Nalanda Open University

Annual Exam - 2019

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) *Which one of the following is correct, $1 + w + w^2$ is equal to :*

(i) 1 (ii) -1 (iii) *0*

(iv) None of these where w is the cube root of unity.

(b) *If* $15_{Cr} : 15_{Cr-1} = 11 : 5$ *then* 8_{Cr} *is equal to :*

(i) 56 (ii) 65 (iii) 30 (iv) None of these

(c) *If a Set A has n elements then the number of elements in the power Set i.e. P(A) is :*

(i) n^2 (ii) $2n$ (iii) 2^n (iv) None of these

(d) *The value of* $Co + C_2 + C_4 + C_6 + \ldots\ldots$ *in* $(1 + x)^n$ *is:*

(i) $2n - 1$ (ii) 2^{n-1} (iii) 2^n (iv) None of these

(e) $(A \cap B) \cap A$ *is :*

(i) *A* (ii) *B* (iii) $A \cap B$ (iv) None of these

(f) *If* $f(x) = x^2 + 3x + 2$, $x \in R$, *then* $f(1) \times f(-2)$ *is :*

(i) 1 (ii) 2 (iii) 0 (iv) None of these

(g) *log* $\log_4^{32}$ *is equal to :*

(i) $\frac{2}{5}$ (ii) $\frac{5}{2}$ (iii) 5 (iv) None of these

(h) $\sin^{-1} x + \cos^{-1} x$ *is equal to :*

(i) π (ii) $\frac{\pi}{2}$ (iii) $\frac{\pi}{3}$ (iv) None of these

(i) *If* $A + B + C = \pi$ *then* $\cos A + \cos B + \cos C$ *is equal to :*

(i) $\cos A \cos B \cos C$ (ii) $\sin A \cdot \sin B \cdot \sin C$

(iii) $\sin A + \sin B + \sin C$ (iv) $1 + 4 \sin \frac{A}{2} \sin \frac{B}{2} \sin \frac{C}{2}$

(j) *If R is the circum radius of a triangle then :*

(i) $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$ (ii) $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = R$

(iii) $\frac{a}{\tan A} = \frac{b}{\tan B} = \frac{c}{\tan C} = R$ (iv) None of these

(k) *If* $a \neq b \neq c \neq 0$ such that

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = 0,$$ then $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$ is equa to :

(i) 1 (ii) -1 (iii) 0 (iv) None of these

(l) *If the equations* $x^2 + px + q = 0$ *and* $x^2 + qx + p = 0$ *have a common root then* $p + q + 1$ *is equal to :*

(i) 0 (ii) 1 (iii) 2 (iv) -1

(m) *If* $y = mx + c$ *and* $x \cos\alpha + y \sin\alpha = p$ *represent the same line then p is equal to :*

(i) $p = c\sqrt{1 + m^2}$ (ii) $c = p\sqrt{1 + m^2}$ (iii) $p^2 + c^2 + m^2 = 1$ (iv) $cp = \sqrt{1 + m^2}$

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(n) *The triangle formed by the lines* $x + y - 4 = 0$, $3x + y = 4$, $x + 3y = 4$ *is :*

(i) isosceles (ii) Equilateral (iii) Right angled (iv) None of these

(o) *For all values of q, the locus of the point of intersection of the lines* $x\cos\theta + 4\sin\theta = a$ *and* $x\sin\theta - y\cos\theta = b$ *is :*

(i) An ellipse (ii) A circle (iii) A parabola (iv) A Hyperbola

(p) *The eccentricity of parabola* $x^2 - 4x - 4y + 4 = 0$ *is :*

(i) e = 0 (ii) e = 1 (iii) e = 4 (iv) e > 4

2. Prove that $\Delta = \begin{vmatrix} b^2+c^2 & ab & ac \\ ab & c^2+a^2 & bc \\ ac & bc & a^2+b^2 \end{vmatrix} = 4a^2b^2c^2.$

3. Find the sum to n terms of the series 1, 2, 5 + 2, 3, 6 + 3, 4, 7 + ...

4. If x is real show that the value of $\left(\frac{x^2+34x-71}{x^2+2x-7}\right)$ can never lie between 5 and 9.

5. How many even numbers of four digits can be made with the digits 0, 3, 5, 4, 9.

6. Prove that $n_{C_0} \cdot n_{C_r} + n_{C_1} \cdot n_{C_{r+1}} + n_{C_2} \cdot n_{C_{r+2}} + ... + n_{C_{n-r}} \cdot n_{C_n} = \frac{2n}{n-r \quad n+r}$.

