - \frac{x^3 - 2}{x - 1} = \frac{10}{x^2 - 1} - 2x$

5. (a). Reduce to equivalent surds of the same order:

$$\sqrt[3]{7x^2y}, \sqrt[4]{3ab^2}$$

(b). Rationalize the denominator of the fraction,

$$\frac{\sqrt{8} - \sqrt{6}}{\sqrt{8} + \sqrt{6}}$$

(c). Simplify: $\frac{2}{3}\sqrt{3} - \sqrt{\frac{3}{25}} + \frac{8}{5}\sqrt{\frac{1}{3}}$

6. Divide $2a^5b^{-3} - 5a^4b^{-2} + 7a^3b^{-1} - 5a^2 + 2ab$ by $a^3b^{-3} - a^2b^{-2} + ab^{-1}$

7. Solve: $2\sqrt{3-x} + \sqrt{x} = \frac{5}{\sqrt{3-x}}$

8. Expand by the binomial theorem, $\left(1 - \frac{a}{x^{-\frac{2}{3}}}\right)^5$

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THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

ADVANCED ALGEBRA

[Time allotted to this examination, two hours.]

Answer five questions.

1. Prove by mathematical induction that

$$1 + 2 + 3 + \cdots + n = \frac{1}{2} n (n + 1).$$

2. Separate into partial fractions the fraction, $\frac{x^2 - x + 1}{(x^2 + 1)(x - 1)^2}$

3. Expand to five terms by the binomial theorem, $\left(2 - \frac{\sqrt{a}}{x}\right)^{\frac{1}{2}}$

4. Using synthetic division to find the values of the function, plot the equation $x^3 - 7x^2 + 4x + 12 = 0$, and determine the roots from the figure. Prove the result.

- 5 (a). Show by Descartes' rule that the equation $x^5 - 1 = 0$ has 4 imaginary roots.

- (b). Form the equation of the fourth degree that has for three of its roots the quantities, 2, 5, $-\sqrt{-3}$.

- 6 (a). Given $\begin{cases} \log 2.35 = 0.3711 \\ \log 2.36 = 0.3729 \end{cases}$ and $\begin{cases} \log 7.43 = 0.8710 \\ \log 7.44 = 0.8716 \end{cases}$

solve by logarithms the expression $\sqrt{\frac{(.02352)^2 \times 23.56}{23.58}}$

- (b). Given $\log_{10} 2 = 0.3010$, find $\log_{416}$.

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

CHEMISTRY

Always give examples where necessary.

1. What is a mixture? A compound? A neutral salt? A basic salt? An acid salt.
2. State Avogadro's law. Give the laws that govern combination of gases by volume.
3. What are symbols? Give symbols for sodium, sulphur, potassium, phosphorus. Give the atomic weights of O. H. N. C. Fe.
4. How much Hg Cl_2 can be made from 28 grams of Hg? Atomic weight of Hg = 200. Cl = 35.5.
5. Give the manufacture, properties and uses of sulphuric acid.
6. Give the preparation, properties and uses of hydrochloric acid.
7. Give preparation, properties and uses of oxygen.
8. Discuss the properties of water and methods of purifying it.

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

ENGLISH

A. GRAMMAR.

1. So spake, he clouded with his own conceit,
2. And hid Excalibur the second time,
3. And so strode back slow to the wounded King.
1. Classify the sentence as simple, complex, or compound.
2. Classify the clauses as principal or subordinate.
3. Name the verbs and give their principal parts.
4. Name all the adjective modifiers, and state what they modify.
5. Name the adverbial modifiers and the words modified by them.
6. Parse *so* (line 1), *so* (line 3), *time* (line 2), *clouded* (line 1).
7. Conjugate *hide* (line 2) in the indicative future perfect, and *stride* (line 3) in the potential present perfect.
8. Define *voice*, *mood*, *tense*.
9. Give the comparison of the following adjectives: *sweet*, *little*, *sorrowful*.
10. Give the declension of the personal pronouns.

I. MACAULAY'S ESSAY ON MILTON

1. Why does Macaulay in his essay on Milton describe so minutely the reign of Charles the First? What is his opinion of Charles?
2. In what way did Milton show his devotion to the cause of liberty?
3. Does Macaulay think Milton is greater as a poet or as a reformer? What is his estimate of Milton's poetical works?

