

Nalanda Open University

Annual Exam-2014

Intermediate of Science (I.Sc.), Part-I

Mathematics, Paper-I

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No.1 is compulsory. All questions carry equal marks.

1. Select the correct answer from the following question. Each part of the questions carry one mark.

(a) $(A \cup B) \cap (A \cup B')$ equals :

- (i) B (ii) A (iii) $A \cup B$ (iv) ϕ

(b) If $f(x) = 3x^2 - 5x + 6$, the $f(2)$ is :

- (i) 4 (ii) 6 (iii) 8 (iv) 10

(c) If $x + iy = 7 + i\sqrt{2}$, then :

- (i) $x = 7, y = \sqrt{2}$ (ii) $x = \sqrt{2}, y = 7$ (iii) $x = 1/7, y = \sqrt{2}$ (iv) $x = 7, y = \frac{1}{\sqrt{2}}$

(d) If a, b, c are in A.P as well as in G.P. then :

- (i) $a = b \neq c$ (ii) $a \neq b = c$ (iii) $a \neq b \neq c$ (iv) $a = b = c$

(e) If α and β are the roots of the equations $px^2 + qx + r = 0$, then $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ equals :

- (i) $\frac{q^2 - 2pr}{pr}$ (ii) $\frac{p^2 - 2pr}{qr}$ (iii) $\frac{r^2 - 2pq}{2pq}$ (iv) pqr

(f) The sum of binomial Coefficients $C_0 + C_1 + C_2 + \dots + C_n$ in the binomial expansion of $(1 + x)^n$ is :

- (i) 2^n (ii) n^n (iii) $\lfloor n$ (iv) $\lfloor n-1$

(g) The inverse of $\begin{bmatrix} 2 & -3 \\ -4 & 2 \end{bmatrix}$ is

- (i) $-\frac{1}{8} \begin{bmatrix} 2 & 3 \\ 4 & 2 \end{bmatrix}$ (ii) $-\frac{1}{8} \begin{bmatrix} 3 & 2 \\ 2 & 4 \end{bmatrix}$ (iii) $\frac{1}{8} \begin{bmatrix} 2 & 3 \\ 4 & 2 \end{bmatrix}$ (iv) $\frac{1}{8} \begin{bmatrix} 3 & 2 \\ 2 & 4 \end{bmatrix}$

(h) For $x \in R$, the range of $f(x) = \frac{x}{1+x^2}$, is :

- (i) $\left[-\frac{1}{2}, \frac{1}{2}\right]$ (ii) $[0, 1]$ (iii) $[-1, 1]$ (iv) $[-1, 0]$

(i) The general solution of $\cos \theta = 1$ is :

- (i) $n\pi$ (ii) $2n\pi$ (iii) $(2n+1)\pi$ (iv) $(2n-1)\pi$
where n is an integer.

(j) If n is a natural number, then $n(n+1)(n+5)$ is divisible by :

- (i) 6 (ii) 7 (iii) 8 (iv) 9

(k) The term in the binomial expansion of $\left(2x - \frac{1}{3x^2}\right)$ free from x is :

- (i) 3rd (ii) 4th (iii) 5th (iv) 6th

(l) In a triangle ABC, $A = \tan^{-1} 2$, $B = \tan^{-1} 3$, the C equals :

- (i) $\pi/4$ (ii) $\pi/2$ (iii) $\pi/3$ (iv) $\pi/6$

(m) The value of $\tan 15^\circ$ equals :

- (i) $2 + \sqrt{3}$ (ii) $2 - \sqrt{3}$ (iii) $\frac{1}{2}$ (iv) $\frac{1}{2}(2 - \sqrt{3})$