7. In a ΔABC prove that $a^3\cos(B - C) + b^3\cos(C - A) + c^3\cos(A - B) = 3abc$.

8. A straight line touches the circle $x^2 + y^2 = 2a^2$ and the parabola $y^2 = 8ax$, show that the equation is $y = \pm(x + 2a)$

Nalanda Open University

Annual Exam-2019

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) Radish is:
(a) Perennials (b) Annual (c) Biennial (d) None

(ii) Rhizome is found in:
(a) Colocasia (b) Potato (c) Ginger (d) Onion

(iii) Placentation in Brassica is:
(a) Parietal (b) Marginal (c) Basal (d) Axile

(iv) Closed vascular bundle lack:
(a) Cambium (b) Pith (c) Ground tissue (d) Conjunctive tissue

(v) Ground tissue includes:
(a) All tissues except epidermis and vascular bundles
(b) All tissues external to endodermis
(c) All tissues internal to endodermis
(d) Epidermis and cortex

(vi) Winged petiole is found in:
(a) Citrus (b) Acacia (c) Radish (d) Peepal

(vii) Sweet Potato is modification of:
(a) Primary root (b) Leaf
(c) Underground root (d) Adventitious root

(viii) Who proposed the cell theory?
(a) Singer & Nicholson (b) Schwann & Schleiden
(c) Hook & Brown (d) Robertson

(ix) Which microorganism is responsible for synthesis of antibiotics
(a) Bacteria (b) Virus (c) Fungus (d) Algae

(x) In onion the inflorescence is:
(a) Raceme (b) Corymb (c) Catkin (d) Cyathium

(xi) Cyathium is found in:
(a) *Ixora* (b) Begonia (c) *Calotropis* (d) *Bigronia*

(xii) Companion cells are found in:
(a) Xylem (b) Phloem (c) Cortex (d) Pith

(xiii) A nucleoside is:
(a) Base+Sugar+Phosphorus (b) Sugar+Phosphate
(c) Base+sugar (d) base+phosphate

(xiv) Pachytene is a stage of:
(a) Mitosis (b) Meiosis (c) Amitosis (d) None of these

(xv) Photophosphorylation is associated to:
(a) Respiration (b) Photosynthesis (c) Fat synthesis (d) Protein synthesis

(xvi) Winged Pallen grain is found in:
(a) Cycas (b) Pinus (c) Taxus (d) Potato

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2. With suitable diagram describe different stages of Mitosis.
3. Describe the floral character of family Brassicaceac. Give the floral formula, floral diagram and Botanical names of two plants of this family.
4. Describe the structure and function of Mitochondria.
5. Give an account of water pollution. Suggest methods to minimize it.
6. What is secondary growth? Describe method of secondary growth in a Dicotyledonous stem.
7. What is ecosystem? Describe a pond ecosystem.
8. What is mutation? Describe various method to induce mutation.
9. Describe carbon cycle of Photosynthesis.
10. Write short notes on any **Four** of the following :
    (a) Spike inflorescence
    (b) Cell Cycle
    (c) Verticillaster
    (d) Genetic engineering
    (e) Two oil yielding plants (Botanical name and family)
    (f) Two medicinally important plants (Botanical name and family)

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Programme of I.Sc. Part-I Practical Counselling and Exam, 2019

Venue : For Botany - 1st Floor, Bio Lab, Biscomaun Tower, Patna
For Chemistry - 4th Floor, Chemistry Lab, Biscomaun Bhawan, Patna
For Physics - 1st Floor, Physics Lab, Biscomaun Tower, Patna

