

# SHIKSHA CLASSES, BHANDARA

## FULL TEST-4

CHEMISTRY , PHYSICS, BIOLOGY

Time : - 3 Hours

Max. Marks:- 720

Date : .....

### INSTRUCTIONS :

1. The test is of 3 hours duration.
2. The Test Booklet consists of 180 questions. The maximum marks are 720.
3. There are three parts in the question paper A, B, C consisting of Chemistry, Physics having 45 questions each and Biology having 90 questions of equal weightage. Each question is allotted 4 (four) marks for each correct response.  $\frac{1}{4}$  (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
4. There is only one correct response for each question. Filling up more than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly.

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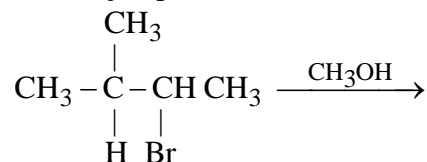
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## PART A – CHEMISTRY

**Q.1** Which is wrong with respect to our responsibility as a human being to protect our environment ?

- (1) Avoiding the use of floodlighted facilities.
- (2) Restricting the use of vehicles.
- (3) Using plastic bags.
- (4) Setting up compost tin in gardens.

**Q.2** The major product of the following reaction is



- (1)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH} - \text{CH}_3 \\ | \quad | \\ \text{H} \quad \text{OCH}_3 \end{array}$  (2)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH} = \text{CH}_2 \\ | \\ \text{H} \end{array}$
- (3)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_2\text{CH}_3 \\ | \\ \text{OCH}_3 \end{array}$  (4)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} = \text{CH} - \text{CH}_3 \end{array}$

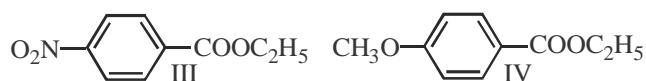
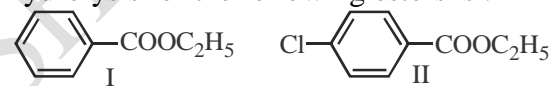
**Q.3** Two pi and half sigma bonds are present in:

- (1)  $\text{N}_2^+$
- (2)  $\text{N}_2$
- (3)  $\text{O}_2^+$
- (4)  $\text{O}_2$

**Q.4** Poly- $\beta$ -hydroxybutyrate-co- $\beta$ -hydroxyvalerate (PHBV) is a copolymer of \_\_\_\_.

- (1) 3-hydroxybutanoic acid and 4-hydroxypentanoic acid
- (2) 2-hydroxybutanoic acid and 3-hydroxypentanoic acid
- (3) 3-hydroxybutanoic acid and 2-hydroxypentanoic acid
- (4) 3-hydroxybutanoic acid and 3-hydroxypentanoic acid

**Q.5** The decreasing order of ease of alkaline hydrolysis for the following esters is :



- (1) IV > II > III > I
- (2) III > II > I > IV
- (3) III > II > IV > I
- (4) II > III > I > IV

**Q.6** The correct order of the spin-only magnetic moment of metal ions in the following low spin complexes,  $[\text{V}(\text{CN})_6]^{4-}$ ,  $[\text{Fe}(\text{CN})_6]^{4-}$ ,

$[\text{Ru}(\text{NH}_3)_6]^{3+}$ , and  $[\text{Cr}(\text{NH}_3)_6]^{2+}$ , is :

- (1)  $\text{V}^{2+} > \text{Cr}^{2+} > \text{Ru}^{3+} > \text{Fe}^{2+}$
- (2)  $\text{V}^{2+} > \text{Ru}^{3+} > \text{Cr}^{2+} > \text{Fe}^{2+}$
- (3)  $\text{Cr}^{2+} > \text{V}^{2+} > \text{Ru}^{3+} > \text{Fe}^{2+}$
- (4)  $\text{Cr}^{2+} > \text{Ru}^{3+} > \text{Fe}^{2+} > \text{V}^{2+}$

**Q.7** The IUPAC symbol for the element with atomic number 119 would be :

- (1) unh
- (2) uun
- (3) une
- (4) uue

**Q.8** If  $K_{sp}$  of  $\text{Ag}_2\text{CO}_3$  is  $8 \times 10^{-12}$ , the molar solubility of  $\text{Ag}_2\text{CO}_3$  in 0.1M  $\text{AgNO}_3$  is :

- (1)  $8 \times 10^{-12}$  M
- (2)  $8 \times 10^{-10}$  M
- (3)  $8 \times 10^{-11}$  M
- (4)  $8 \times 10^{-13}$  M

**Q.9** The correct statement(s) among I to III with respect to potassium ions that are abundant within the cell fluids is/are :

- I. They activate many enzymes.
- II. They participate in the oxidation of glucose to produce ATP.
- III. Along with sodium ions, they are responsible for the transmission of nerve signals.