- (n) If the lines $mx + y + 1$ and $n + ny = 4$ are parallel, then :
- (i) $mn = -1$ (ii) $mn = 1$ (iii) $m = n$ (iv) $m = -n$
- (o) The vertex of the parabola $x^2 + 4x - 2y + 6 = 0$ is at :
- (i) $(2, 5)$ (ii) $(-2, -5)$ (iii) $(-2, 5)$ (iv) $(2, -5)$
- (p) The value of eccentricity of the hyperbola $x^2 - y^2 = C^2$, is :
- (i) 2 (ii) $\sqrt{2}$ (iii) $\sqrt{3}$ (iv) 3
2. (a) Let X be a finite set. Then prove that its power set is also finite.
- (b) Let $A = \{1, 2\}$, $B = \{1, 3, 4\}$, $C = \{1, 2, 3\}$, then find $A \times (B - C)$.
3. (a) Express $\frac{1-i}{1+i}$ in the polar form.
- (b) Determine all values of $(1 + \sqrt{3})^{\frac{1}{7}}$.
4. (a) Insert n harmonic means between two distinct real numbers a & b .
- (b) Find the sum of cubes of n natural numbers.
5. (a) If α, β be the roots of the equation $ax^2 + bx + c = 0$, then find the value of $\alpha^4 + \beta^4$.
- (b) Compute the square roots of $3 + 4i$.
6. From 8 Indians and 6 Englishmen, how many group of 10 persons can be formed so as to :
- (i) include exactly one Englishman
- (ii) at least one Englishman
7. (a) Find the equation of a line passing through the intersection of lines $3x - y + 7 = 0$ and $2x + 3y + 1 = 0$ and the point $(1, -1)$.
- (b) Determine the Co-ordinates of the orthocentre of the triangle formed by the points $(-2, -3)$, $(-1, 0)$ and $(7, -6)$.
8. (a) Find the equation of circle having centre $(3, 4)$ and touching the line $3x + 4y + 5 = 0$
- (b) Find the equations of Conic having focus at $(2, -2)$, directrix $3x - y + 1 = 0$ and eccentricity $\frac{1}{3}$.



Examination Programme, 2014
I.Sc. Part - I

Date	3.30 PM to 6.30 PM	Examination Centre
12.04.2014	Biology and Math Paper - I	Nalanda Open University, Patna
13.04.2014	Chemistry Paper - I	Nalanda Open University, Patna
14.04.2014	Physics Paper - I	Nalanda Open University, Patna
16.04.2014	Hindi Composition 100 Marks or Hindi 50 Marks & Urdu 50 Marks	Nalanda Open University, Patna
18.04.2014	English Language & Literature Paper - I or Hindi Language & Literature Paper - I	Nalanda Open University, Patna

Nalanda Open University

Annual Exam-2014

Intermediate of Science (I.Sc.), Part-I

Botany, Paper-I

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No.1 is compulsory. All questions carry equal marks.

1. Select the correct answer in the following statements :
 - (i) The field of Botany concerned with the study of living activities and functions is :
 - (a) Physiology
 - (b) Cytology
 - (c) Genetics
 - (d) Ecology
 - (ii) Binomial nomenclature means writing the name of plants in two words which designate :
 - (a) Order and family
 - (b) Family and genus
 - (c) Genus and species
 - (d) Species and variety
 - (iii) The binomial nomenclature was proposed by :
 - (a) Hugo de Vries
 - (b) Mendel
 - (c) Carolus Linnaeus
 - (d) Darwin
 - (iv) Food is changed to energy in :
 - (a) Nucleolus
 - (b) Golgi bodies
 - (c) Chloroplast
 - (d) Mitochondria
 - (v) As per template theory amino acids first combine with :
 - (a) mRNA
 - (b) sRNA
 - (c) tRNA
 - (d) DNA
 - (vi) Which one of the following statement is correct :
 - (a) Some viruses contain DNA and some RNA
 - (b) All viruses contain DNA
 - (c) Viruses do not contain nucleic acid
 - (d) All viruses contain RNA
 - (vii) Number of stamens in Fabaceae is :
 - (a) 5
 - (b) 6
 - (c) 10
 - (d) ∞
 - (viii) In which of the following plants, the leaf is modified to pitcher?
 - (a) *Dionaea*
 - (b) *Utricularia*
 - (c) *Drosera*
 - (d) *Nepenthes*
2. Describe the floral characters of the family Fabaceae and give the floral formula and floral diagram. Also write the botanical name of two plants of economic importance of the family.
3. Describe the structure of bacteriophage.
4. Write notes on any *two* of the following :
 - (a) Economic importance of Cyanobacteria
 - (b) Mycoplasma
 - (c) Transformation
 - (d) Protista