(A) Practical Counselling

Date	***Time***		
	08.00 AM to 11.00 AM	**11.15 AM to 02.15 PM**	**02.30 PM to 05.30 PM**
26.02.2019	Botany (All Students)	Physics (Roll No.) 1706300001 to 170630070 & 1800630001 to 180630025	Physics (Roll No.) 170630026 to 180630050
22.02.2019	------	Chemistry (Roll No.) 170630001 to 170630070 & 180630001 to 180630025	Chemistry (Roll No.) 180630026 to 180630050

(B) Practical Examination

Date	***Time***	
	11.15 AM to 02.15 PM	**02.30 PM to 05.30 PM**
28.02.2019	Botany (All Students)	Physics (Roll No.) 1706300001 to 170630070 & 1800630001 to 180630025
01.03.2019	Physics (Roll No.) 170630026 to 180630050	Chemistry (Roll No.) 170630001 to 170630070 & 180630001 to 180630025
02.03.2019	Chemistry (Roll No.) 180630026 to 180630050	

Nalanda Open University

Annual Exam - 2019

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. Choose the correct answer of the following :

(i) The electronic configuration of an atom is $1s^2\ 2s^2\ 2p^3$. The number of unpaired electron in this atom are :
(a) 3 (b) 5 (c) 7 (d) 1

(ii) Electromagnetic radiation with maximum wavelength is :
(a) Infrared (b) Radio waves (c) X-ray (d) Ultraviolet

(iii) Which of the following represent a correct set of quantum numbers of a 4d electron?
(a) 4, 3, 2, +1/2 (b) 4, 2, 1, 0 (c) 4, 3, –2, +1/2 (d) 4, 2, 1, –1/2

(iv) Which of the following has maximum number of unpaired electrons?
(a) Zn (b) Fe^{+2} (c) Ni^{+3} (d) Cu^{+}

(v) Number of elements present in the 3rd period of periodic table is :
(a) 6 (b) 32 (c) 18 (d) 8

(vi) Which pair of atomic numbers represent s-block element:
(a) 7, 15 (b) 6, 12 (c) 9,17 (d) 3,12

(vii) Carbon in ethene involves the hybridisation:
(a) SP^3 (b) SP^2 (c) SP (d) None of the above

(viii) Which of following has highest dipole moment?
(a) NH_3 (b) PH_3 (c) SbH_3 (d) AsH_3

Group - A

2. What are bohr's atomic theory and describe its limitation.

3. Write the hybridisation, structure and shape of following:
(a) CH_4 (b) NH_3 (c) H_2O (d) CO_2

4. Define Oxidation number and Equivalent Weight? Determine the Oxidation number of:
(a) Cr in $K_2Cr_2O_7$ (b) S in $Na_2S_2O_3$. H_2O
(c) C in $C_{12}H_{22}O_{11}$ (d) Mn in $KMnO_4$

5. Write the electronic dot formula of following:-
(a) C_2H_2 (b) HCHO (c) SO_4^{-2} (d) CaO

6. Explain the following term:
(a) Entropy (b) PH (c) electronegativity (d) Electron affinity

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Group - B

7. Explain the characteristic of 3d block elements on following terms:
   (a) Colour (b) Magnetic properties (c) formation of complex compound

8. Write the IUPAC nomenclature of following compounds of any four :
   (a) $K_4[Fe(CN)_6]$ (b) $[Ni(CN)_4]^{-4}$ (c) $[Cr(H_2O)_6]^{+2}$ (d) $[Ni(en)_2cl_2]^{+2}$
   (e) $[Ni(CO)_4]$

9. Explain following:-
   (a) Ionisation Energy (b) electronegativity
   (c) Ores and minerals (d) Lewis acid and base

10. Write notes on any two:-
   (a) Water pollution (b) Air pollution (c) Nitrogen fertilizer

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Programme of I.Sc. Part-I Practical Counselling and Exam, 2019

Venue : For Botany - 1st Floor, Bio Lab, Biscomaun Tower, Patna
For Chemistry - 4th Floor, Chemistry Lab, Biscomaun Bhawan, Patna
For Physics - 1st Floor, Physics Lab, Biscomaun Tower, Patna

(A) Practical Counselling

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(B) Practical Examination

Date	***Time***	
	11.15 AM to 02.15 PM	**02.30 PM to 05.30 PM**
28.02.2019	Botany (All Students)	Physics (Roll No.) 1706300001 to 170630070 & 1800630001 to 180630025
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02.03.2019	Chemistry (Roll No.) 180630026 to 180630050	

Nalanda Open University

Annual Exam - 2019

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 questions carries 1 mark.