II. L'ALLEGRO AND IL PENSEROSO

1. What do you think was Milton's purpose in writing L'ALLEGRO and IL PENSEROSO? Does one contradict the other?

2. Tell who the following mythological characters were, state in which poem they are found, and give a reason for their presence: Bacchus, Venus, Cerebus, Hymen, Saturn, Philomel, Cynthia, Phillis.

III

1. Who were the parents of Comus, and what is the significance of his parentage?

2. What was the office of the "Attending Spirit?" What is the moral of the poem?

3. Describe the scene before the capitol in "Julius Caesar;" also the scene between Brutus and Portia at their home.

4. In what poem can be found the following lines? To whom do they refer?

"Where thou, perhaps under the wheming tide,
Visit'st the bottom of the monstrous world."

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

ELEMENTARY FRENCH

I.

Translate into English :

1. De bonne heure, et vers l'âge de treize ans, ses visions avaient commencé. Elle avait d'abord vu une grande lumière, et entendu une voix qui lui recommanda seulement d'être bonne et sage et d'aller souvent à l'église. Une autre fois, elle entendit encore la voix, vit encore la clarté ; mais il lui apparut aussi des personnages d'un bien noble maintien. L'un d'eux avait des ailes aux épaules, et semblait un sage prud'homme ; il lui dit d'aller au secours du roi, et qu'elle lui rendrait tout son royaume.

Elle répondit, assurait-elle, qu'étant une pauvre fille des champs, elle ne saurait ni monter à cheval, ni conduire les hommes d'armes. Mais la voix lui dit d'aller trouver messire de Baudricourt, capitaine en la ville de Vaucouleurs, qui la ferait mener vers le roi, ajoutant que sainte Catherine et Sainte Marguerite viendraient l'assister de leurs conseils.

Une troisième fois, elle connut que ce grand personnage était saint Michel. Elle commença à se rassurer et à le croire. Il lui parla encore de la grande pitié que faisait le royaume de France, lui recommanda d'être bonne et sage enfant, et que Dieu lui aiderait.

Puis les deux saintes lui apparurent, toujours au milieu d'une clarté ; elle vit leur tête couronnée de pierreries ; elle entendit leur voix, belle, douce et modeste ; elle ne remarqua pas si elles avaient des bras ou d'autres membres ; toutefois elle disait aussi qu'elle avait embrassé leurs genoux.

2. Vous nous croyez peut-être battus ! C'est une erreur : nous avons reculé d'un pas hier, nous en ferons vingt en avant demain. Et si par malheur la France ne représente plus un jour cette grande cause que nous défendons, d'autres peuples prendront notre place et poursuivront notre ouvrage, car la justice et la liberté sont immortelles, et tous les despotes du monde ne parviendront jamais à les détruire.—Quant à moi, je

pars pour Mayence et peut-être pour la Prusse, escortée par des soldats de Brunswick ; mais souvenez-vous de ce que je vous dis : les Républicains n'en sont encore qu'à leur première étape, et je suis sûre qu'avant la fin de l'année prochaine ils viendront me délivrer.

II.

Translate into French :

1. Who told you we did not like each other ?
2. Nobody, but you are always scolding one another.
3. Two brothers quarrel, but in spite of that they like each other.
4. If we lose our way in this wood, we will not part from each other.
5. And if any one attacks us, we will defend ourselves.
6. You forget I am no longer the young man you saw five years ago.
7. I did not ask them for the book, because they would not have lent it to me.
8. No, I shall not lend it to you, because you would lose it.
9. It is my mother who has asked him for it.
10. I should have given it to him, if he had asked me for it.

III.

1. State the rule concerning the place of the personal pronouns when used as objects of the verb. Illustrate fully by examples.
2. Give rules of the formation of the feminine of adjectives. Illustrate fully by examples.
3. Conjugate in full the present, preterit, imperfect and future of the indicative mood of the following verbs : *asseoir*, *connaître*, *craindre*, *croire*, and *devoir*.

THE UNIVERSITY OF MAINE

Admission Examination

September 1908

ADVANCED FRENCH

I.