5. Describe the structure and function of Chloroplast.
6. Describe the secondary growth in dicot stem.
7. Give an account of Calvin cycle.
8. Describe prophase I of meiosis.
9. Mention the sources of air pollution and suggest the methods of its control.
10. Write short notes on any *two* of the following.
 - (a) Prokaryotic cell
 - (b) Stomatal movement
 - (c) Carbon cycle
 - (d) Cell cycle



Examination Programme, 2014

I.Sc. Part - I

Date	3.30 PM to 6.30 PM	Examination Centre
12.04.2014	Biology and Math Paper - I	Nalanda Open University, Patna
13.04.2014	Chemistry Paper - I	Nalanda Open University, Patna
14.04.2014	Physics Paper - I	Nalanda Open University, Patna
16.04.2014	Hindi Composition 100 Marks or Hindi 50 Marks & Urdu 50 Marks	Nalanda Open University, Patna
18.04.2014	English Language & Literature Paper - I or Hindi Language & Literature Paper - I	Nalanda Open University, Patna

Nalanda Open University

Annual Exam-2014

Intermediate of Science (I.Sc.), Part-I

Chemistry, Paper-I

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No.1 is compulsory. Attempt Two Questions from Group 'A' and Two Questions from Group 'B'. All questions carry equal marks.

1. Select the correct answer from the following questions.
 - (i) Elements having same atomic number but different in atomic mass number are called :
(a) Isotone (b) Isobar (c) Isotopes (d) none of these
 - (ii) If one s and three p-orbitals are hybridised together, such hybridisation is called :
(a) sp^2 hybridisation (b) sp^3 -hybridization
(c) sp-hybridization (d) none of these
 - (iii) Enzymes are :
(a) Micro organism (b) Proteins
(c) Transition metals (d) fats
 - (iv) Which is the most important ore of aluminium in the following :
(a) Galena (b) Malachite (c) Bauxite (d) Carinalite
 - (v) Ionisation energy of a isolated atom in gaseous state is :
(a) the amount of energy released when an electron is released or removed from an atom in gaseous state
(b) the amount of energy required when an electron is removed from a gaseous atom in free state
(c) Power of an atom in gaseous state to attract an electron towards itself
(d) none of all these
 - (vi) A d-orbital having $n = 3, l = 2$ can accomodate maximum number of electron are :
(a) 5 (b) 10 (c) 18 (d) 8
 - (vii) Oxidation state of hydrogen in LiH is :
(a) +1 (b) 0 (c) -1 (d) none of these

Group 'A'

2. Distinguish between order of reaction and molecularity of a reaction. Derive an expression of rate of constant of first order of reaction.
3. Write notes on :-
 - (a) Carbon Dating
 - (b) Nuclear Fission
 - (c) Radio Active distingtegration series
4. What are the basic postulates of valence shell electron repulsion theory given by Gell espie and Nyholm. Give examples to explain the above theory

5. Explain oxidation number and determine the O-N underlined elements in following compound :



Group 'B'

6. Discuss what do you understand by periodicity among elements. What are its cause. Discuss normal and transition elements. Write the electronic configuration of first transition element.
7. Write down the principle of Solvay (Ammonia Soda) Process for the preparation of washing soda. Give the outline of the details of the method of preparation. How does NaOH reacts with Zn powder in presence of NaNO_3 .
8. Write notes on any *two* of the following :
- (i) Epsom (ii) Blue vitrol (iii) Plaster of Paris
(iv) Caustic soda
9. What is a chemical fertiliser? Describe the preparation of any two nitrogenous fertilizers. What are its merit and demerits in using them in our agriculture land.
10. What do you understand by air pollution. What are its main pollutants. What are its effect of air pollution on human health.



Nalanda Open University

Annual Exam-2014

Intermediate of Science (I.Sc.), Part-I

Physics, Paper-I

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No.1 is compulsory.

All questions carry equal marks.