(i) Select the correct dimensional formula of impulse

(a) $[ML^2T]$ (b) $[ML^2T](c)$

(c) mass, time and velocity (d) length, time and mass

(ii) If dy is the error in the measurement of a quantity y, then percentage error is

(a) $\frac{dy}{y} x 100\%$ (b) $\frac{dy}{y} x 100$

(c) $\frac{y}{dy} x 100$ (d) $\frac{y}{dy} x \frac{1}{100}$

(iii) The numerical value of one newton into dyne is

(a) 10^5 (b) 10^{10} (c) 10^{15} (d) None of the three

(iv) If $|\vec{P} + \vec{Q} = \vec{R}|$ and $\left|\vec{P}\right| + \left|\vec{Q}\right| = \left|\vec{R}\right|$, Then the angle between $\vec{P}$ & $\vec{Q}$ is

(a) 120^o (b) 90^o (c) 0^o (d) None of the three

(v) If the displacement of a particle is proportional to the square of time t^2 i.e. if $Y \propto t^2$ Then the initial velocity of the particle is

(a) constant (b) veriable (c) zero (d) None of three

(vi) A spring balance is kept horizontally, its two ends are pulled by a force of 5 kg, then its reading will be

(a) 9.8 kg wt (b) 9.8 newton (c) 5 newton (d) 5 kg wt

(vii) A wheel of radius 2 meter is making 60 revolutions per second, then linear velocity of a point on rim will be

(a) 2π (b) 4π (c) π (d) None of three

(viii) 64 rain drops combine to form a single drop. The ratio of the total surface energy of all the drops to that of the single drop is

(a) 4 : 1 (b) 64 : 1 (c) 1 : 4 (d) 8 : 1

(ix) A barometer reads 72 cm of mercury, then what will be the pressure in bars

(a) 0.959616 (b) 1 bar (c) 13.6 bar (d) 9.8 bar

(x) For a gram molecule of a gas, the quantity pv/T is called

(a) mass (b) a constant

(c) universal gas constant (d) number of moles of the gas

(xi) The absolute zero of temperature is

(a) 0^o (b) -260^o (c) -273.16^o (d) 273^o

(xii) 2 gm mole of a gas is heated thorugh 30^o c at constant pressure. The work done is nearly equal to

(a) 480 joule (b) 490 Joule (c) 500 Joule (d) None of three

(xiii) The maximum wavelength of a transverse wave that can be set up in a string of length (l) is

(a) l (b) $\frac{l}{2}$ (c) $2l$ (d) $4l$

(xiv) An open organ pipe contains

(a) longitudinal stationary waves (b) longitudinal travelling waves

(c) Transverse stationary waves (d) transverse travelling waves

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(xv) The interval between two notes of frequencies 256 c/s and 512 c/s is

(a) 2 (b) 786 (c) $\frac{1}{2}$ (d) 256

(xvi) Which of the following quantities are always zero in a S.H.M.

(a) $\vec{F} \, x \, \vec{a}$ (b) $\vec{V} \, x \, \vec{r}$ (c) $\vec{a} \, x \, \vec{r}$ (d) all

2. Derive the formula for 'The maximum height attained' and 'the time of flight' of a projectile projected with velocity *v* at an angle θ with the horizontal.
3. Explain centripetal and centrifugal forces. Deduce expression for centripetal force acting on a particle moving uniformly along a circle.
4. What is Hooke's law? Define the various elastic constants. Find the energy stored in a stretched wire.
5. Define surface tension. Obtain an expression for rise of water in a narrow capillary tube of glass kept vertically and partially dipped in water.
6. Discuss the composition of two mutually perpendicular S.H.Ms about the same central pt.
7. State the postulates of kinetic theory of gases. On its basis deduce expression for the pressure of an ideal gas.
8. State and explain the first law of thermodynamics.
9. Discuss Laplace's correction in the expression for velocity of sound in air. What is the effect of temperature on the velocity of sound.
10. Describe the construction and working of a constant volume standard hydrogen thermometer. Mention its merits.