Translate into English :

1. Pendant cette matinée même, on donna l'alarme en annonçant que les régiments postés à Saint-Denis étaient en marche, et que les canons de la Bastille étaient braqués sur la rue Saint-Antoine. La crainte qu'inspirait cette forteresse dirigea l'attention de la multitude de ce côté. Depuis neuf heures du matin jusqu'à deux heures, il n'y eut qu'un mot d'ordre d'un bout de Paris à l'autre : *A la Bastille ! à la Bastille !* On s'y rendait de tous côtés par pelotons, armés de fusils, de piques et de sabres. La foule qui l'entourait était déjà considérable : les sentinelles de la place étaient postées et les ponts levés comme dans un jour de guerre.

2. Le paysage était vaste aussi et encadrait de grandes lignes de verdure, un peu rougie aux approches de l'automne, ce large terrain d'un brun vigoureux, où des pluies récentes avaient laissé, dans quelques sillons, des lignes d'eau que le soleil faisait briller comme de minces filets d'argent. La journée était claire et tiède, et la terre, fraîchement ouverte par le tranchant des charrues, exhalait une vapeur légère. Dans le haut du champ un vieillard, dont le dos large et la figure sévère rappelaient celui d'Hofbein, mais dont les vêtements n'annonçaient pas la misère, poussait gravement son *araire* de forme antique, traîné par deux bœufs tranquilles, à la robe d'un jaune pâle, véritables patriarches de la prairie, hauts de taille, un peu maigres, les cornes longues et rabattues, de ces vieux travailleurs qu'une longue habitude a rendus *frères*, comme on les appelle dans nos campagnes, et qui privés l'un de l'autre, se refusent au travail avec un nouveau compagnon et se laissent mourir de chagrin.

II.

Translate into French :

1. If I were sure he would consent, I should invite a few other friends to come at the same time.
2. Is there nobody that can tell me what I ought to do?
3. When we were in Europe last year, we received a great many letters from our friends, which made us very happy.
4. I do not know whether we shall receive so many, now that we have come again.
5. You talk too loud; do you think I am deaf?
6. I do not think you are.
7. Don't you know that I am not? I do.
8. Tell us something new.
9. I don't know anything new to tell you.
10. If we had a few francs more, we should have money enough to buy that little gold watch.

III.

1. Give rules for the use of the subjunctive mood. Illustrate fully by examples.
2. Give rules for the position of adjectives. Illustrate fully by examples.
3. Conjugate in full the present, imperfect, preterit and future of the indicative mood of the following verbs: *savoir, résoudre, nuire, mouvoir, moudre*.

THE UNIVERSITY OF MAINE.

Admission Examination

September, 1908

ELEMENTARY GERMAN

1. Translate into idiomatic English :

a. Drei Tage später *lobte* ein furchtbarer Sturm. Es war Mitternacht, aber alles im Schlosse ausser dem Bett. Der Gutsherr *stand* am Fenster und *sah* besorgt ins Dunkle, nach seinen Feldern *hinüber*. An den Scheiben *flogen* Blätter und Zweige *her*; mitunter fuhr ein Ziegel hinab und schmetterte auf das Pflaster des Hofes. "Furchtbares Wetter!" sagte Herr von S. Seine Frau sah ängstlich aus. "Ist das Feuer auch gewisz gut *verwahrt*?" sagte sie; "Gretchen, sieh noch einmal nach, giesz es lieber ganz aus!"—Droste-Hülshoff.

b. Das Ries ist ein Gau im Schwabenlande, einige Stunden nordwärts von der Donau. Der gröszte Teil gehört zu Bayern, der nordwestliche Strich zu Württemberg. Man braucht in diesem Gau nicht geboren zu sein, sondern nur in guter Jahreszeit daren verweilt zu haben, um ihn für einen der anmutigsten und gesegnetsten in unserem Vaterlande zu halten. Wer an einem schönen Juniabend auf einer der westlichen Anhöhen steht und die von bewaldeten Hügeln umschlossene Ebene erblickt in dem glänzenden Reichtum ihrer Feldfrüchte, die alte Reichsstadt Nördlingen mit ihrem hohen Turm, die fürstliche Residenz Wallerstein mit dem grauen Felsen, der früher die Burg der Grafen von Wallerstein trug, hier und da ein wohlerhaltenes Schloss oder ehemaliges Klostergebäude und die Menge schmucker Dörfer, den wird ein freudiges Gefühl überkommen. —Melchior Meyr.