1. Select the correct option in each of the following. Each part of the question carries 1 mark :-

(i) Identify the pair which has different dimensions :

- (a) Energy density and pressure
- (b) Work and energy
- (c) Planck's constant and angular momentum
- (d) Angular momentum and frequency.

(ii) Angle between the vector $(\hat{j} + \hat{k})$ and $(\hat{i} - \hat{j})$ is :

- (a) 0
- (b) $\pi/3$
- (c) $\pi/4$
- (d) π/d

(iii) Moment of inertia of a solid sphere about a tangent is :

- (a) MR^2
- (b) $\frac{1}{2}MR^2$
- (c) $\frac{7}{5}MR^2$
- (d) $\frac{5}{3}MR^2$

(iv) The angular speed of the 'second' needle of watch is :

- (a) $\frac{\pi}{6}$ radian/hr
- (b) $\frac{\pi}{60}$ radian/s
- (c) $\frac{\pi}{180}$ radina/s
- (d) 2π radian/min.

(v) A simple pendulum has a time period T_1 when it is on earth's surface and T_2 when taken to a height R_e (Earth's radius) above the earth's surface then $T_2 : T_1$ is :

- (a) 1
- (b) $\sqrt{2}$
- (c) 2
- (d) 4

(vi) Two equal drops are falling through air with a steady velocity of 5 cm/sec. If the drops combine to form a single drop then its terminal velocity will be :

- (a) 10 cm/sec.
- (b) $5\sqrt{2}$ cm/sec.
- (c) $5 \times (4)^{1/3}$ cm/sec.
- (d) $\frac{5}{\sqrt{2}}$ cm/sec.

(vii) In simple harmonic motion, the particle is :

- (a) always retarded
- (b) always accelerated
- (c) alternately accelerated and retarded
- (d) neither accelerated nor retarded

- (viii) Two wires of the same material and radius but having lengths in the ratio of 1 : 2 are stretched with the same force. The ratio of work done in the two cases is :
- (a) 1 : 2 (b) 1 : $\sqrt{2}$ (c) 1 : 4 (d) 1 : $2\sqrt{2}$
- (ix) The rate of flow of viscous fluid through a narrow cylindrical tube is given by $\frac{p\pi r^4}{8\eta l}$ where p is the pressure difference between the two ends of the tube, r is radius and l is the length of the tube and η is the coefficient of viscosity. This expression was derived by :
- (a) Bernoulli (b) Stoke (c) Poiseuille (d) Newton
- (x) If C_p and C_v are the specific heats of a gas then the ratio C_p/C_v is :
- (a) greater than 1 (b) less than 1
(c) equal to 1 (d) the same for all gases
- (xi) Equal masses of three liquids A, B and C have temperatures 10°C , 25°C and 40°C respectively. If A and B are mixed, the mixture has a temperature of 15°C . If B and C are mixed, the mixture has the temperature of 30°C . Then, if A and C are mixed, the mixture will have a temperature of :
- (a) 25°C (b) 20°C (c) 16°C (d) 12°C
- (xii) Stefan's law for the amount of heat radiated by a perfectly black body at temperature T per second per unit area is given by $R = \sigma T^n$ where n is :
- (a) $\frac{1}{2}$ (b) 2 (c) 3 (d) 4
- (xiii) Two tuning forks of frequencies of 250 Hz and 256 Hz produce beats. If a maximum is observed just now, then after how much time, the minimum is observed at the same place :
- (a) $\frac{1}{18}$ sec. (b) $\frac{1}{24}$ sec. (c) $\frac{1}{6}$ sec. (d) $\frac{1}{12}$ sec.
- (xiv) The first three modes of vibration have frequencies in the ratio 1 : 3 : 5. in the case of :
- (a) open organ pipe
(b) closed organ pipe
(c) both open and closed organ pipes
(d) neither open nor closed organ pipe
- (xv) A compact object of mass M is contained within its Schwarzschild radius $2GM/C^2$, then this object is :
- (a) white dwarf (b) a neutron star
(c) a black hole (d) none of these
- (xvi) The brightest part of the spectrum of a star has a wavelength of 2900 \AA then the surface temperature of this star is :
- (a) 10 K (b) 10^4 K (c) 10^7 K (d) 10^{10} K
(Wien's constant $b = 2.9 \times 10^{-3} \text{ mK}$)