Programme of I.Sc. Part-I Practical Counselling and Exam, 2019

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(B) Practical Examination

Date	***Time***	
	11.15 AM to 02.15 PM	**02.30 PM to 05.30 PM**
28.02.2019	Botany (All Students)	Physics (Roll No.) 1706300001 to 170630070 & 1800630001 to 180630025
01.03.2019	Physics (Roll No.) 180630026 to 180630050	Chemistry (Roll No.) 170630001 to 170630070 & 180630001 to 180630025
02.03.2019	Chemistry (Roll No.) 180630026 to 180630050	

Nalanda Open University

Annual Exam - 2019

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 questions. Each part of the questions carries one mark.

(a) $\lim\limits_{x\to 0} \dfrac{\tan x - \sin x}{x^3}$ *is :*

(i) $\dfrac{1}{2}$ (ii) $-\dfrac{1}{3}$ (iii) $\dfrac{1}{3}$ (iv) None of these

(b) $\lim\limits_{x\to 0}\left(\dfrac{\tan x}{x}\right)^{\frac{1}{x^2}}$ *is :*

(i) $e^{\frac{1}{3}}$ (ii) $e^{\frac{1}{2}}$ (iii) e (iv) None of these

(c) *If* $f(x) = |x|$ *then f is continuous at* :

(i) origin (ii) at $x = 1$ (iii) at $x = -1$ (iv) None of these

(d) *If* $x = a(t + \sin t)$, $y = a(1 - \cos t)$ *then* $\dfrac{dy}{dx}$ *is* :

(i) $\sin\dfrac{t}{2}$ (ii) $\cos\dfrac{t}{2}$ (iii) $\tan\left(\dfrac{t}{2}\right)$ (iv) None of these

(e) *If* $x > 0$, $y > 0$ *and* $xy = 1$ *then the minimum value of* $x + y$ *is :*

(i) 1 (ii) 2 (iii) 4 (iv) None of these

(f) $\int \dfrac{\sin\sqrt{x}}{\sqrt{x}}dx$ is :

(i) $-2\cos\sqrt{x}$ (ii) $2\cos\sqrt{x}$ (iii) $\cos\sqrt{x}$ (iv) None of these

(g) $\int_2^3 \dfrac{\sqrt{x}}{\sqrt{5-x}+\sqrt{x}}dx$ *is :*

(i) $\dfrac{1}{2}$ (ii) 3 (iii) 5 (iv) None of these

(h) *The area bouded by the line* $y = x$, *the x - axis and the ordinates* $x = -1$, $x = 2$ *is :*

(i) $\dfrac{5}{2}$ *sq. units* (ii) $\dfrac{1}{2}$ *sq. units* (iii) $\dfrac{3}{2}$ *sq. units* (iv) None of these

(i) *The order and degree of the differential equation* $\dfrac{d^2y}{dx^2} = \sqrt{1+\left(\dfrac{dy}{dx}\right)^2}$ *is :*

(i) 1, 1 (ii) 2, 2 (iii) 2, 1 (iv) None of these

(j) *The solution of the differential equation* $\dfrac{dy}{dx} = \dfrac{1+y^2}{1+x^2}$ *is :*

(i) $y - x = c(1 + xy)$ (ii) $x - y = c(1 + xy)$ (iii) $y - x = c(1 - xy)$ (iv) None of these

(k) *The function* $f(x) = 2x^3 + 21x^2 - 60x + 41$ *is strictly positive in the interval.*

(i) $(-1, \infty)$ (ii) $(1, 2)$ (iii) $(1, \infty)$ (iv) None of these

(l) *If A is a sqare matrix such that* $A^2 = A$ *then*

$(1 + A)^3 - 7A$ is equal to :

(i) A (ii) $1 - A$ (iii) 1 (iv) None of these

(m) *The rate of change of the area of a circle with respect to the radius r at r = 6cm is :*