2. a. Decline in full the German for : the big field, the old city, a German count, her high tower, little sister.

b. Compare: alt, schwarz, hoch, nah, gut, gern, heisz, edel.

c. Principal parts of the verbs italicized in 1a above.

d. When is *sein*, and not *haben*, used as an auxiliary of tense?

e. What verbs in the present indicative active have the third person singular the same as the first?

f. Give the third singular preterit subjunctive active forms of the verbs italicized in 1a.

g. When is the verb placed at the end of a subordinate clause?

h. What cases are governed by the following propositions :
auszer, an, in, nach, auf, von, zu, für, mit?

i. Name the inseparable prefixes used with verbs.

j. Give the first thirteen German ordinals as preceded by
der.

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

PLANE GEOMETRY

[Time allotted to this examination, 2 hours].

(Omit one question).

1. State three ways in which two triangles may be proved equal and prove one of them.
2. The line joining the middle points of two sides of a triangle is parallel to the third side, and equal to one half of it.
3. If through a fixed point without a circle, a tangent and a secant be drawn, the product of the secant and its external segment, is equal to the square of the tangent.
4. Find the area included between a square, whose side is 8, and (a) the circumscribed circle, (b) the inscribed circle.
5. If perpendiculars PF, PD & PE, be drawn from any point P to the sides AB, BC and CA : respectively of a triangle prove :
 $\overline{AF}^2 + \overline{DB}^2 + \overline{CE}^2 = \overline{AE}^2 + \overline{BF}^2 + \overline{CD}^2$.
6. Prove that the angle formed by a tangent and a chord is measured by one-half the intercepted arc.
Show directly from this that any chord PA, bisects the angle between the tangent at P, and the line drawn from P perpendicular to the diameter through the point A.
7. If two angles have their sides perpendicular each to each, the angles are equal or supplementary.

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

SOLID GEOMETRY

[Time allotted to this examination, 2 hours]

(Omit one question)

1. (a) Give four conditions that determine a plane.
(b) What is the locus of points in space ; (1st) equally distant from the vertices of a given triangle ; (2nd) n units from each of two intersecting planes.
2. If two straight lines are cut by three parallel planes the corresponding segments are proportional.
3. Two straight lines not in the same plane have one common perpendicular, and but one ; and this line is the shortest line that can be drawn between them.
4. The slant height of a right circular cone is 8 ft. ; each element makes an angle of 60° with the plane of the base. Find the total surface and the volume of the cone.
5. The altitude of a regular hexagonal frustum is 10 ft. ; the radius of the upper base is 6 ft. and the radius of the lower base is 10 ft. Find the volume of the frustum.
6. The sum of any two face angles of a trihedral angle is greater than the third.
7. If the unit of measure for angles is the right angle, the area of a spherical triangle is equal to its spherical excess, multiplied by the area of a tri-rectangular triangle.

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

AMERICAN HISTORY AND CIVIL GOVERNMENT

1. Write briefly on the following :— Lord Baltimore, William Penn, Paul Jones, Aaron Burr.
2. (a.) What is the relation of the President of the United States to Congress?
(b.) Outline the system of Federal Courts.
3. Give the chief provisions, date and significance of the Missouri Compromise.
4. Account for the success of the North in the Civil War.

THE UNIVERSITY OF MAINE

Admission Examination

September 1908

ENGLISH HISTORY

1. a. What were the chief influences of the Norman Conquest upon the development of English life and character?
b. What political changes were introduced by the conquerors?
2. Write account of :—The Black Death and its effects.
The War of the Roses.
3. Show the claim of Mary Stuart to the English throne and explain its effect on the policy of Queen Elizabeth.
4. Explain the necessity for the Reform Bill of 1832 and state briefly its effects.

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

ROMAN HISTORY

[Time allotted to this examination, 1 hour]

1. Where were the following places, and for what was each one noted in Roman history (Give dates wherever possible): Capua, Veii, Zama, Munda, Trebia, Herculaneum?
2. What was a province and how was it governed?
3. Discuss the character of C. Marius and mention his great public acts, with dates.
4. Describe briefly the social and political struggle of the plebs.
5. Which one of the twelve Caesars did the most for Rome? What did he do (Give dates)?