2. Define 'Uniform Circular Motion' and 'Centripetal acceleration' and prove that the Centripetal acceleration of a body in uniform circular motion is

$$\vec{a}_r = -\left(\frac{v^2}{r}\right)\hat{r}.$$

3. Distinguish between elastic and inelastic collision and discuss in detail, the elastic collision of two bodies in one dimension. Hence, show that in a head on elastic collision between two bodies of equal masses, the velocities are interchanged.
4. Derive the expressions for : (a) Kinetic energy and (b) the angular momentum of a rotating rigid body.
5. Define 'Gravitational field intensity' and 'Gravitational potential'. Calculate the gravitation potential due to a uniform circular ring at a point on its axis.
6. State and explain Stoke's law of viscosity. Define terminal velocity and describe the experiment for the measurement of coefficient of viscosity of a thick liquid using Stoke's law.
7. Derive the expression for the excess pressure inside (a) liquid drop and (b) soap bubble.
8. What are the postulates of Kinetic theory of gases? Use them to find the expression for the pressure of an ideal gas.
9. What is Carnot Cycle? Derive the expression for the efficiency of a 'Carnot ideal engine'.
10. Define 'simple harmonic motion'. Write the differential equation of a motion of a simple harmonic oscillator and solve it to find velocity and displacement. What is Kinetic and Potential energy?



Nalanda Open University
Annual Exam-2014
Intermediate of Science (I.Sc.), Part-II
Mathematics, Paper-II

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No.1 is compulsory. All questions carry equal marks.

1. Select the correct answer from the following question. Each part of the questions carries one mark.

- (a) The value of $\lim_{x \rightarrow 0} \frac{4^x - 3^x}{2^x - 3^x}$ equals :
- (i) $\frac{\cos 4 - \cos 3}{\cos 2 - \cos 3}$ (ii) -1 (iii) $\frac{\cos 4 - \cos 3}{\cos 2 - \cos 3}$ (iv) none of these
- (b) The value of $\lim_{x \rightarrow a} \frac{x - a}{\sqrt{x} - \sqrt{a}}$ equals :
- (i) $2\sqrt{a}$ (ii) $\frac{1}{2\sqrt{a}}$ (iii) \sqrt{a} (iv) $\frac{1}{\sqrt{a}}$
- (c) The differential Coefficient of x^a with respect to a is :
- (i) ax^{a-1} (ii) ax^a (iii) $x^a \log a$ (iv) $x^a \log x$
- (d) If $x = a \cos^3 \theta$, $y = b \sin^3 \theta$, then $\frac{dy}{dx}$ equals :
- (i) $\frac{b}{a} \tan \theta$ (ii) $\frac{a}{b} \cot \theta$ (iii) $\frac{-b}{a} \tan \theta$ (iv) $\frac{b}{a} \tan \theta$
- (e) The function $f(x) = x^3 + 5$ is increasing for :
- (i) $x \in \mathbb{R}$ (ii) for $x \in [0, 5]$
 (iii) for $x \in [-5, 0]$ (iv) for no where in \mathbb{R} .
- (f) The slope of the curve $x^2 = 4y$ at $(2, 1)$ is :
- (i) 2 (ii) 1 (iii) $\frac{1}{2}$ (iv) $\pi/6$
- (g) The value of the integral $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\tan x}}{\sqrt{\tan x} + \sqrt{\cot x}} dx$ is :
- (i) $\frac{\pi}{4}$ (ii) $\frac{\pi}{2}$ (iii) π (iv) $\frac{\pi}{6}$
- (h) The general solution of $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$ is :
- (i) $x + y = C(1 + xy)$ (ii) $x - y = C(1 - xy)$
 (iii) $x - y = C(1 + xy)$ (iv) $x - y = C(1 + xy)$
- (i) The xy plane divides the line joining the points $(3, 1, 5)$ and $(2, 4, -1)$ in the ratio :
- (i) 1 : 5 (ii) 5 : 1 (iii) 10 : 1 (iv) 1 : 10
- (j) The differential equation $y = px + \sqrt{a^2 + b^2 p^2}$ is of :
- (i) 1st order and 1st degree (ii) 2nd order and 1st degree
 (iii) 2nd order and 2nd degree (iv) 1st order and 2nd degree
- (k) If \vec{a}, \vec{b} are unit vectors, then the angle between \vec{a} and \vec{b} is :
- (i) $\frac{\pi}{6}$ (ii) $\frac{\pi}{4}$ (iii) $\frac{\pi}{3}$ (iv) $\frac{\pi}{2}$