(i) $12\pi\, cm$ (ii) $11\pi\, cm$ (iii) $10\pi\, cm$ (iv) None of these

(n) *A bag contains 9 red, 4 block, 7 white balls. The probability that a ball drawn is not black is :*

(i) $\frac{13}{20}$ (ii) $\frac{16}{20}$ (iii) $\frac{11}{20}$ (iv) None of these

(o) *If three vectors* $\vec{i} - \vec{j} + \vec{k}, 2\vec{i} + \vec{j} - \vec{k}$ *and* $\lambda\vec{i} - \vec{j} + \vec{k}$ *are co-planar then the value of* λ *is:*

(i) *1* (ii) *2* (iii) *3* (iv) None of these

(p) *If* $\left|\vec{a} + \vec{b}\right| = \left|\vec{a} - \vec{b}\right|$. *Then the angle between* $\vec{a}$ *and* $\vec{b}$ *is* :

(i) $30°$ (ii) $60°$ (iii) $90°$ (iv) None of these

2. *If f(x) =*
$$\begin{cases} x - 1 & when\ x < 0 \\ \frac{1}{4} & when\ x = 0 \\ x^2 & when\ x > 0 \end{cases}$$
Then discuss the continuity of f(x)at x = 0.

3. *If* $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x - y)$ then show that $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$.

4. (a) prove that the maximum value of $\left(\frac{1}{x}\right)^x$ *is* $e^{\frac{1}{e}}$.

(b) Find internal of monotonicity of $x\log_e^x$.

5. Evaluate the following integrals :

(i) $\int \frac{dx}{x^2 + 2x + 6}$ (ii) $\int \frac{dx}{4 + 5\cos x}$

6. *Evaluate :*

(i) $\int_0^{\pi} \frac{x\sin x}{1 + \cos 2x} dx =$ (ii) $\int_0^{\pi/4} \log(1 + \tan x) dx$

7. *Solve :*

(i) $\frac{dy}{dx} = \frac{3x - 4y + 2}{4x - 5y + 3}$ (ii) $\left(\frac{dy}{dx}\right)^2 - (e^{-x} + e^x)\frac{dy}{dx} + 1 = 0$

8. *Prove That :*

(i) $\vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} \times \vec{b}) = \vec{0}$

(ii) The volume of the parallelepiped whose edges are $-12\vec{i} + \lambda\vec{k}, 3\vec{j} - \vec{k}, 2\vec{i} + \vec{j} - 15\vec{k}$ is 546, find the value of λ.

Nalanda Open University

Annual Exam - 2019

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 of the following is called suicidal Sac of a cell.
(a) Mitochondria (b) Lysosomes (c) Ribosomes (d) Golgibody

(ii) Out of the following who proposed the term mitosis
(a) Flemming (b) Altmann (c) Brown (d) Porter

(iii) Which of the following is monosaccharide?
(a) sucrose (b) Ribose (c) Lactose (d) maltose

(iv) Octopus belongs to which of the following classes:
(a) Gastropoda (b) Scaphopoda
(c) Pelecypoda (d) Cephalopoda

(v) The chordates are characterized by which of the following features?
(a) Notochord (b) Dorsal tubular nerve chord
(c) Pharyngeal gill slits (d) All of these

(vi) Which of the following gland secrate Thyroxine
(a) Adrena (b) Pituitary (c) Thyroid (d) Testis

(vii) Mammalian heart is :
(a) 2 Chambered (b) Single Chambered (c) 4 Chambered (d) 3 Chambered

(viii) Gametes are formed during:
(a) Spermetogenesis (b) Oogenesis
(c) Gemetogenesis (d) Fertilization

2. Describe the mouth parts of Cockroach.
3. Give an account of Thyroid Gland.
4. Describe the digestive system of frog.
5. Describe the Reproductive system of Earthworm.
6. Describe the development of frog up to three germinal layers.
7. Describe the structure and classification of carbohydrate.
8. Describe the structure and function of mitochondria.
9. Describe Darwin's theory of natural selection.
10. Write short notes on any two of the following.
(a) Starfish (b) Endoplasmic reticulum
(c) Gizzard of Cockroach (d) Blastulation