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

LATIN

[Time allotted for this examination, 3 hrs.]

1. Translate the following passage :

Cum Caesar in Gallia esset, in Britanniam navigare cupivit, ut cum Britannis bellum gereret. Nam hi ad hostes nostros auxilia miserant. Parva aetatis¹ pars erat reliqua et in iis locis longae sunt hiemes. Tamen insulam videre cupivit et loca, portus, aditus, cognoscere. Ea omnia neque a Gallis neque a mercatoribus, qui in Britanniam navigabant, reperire poterat.

1. aestas—summer.

2. a. Decline *locis*, *pars*, *hi*, *portus*.

b. Define exactly the form of *esset*, *gereret*, *cognoscere*, and tell what it is used to express.

c. Compare *longae*, *parva*.

d. Give the principal parts of *miserant*, *gereret*, *poterat*, *videre*.

e. Give all of the forms in the third person singular of *poterat* and *videre*.

SECOND YEAR.

1. Translate the following passage :

Ariovistus ad postulata Caesaris pauca respondit ; de suis virtutibus multa praedicavit : 'Transisse Rhenum sese non sua sponte, sed rogatum et arcessitum a Gallis ; non sine magna spe magnisque praemiis domum propinquosque reliquisse ; sedes habere in Gallia ab ipsis concessas, obsides ipsorum voluntate datos ; stipendium capere jure belli, quod victores victis imponere consuerint. Non sese Gallis, sed Gallos sibi bellum intulisse ; omnes Galliae civitates ad se oppugnandum venisse, ac contra se castra habuisse ; eas omnes copias a se uno proelio pulsas ac superatas esse.

2. a. Explain the mode and tense of *transisse* (1. 2), *consuerint* (1. 7), *imponere* (1. 7).

b. Explain the case of *sponte* (1. 3), *voluntate* (1. 5), *iure* (1. 6), *victis* (1. 6), *sibi* (1. 7), *oppugnandum* (1. 8).

c. Give the principal parts of *respondit*, *reliquisse*, *concessas*, *consuerint*.

3. Translate into Latin : To the demands of Caesar, Ariovistus replied that he had not come into Gaul before he was sent for ; that he had sought the friendship of the Roman people because he thought it would be an honor and a help to him.

THIRD YEAR.

1. Translate the following passage :

Reliquum est ut de felicitate (quam praestare de se ipso nemo potest, meminisse et commemorare de altero possumus, sicut aequum est homines de potestate deorum) timide et pauca dicamus. Ego enim sic existimo : Maximo, Marcello, Scipioni, Mario, et ceteris magnis imperatoribus non solum propter virtutem, sed etiam propter fortunam saepius imperia mandata atque exercitus esse commissos. Fuit enim profecto quibusdam summis viris quaedam ad amplitudinem et ad gloriam et ad res magnas bene gerendas divinitus adjuncta fortuna. De huius autem hominis felicitate, de quo nunc agimus, hac utar moderatione dicendi, non ut in illius potestate fortunam positam esse dicam, sed ut praeterita meminisse, reliqua sperare videamur, ne aut invisa dis immortalibus oratio nostra aut ingrata esse videatur.

Who were Maximo, Marcello, Scipioni, and Mario ?

To whom does *huius hominis* (1. 9-10) refer ?

2. Translate the following passage (at sight) :

Licet iste dicat emisse se, sicuti solet dicere, credite hoc mihi, iudices : nulla umquam civitas tota Asia et Graecia signum ullum, tabulam pictam, ullum denique ornamentum urbis, sua voluntate cuiquam vendidit, nisi forte existimatis, postea quam iudicia severa Romae fieri desierunt, Graecos homines haec venditare coepisse, quae tum non modo non venditabant, cum iudicia fiebant, verum etiam coëmebant ; aut nisi arbitramini L. Crasso, Q. Scaevolae, C. Claudio, potentissimis hominibus, quorum aedilitates ornatissimas vidimus, commercium istarum rerum cum Graecis hominibus non fuisse, eis qui post iudiciorum dissolutionem aediles facti sunt fuisse.

FOURTH YEAR.