- (l) The distance of the point (2, 3, 4) from the plane $\vec{r} \cdot (3\hat{i} - 6\hat{j} + 2\hat{k}) + 11 = 0$, is :
- (i) $\frac{3}{2}$ (ii) $\frac{5}{3}$ (iii) 1 (iv) 2
- (m) A particle moves along a straight line so that the distance travelled in t seconds is $S = 5t^2 + 3t$, then the velocity after 3 seconds is :
- (i) 10 m/sec (ii) 15 m/sec (iii) 30 m/sec (iv) 33 m/sec
- (n) A body is thrown upwards with a given velocity u , then the greatest height ascended is :
- (i) $\frac{u^2}{2g}$ (ii) $\frac{u^2}{3g}$ (iii) $\frac{u^2}{g}$ (iv) $\frac{2u^2}{g}$
- (o) Two like parallel forces 2P and 3P acting at two points distance 10 units. Then the distance of their resultant from the smaller force, is :
- (i) 2 units (ii) 1 unit (iii) $\frac{5}{3}$ units (iv) $\frac{7}{2}$ units
- (p) A particle is projected from a point on a horizontal plane comes back to the plane in 4 seconds, at a distance of 64 yards from the point of projection. Then the velocity of projection in feet per second, is :
- (i) 40 (ii) 60 (iii) 80 (iv) 100
2. (a) Define even and odd functions and give their examples.
 (b) Prove that $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = n a^{n-1}$.
3. (a) Test the continuity and differentiability of the greatest integer function at $x = 3$.
 (b) Find the differential coefficient of $\text{Cos}^{-1} ax$ with respect to x .
4. (a) Use the first principle method to determine the differential coefficient of $\text{sec}x^\circ$.
 (b) If $y = A \text{Cos} mx + B \text{Sin} mx$, then prove that $\frac{d^2y}{dx^2} + m^2y = 0$.
5. (a) Using differentiability to find the approximate value of $(33)^{45}$.
 (b) Find the equation of normal to a curve $y = f(x)$ by calculus method.
6. (a) Evaluate the following integrals :
- (i) $\int \frac{dx}{\sqrt{3x+4} - \sqrt{3x-1}}$ (ii) $\int (7x+3) \sqrt{3x+2} dx$
- (b) Integrate : (i) $\int_0^1 \sqrt{\frac{1-x}{1+x}} dx$ (ii) $\int_0^\pi x \sin^2 x dx$
7. (a) By giving the idea of scalar triple product vectors give the geometried meaning of it.
 (b) A force is represented in magnitude and direction by the line joining points (1, -2, 4) and (5, 2, 3). Find the moment of this force about the point (-2, 3, 5).
8. (a) Find the radius of circular section of the sphere $\left| \vec{r} \right| = 13$ by the plane $\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k}) = 13$.
 (b) State parallelogram law of a forces and use it to determien magnitude and direction of the resultant force.

9. (a) Describe quickest path and shortest path of a particle in the motion, in a river.
- (b) If a, b, c be the spaces described in the p th, q th and r th seconds by a body starting with a given velocity and moving with uniform acceleration. Show that $a(q - r) + b(r - p) + c(p - q) = 0$.