Programme of I.Sc. Part-II Practical Counselling and Exam' 2019

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For Chemistry - 4th Floor, Chemistry Lab, Biscomaun Bhawan, Patna
For Physics - 1st Floor, Physics Lab, Biscomaun Tower, Patna

(A) Practical Counselling

Date	*Time*	
	11.00 AM to 2.00 PM	**2.30 PM to 5.30 PM**
26.02.2019	Zoology (All Students)	Chemistry (All Students)
27.02.2019	Physics (All Students)	Physics (All Students)

(B) Practical Examination

Date	*Time*	
	11.15 AM to 2.15 PM	**2.30 PM to 5.30 PM**
28.02.2019	Zoology (All Students)	Chemistry (All Students)
01.03.2019	----------	Physics (All Students)

Nalanda Open University

Annual Exam - 2019

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

Chemistry, Paper-II

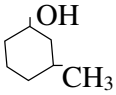
Time: 3.00 Hrs. **Full Marks: 80**

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.

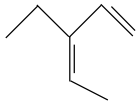
1. Choose the correct answer in the following :-

(i) The compound  correct name is

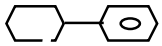
(a) Pent-1, 4-diene (b) Penta-1, 4-diene
(c) Penta-1, 3-diene (d) Pent-1-ene

(ii) The Compound  correct name is:

(a) 3-Methyl cyclo hexan-1-ol (b) 3-Methyl hexanol
(c) Hepten-01 (d) 3-Hydroxy toluene

(iii) The compound  correct name is :

(a) Hepta-2, 4-diene (b) 3-Ethyl penta-1, 3-diene
(c) 3-Ethenylpenta-1,3-diene (d) Not any

(iv) The compound  correct name is:

(a) Hexyl benzene (b) Cyclohexyl benzene
(c) Phenyl benzene (d) Cyclopentyl benzene

(v) The compound $CH_3 - CH_2 - O - CH_2 - CHoH - CH_3$ correct name is :
(a) Ethoxy propenol (b) 1-Ethoxypropon-2-01
(c) 1-Ethoxy propyl alcohal (d) 1-Ethoxy propenol

(vi) Hybridisation of carbon in ethyne is :
(a) Sp^3 (b) Sp^2 (c) Sp (d) Sp^3d^2

(vii) The most electronegative element is :
(a) Cl (b) Br (c) I (d) F

(viii) Coinage elements are known as :
(a) Na, K, Ru (b) Mg, Ca, Sr (c) Cu, Ag, Au (d) Sc, Ti, V

Group - A

2. What is Hess's Law of constant Heat summation? Explain it with its theoratical proof and application.

3. (a) What is Bond energy ? How Bond energy is calculated.
(b) Find the enthalpy of formation of Hydrogen Fluoride (HF) on the basis of the data :
Bond energy of H-H bond = 434 Kj mol^{-1}
Bond energy of F-F bond = 158 Kj mol^{-1}
Bond energy of H-F bond = 565 Kj mol^{-1}

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4. (a) Give the representation of electrochemical cell?

   (b) What is electrolytes, electrolytic conductance and specific conductance?

5. Write short short notes on eny two :-

   (a) Buffer soln (b) Hund's Rule (c) PHof soln.

Group - B

6. Write the structural formula of following compound :

   (a) 1-Ethoxy propan-2-ol (b) 2-Methylbuta-1, 3-diene

   (c) Penta-1, 4-diene (d) Hexa-1, 3, 5-triene

7. Write notes on any two:
   (a) Inductive effect (b) Elimination reaction (c) Perkin reaction

8. (a) What is aromaticity?

   (b) Explain the effect of substituent on the aeidity of phenol?

9. Write notes on any two:

   (a) Tollen's Reegent (b) Aldol Condensation (c) Polythene

10. Explain following:

   (a) Natural and synthetic Rubber (b) Proteins

   (c) Benzene diazonium chloride

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(B) Practical Examination

Date	*Time*	
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Nalanda Open University

Annual Exam - 2019

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 question carries 1 mark.