1. Translate the following passage :

Pastorum Musam Damonis et Alphesiboei —
immemor herbarum quos est mirata iuvenca
certantis, quorum stupefactae carmine lynces,
et mutata suos requierunt flumina cursus —
Damonis Musam dicemus et Alphesiboei.

Tu mihi seu magni superas iam saxa Timavi,
sive oram Illyrici legis aequoris, en erit umquam
ille dies, mihi cum liceat tua dicere facta ?
En erit ut liceat totum mihi ferre per orbem
sola Sophocleo tua carmina digna coturno ?

Write out lines 6-7, marking the metrical quantities, feet, ictus, and main caesura.

2. Translate the following passage :

Dixerat. Ille patris magni parere parabat
imperio ; et primum pedibus talaria nectit
aurea, quae sublimem alis sive aequora supra
seu terram rapido pariter cum flamine portant ;
tum virgam capit : hac animas ille evocat Orco
pallentis, alias sub Tartara tristia mittit,
dat somnos adimitque, et lumina morte resignat.
Illa fretus agit ventos, et turbida tranat
nubila ; iamque volans apicem et latera ardua cernit
Atlantis duri, caelum qui vertice fulcit,
Atlantis, cinctum adsidue cui nubibus atris
piniferum caput et vento pulsatur et imbri ;
nix umeros infusa tegit ; tum flumina mento
praecipitant senis, et glacie riget horrida barba.

To whom do *ille* and *patris* in the first line refer ?

Who was *Orco* ? *Atlantis* ?

3. Translate into Latin :

When the senate was called together to see what to do with the conspirators, all turned their eyes upon Cicero. And he was glad to speak, for their good will towards him in the time of danger was very gratifying to him. Although, since he became consul, he had at no time been free from plots at his own home or in the senate house, he had rescued the city from flames and secured safety to the senate and people.

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

PHYSIOGRAPHY

1. Give the size and form of the earth and the relative proportions of land and water.
2. Describe the formation of a coral reef.
3. Describe an earthquake. Name the regions most affected.
4. Give the theory of the ocean currents.
5. Explain the influence of latitude upon temperature.
6. What is the cause of the winds?
7. Explain the cause of storms.
8. What are the physical conditions most favorable to an abundant rainfall?
9. What are glaciers? Name the conditions necessary for their formation.
10. Point out the most marked differences between the Atlantic and Pacific coast lines of the United States.

THE UNIVERSITY OF MAINE

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PHYSIOLOGY

To count one point.

Answer seven, but not more, of the following questions.

1. What is a gland? Name one, tell where it is situated and discuss the value of its products.

2. What parts must enter into the formation of a movable joint? Make a diagram that will show a simple arrangement of the muscles that move the bones of a joint. Why is one muscle not enough?

3. What classes of foods are there? What class is most abundant in each of the following : Potatoes, eggs, candy, meat, butter?

4. What organs are used in eliminating wastes from the body that are due to the activity of the body?

5. How is it possible for food to get into and out of the blood vessels, these consisting, as they do, of a closed system of tubes?

6. What function is performed by the red corpuscles of the blood? What chemical property makes this possible?

7. Explain how it is possible to enlarge the thorax in all three dimensions. What makes the air enter the lungs when the thorax is enlarged?

8. What is the chief function of perspiration? Why is it more abundant at one time than at another?

9. What is a nerve center? What is a nerve trunk?

10. Why are reflex centers of great value? Why would it not be as well to have all centers voluntary?

THE UNIVERSITY OF MAINE

Admission Examination

September, 1908

PHYSICS

1. Define : matter, motion, dyne, calorie, volt.
2. State Boyle's law.
3. Find the pressure on the bottom of a cubical box filled with water, if the inside dimensions are 10 cm. $\times$ 10 cm. $\times$ 10 cm. In what unit is the pressure expressed?
4. How far will a body fall freely in 6 seconds?
5. How may it be shown that sound can not pass through a vacuum?
6. What is the modern theory of heat?
7. How does temperature differ from heat quantity?
8. An object is placed 10 cm. from a concave mirror whose radius is 8 cm. Where will the image be formed?
9. The refractive index of water is $\frac{3}{2}$. Explain this statement.
10. Find the current from a battery cell of 2 volts e. m. f. through a resistance of 6 ohms.

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