Examination Programme, 2014

I.Sc. Part - II

Date	3.30 PM to 6.30 PM	Examination Centre
12.04.2014	Biology/ Mathematics Paper - II	Nalanda Open University, Patna
13.04.2014	Chemistry Paper - II	Nalanda Open University, Patna
14.04.2014	Physics Paper - II	Nalanda Open University, Patna
18.04.2014	English Language & Literature Paper - II or Hindi Language & Literature Paper - II	Nalanda Open University, Patna

Nalanda Open University
Annual Exam-2014
Intermediate of Science (I.Sc.), Part-II
Zoology, Paper-II

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No.1 is compulsory. All questions carry equal marks.

1. Multiple choice questions. Each question carries two marks
 - (i) Which one is not found in chromatin.
 - (a) DNA (b) Gene (c) Protein (d) Fat
 - (ii) How many ATP are released during krebs cycle?
 - (a) 12 ATP (ii) 24 ATP (iii) 38 ATP (iv) 2 ATP
 - (iii) Which stage is of shortest duration of Mitosis?
 - (a) Anaphase (ii) Metaphase (c) Telophase (iv) Prophase
 - (iv) Tube feet is locomotory organ of :
 - (a) Butterfly (b) Pila (c) Starfish (d) Jelly fish
 - (v) Sertoli cells are found in :
 - (a) Ovary (b) Testes (c) Vas deferens (d) Stroma
 - (vi) Which of the following endocrine glands secrete glucagon?
 - (a) Adrenal (b) Islet of Langerhans
 - (c) Pituitary (d) Thyroid
 - (vii) Process of sudden change in organism is known as :
 - (a) Variation (b) Natural selection
 - (c) Independent assortment (d) Mutation
 - (viii) Epiboly is a process of :
 - (a) Blastulation (b) Gastrulation (c) Cleavage (d) Fertilization
2. Write short notes on any *two* of the following :-
 - (a) Blood group (b) Mutation (c) Cleavage
 - (d) Insulin (e) Natural selection
3. Describe the structure and classification of carbohydrates.
4. Give an account of thyroid gland.
5. Describe the digestive system of frog.
6. Describe the respiratory system of rabbit.
7. Describe the reproductive system of Earthworm.
8. Give an account of Darwin's theory of natural selection.
9. Give an account of two diseases caused by Viruses.
10. Describe mouth parts of Cockroach.



Examination Programme, 2014
I.Sc. Part - II

Date	3.30 PM to 6.30 PM	Examination Centre
12.04.2014	Biology/ Mathematics Paper – II	Nalanda Open University, Patna
13.04.2014	Chemistry Paper – II	Nalanda Open University, Patna
14.04.2014	Physics Paper – II	Nalanda Open University, Patna
18.04.2014	English Language & Literature Paper – II or Hindi Language & Literature Paper – II	Nalanda Open University, Patna

Nalanda Open University
Annual Exam-2014
Intermediate of Science (I.Sc.), Part-II
Chemistry, Paper-II

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No.1 is compulsory. Attempt Two Questions from Group 'A' and Two Questions from Group 'B'. All questions carry equal marks.

1. Select the correct answer in the following.
- (i) Which of the following represent an alkyne :
(a) C_5H_{12} (b) C_5H_{10} (c) C_5H_8 (d) none of these
 - (ii) Aldehyde on reduction gives :
(a) Primary alcohol
(b) Secondary alcohol
(c) Tertiary alcohol
(d) Mixture of Primary, Secondary & Tertiary alcohol
 - (iii) Milk is a :
(a) Colloidal solution (b) An emulsion
(c) Suspension (d) Gel
 - (iv) Maximum yield of ammonia is obtained at :
(a) High temperature & low pressure
(b) High pressure & low temperature
(c) Low pressure & low temperature
(d) High pressure and high temperature
 - (v) Acetamide will produce primary amine when acetamide is treated with :
(a) Soda lime (b) hot or cold H_2SO_4
(c) $NaOH + Br_2$ (d) Na/Ag
 - (vi) When a mixture of calcium acetate and calcium formate is heated together forms :
(a) Acetaldehyde
(b) Acetone
(c) Formaldehyde
(d) A mixture of acetaldehyde and acetone
 - (vii) The heat of solution of $NaOH (S)$ is $- 41.6 \text{ KJ/mol}$. When $NaOH$ is dissolved in water, the temperature of solution :
(a) increases
(b) decreases
(c) remains constant
(d) decreases or increases depending on how much $NaOH$ is dissolved
 - (viii) Which has hcp crystal structure :
(a) $NaCl$ (b) $CsCl$ (c) $RbCl$ (d) ZnS

Group 'A'

2. What are the basic assumption of Kinetic theory of gases? Derive Kinetic gas equation and apply the gas equation to deduce ideal gas equation and Graham's law of diffusion.