(i) If the angle of incidence in less than its limiting value, then rays are :
(a) partially reflected (b) partially refracted
(c) totally reflected (d) totally refracted

(ii) If focal length (f) is in cm., then power is expressed as
(a) $\frac{1}{f}$ (b) f (c) $\frac{1000}{f}$ (d) $\frac{100}{f}$

(iii) If the sign and radius of curvature of both side of a lens is the same, what will be its power:
(a) Infinite (b) $\frac{1}{f}$ (c) f (d) None of these

(iv) If the least distance of distinct vision and the focal length be D and f respectively, then the magnifying power of a glass is :
(a) $1+\frac{D}{f}$ (b) $\frac{D}{f}$ (c) $1-\frac{D}{f}$ (d) $\frac{f}{D}$

(v) The wave fronts of light coming from a distant source are nearly :
(a) spherical (b) plane (c) cylindrical (d) elliptical

(vi) The sources are called coherent if they produce waves :
(a) of equal wavelength (b) of equal velocity
(c) having same shape of wave front (d) having a constant phase difference

(vii) The number of fringes formed due to interference and diffraction are :
(a) same (b) larger in diffraction
(c) larger in interference (d) lesser in diffraction

(viii) Unit pole in S.I. unit is that pole which when placed at a distance of 1 meter from a similar pole is repelled by a force of :
(a) 10^{-7} weber/amp (b) 10^{-7} nenery (c) 10^{-7} N (d) 10^{-7} N/A^2

(ix) If a magnet is suspended freely in a uniform magnetic field then its time period is :
(a) $\frac{1}{2\pi}\frac{I}{MD}$ (b) $2\pi\frac{\sqrt{I}}{MB}$ (c) $\sqrt{\frac{I}{MB}}$ (d) $2\pi\sqrt{\frac{MB}{I}}$

(x) 1 coulomb is equal to
(a) 1 ab coulomb (b) 1×10^9 stal coulomb
(c) 3×10^{10} stal coulomb (d) None of these

(xi) The unit of dipole moment is Debye which is equal to :
(a) 10^{-29} coulomb meter (b) 3×10^{-29} coulomb meter
(c) $\frac{1}{3} \times 10^{-29}$ coulomb meter (d) 3×10^{-30} coulomb meter

(xii) A uniform wire of resistance 50Ω is cut into 5 equal parts. These parts are now connected in parallel. The equivalent resistance y the connection is
(a) 2Ω (b) 10Ω (c) 250Ω (d) 6250Ω

(xiii) A vertical wire carries a current in upward direction. An electron beam sent horizontally towards the wire will be deflected.
(a) towards right (b) towards left (c) upward (d) downwards

(xiv) If the current is doubled, the deflection is also doubled in :
(a) a tangent galvanometer (b) a moving galvanometer
(c) both (d) None

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(xv) The K.E. of an electron of charge e moving round the nucleus of radius *r* is :

(a) $\frac{Ze^2}{4\pi\varepsilon_0 r^2}$ (b) $\frac{Ze^2}{4\pi\varepsilon_0 r}$ (c) $\frac{Ze^2}{8\pi\varepsilon_0 r}$ (d) None of these

(xvi) A de-Brogli wave corresponding to a particle of mass *m* and velocity *v* has a wavelength associated with it :

(a) h/mv (b) hmv (c) mh/v (d) $\frac{m}{hv}$

2. Derive snell's law of refraction on the basis of wave theory of light.
3. Explain critical angle and angle of minimum diviation for refraction through a prism. Establish the equation $m = \sin\frac{A+\delta m}{2} \Big/ \sin\frac{A}{2}$.
4. Discuss deviation without dispersion and dispersion without diviation produced by a combination of prisms.
5. State and explain Gauss law. Find electric field near an infinite plane sheet of charge having uni form surface charge density.
6. State and explain Kirchoff's laws and Their application to find the balanced condition of wheat stone bridge.
7. Describe the construction and action of a moving soil galvanometer. Explain how it can be converted into an ammeter.
8. What is a p-n junction diode? Define its dynamic resistance.
9. Give Einstein theory to explain photoelectric effect. Explain threshold rectifier of alternating wave.
10. What is Bohr's model of atom? Discuss the model to explain the series spectra of Hydrogen atom.

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