3. Derive Raoult's law of lowering of vapour pressure. Discuss its applicability in determination of molecular weight of a solute.
4. State Faraday law of electrolysis. Establish the relations between Chemical equivalent and Electro chemical equivalent.
5. Write notes on any *two* of the following :-
 - (i) Hydrolysis of salt
 - (ii) Common ion effect
 - (iii) Solubility product

Group 'B'

6. Define term Isomer & Isomerism? Write a notes on structural isomerism.
7. What are amines? How they are classified. How the different classes of amines are distinguished and separated.
8. Give two general methods of preparation of alkene. Give, how does ethylene (ethene) react with :
 - (i) Ozone
 - (ii) Hypobromous acid
 - (iii) Alkaline KMnO₄ solution
9. Give at least two methods of preparation of acetaldehyde. How does acetaldehyde react with :-
 - (i) ammoniacal silver nitrate
 - (ii) NaOH solution
 - (iii) Phenyl hydrazine
10. How benzenediazonium chloride is prepared from aniline? Give its reaction :
 - (i) $\text{Cu}_2\text{Cl}_2 + \text{HCl}$
 - (ii) Steam
 - (iii) K₉



Nalanda Open University
Annual Exam-2014
Intermediate of Science (I.Sc.), Part-II
Physics, Paper-II

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No.1 is compulsory.
All questions carry equal marks.

1. Select the correct option in each of the following. Each part of the question carries 1 mark :-
- (i) Real image of an object can be formed by :
 - (a) Concave lens
 - (b) Concave mirror
 - (c) Convex mirror
 - (d) Plane mirror
 - (ii) Which one of the following does not explain the wave nature of light :
 - (a) photo electric
 - (b) interference
 - (c) diffraction
 - (d) polarisation
 - (iii) Total internal reflection may occur when a ray travels from :
 - (a) vacuum to glass
 - (b) vacuum to air
 - (c) water to glass
 - (d) glass to air
 - (iv) A convex lens of $f = 25$ cm. is placed at a distance of 1 m from a concave lens of $f = 50$ cm. The equivalent power of the combination is :
 - (a) 4 D
 - (b) 6 D
 - (c) 2 D
 - (d) 10 D
 - (v) The length of the tube of a compound microscope is increased. Then the magnifying power of this :
 - (a) increases
 - (b) decreases
 - (c) remains unchanged
 - (d) not possible to determine whether increases or decreases
 - (vi) Coulomb is the SI unit of :
 - (a) current
 - (b) charge
 - (c) capacitance
 - (d) resistance
 - (vii) A piece of copper wire has a resistance R . It is stretched so as to double its length. Then, the new resistance of the wire will be :
 - (a) R
 - (b) $2R$
 - (c) $4R$
 - (d) $R/4$
 - (viii) An electric bulb rated for 500 watts at 100 volts is used in a circuit having a 200 volts supply. The resistance R that must be put in series with the bulb, so that the bulb draws 500 watts is :
 - (a) $10\ \Omega$
 - (b) $20\ \Omega$
 - (c) $50\ \Omega$
 - (d) $100\ \Omega$
 - (ix) Tangent galvanometer is most sensitive when the deflection of the needle is :
 - (a) 0°
 - (b) 30°
 - (c) 45°
 - (d) 90°
 - (x) If the root mean square value of an alternating voltage is 220 volts, its peak value is :
 - (a) 628 volts
 - (b) 400 volts
 - (c) $220\sqrt{2}$ volts
 - (d) 100 volt
 - (xi) According to Huygens, the light wave :
 - (a) is a transverse wave
 - (b) has all the points of its wave front acting as source of light
 - (c) is an electromagnetic wave
 - (d) none of these