- (1) I, II and III
- (2) I and III only
- (3) III only
- (4) I and II only

**Q.10** Which of the following compounds will show the maximum enol content?

- (1)  $\text{CH}_3\text{COCH}_2\text{COCH}_3$
- (2)  $\text{CH}_3\text{COCH}_3$
- (3)  $\text{CH}_3\text{COCH}_2\text{CONH}_2$
- (4)  $\text{CH}_3\text{COCH}_2\text{COOC}_2\text{H}_5$

**Q.11** The correct statements among I to III are :

- (I) Valence bond theory cannot explain the colour exhibited by transition metal complexes.

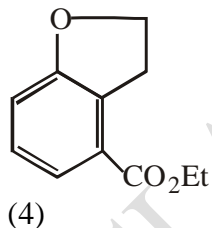
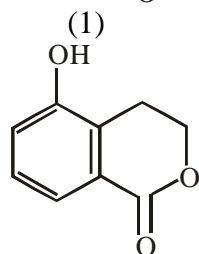
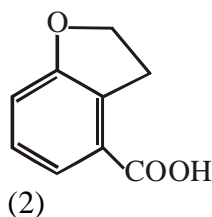
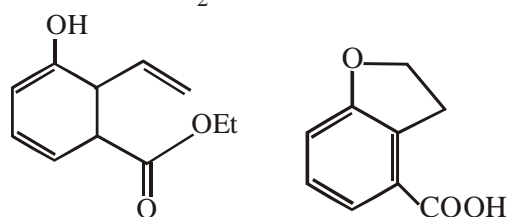
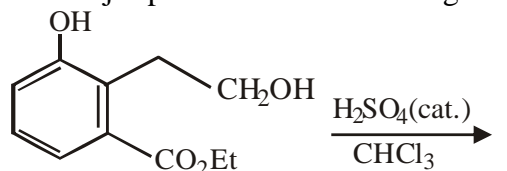
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(II) Valence bond theory can predict quantitatively the magnetic properties of transition metal complexes.

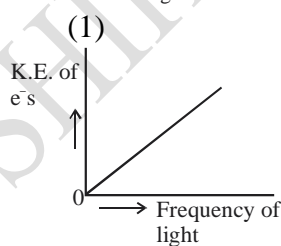
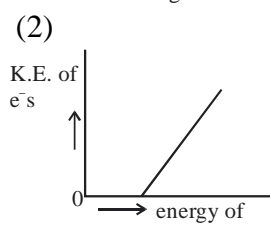
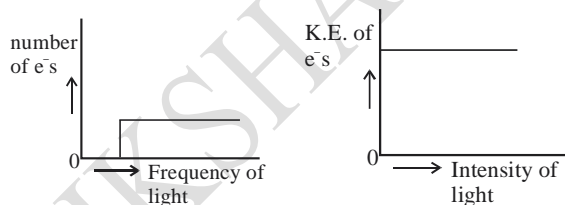
(III) Valence bond theory cannot distinguish ligands as weak and strong field ones.

- (1) (I) and (II) only    (2) (I), (II) and (III)  
 (3) (I) and (III) only    (4) (II) and (III) only

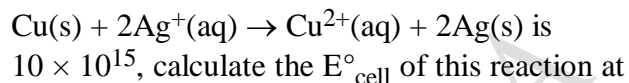
**Q.12** The major product of the following reaction is:



**Q.13** Which of the graphs shown below does not represent the relationship between incident light and the electron ejected from metal surface?



**Q.14** Given the equilibrium constant :  $K_C$  of the reaction :



298 K  $[2.303 \frac{RT}{F} \text{ at } 298 \text{ K} = 0.059 \text{ V}]$

- (1) 0.04736 V    (2) 0.4736 V  
 (3) 0.4736 mV    (4) 0.04736 mV

**Q.15** Which primitive unit cell has unequal edge lengths ( $a \neq b \neq c$ ) and all axial angles different from  $90^\circ$ ?

- (1) Tetragonal    (2) Hexagonal  
 (3) Monoclinic    (4) Triclinic

**Q.16** The oxoacid of sulphur that does not contain bond between sulphur atoms is :

- (1) H2S4O6    (2) H2S2O7  
 (3) H2S2O3    (4) H2S2O4

**Q.17** Hinsberg's reagent is :

- (1) C6H5SO2Cl    (2) C6H5COCl  
 (3) SOCl2    (4) (COCl)2

**Q.18** For the equilibrium, 2H2O <=> H3O+ + OH-, the value of  $\Delta G^\circ$  at 298 K is approximately :

- (1)  $-80 \text{ kJ mol}^{-1}$     (2)  $-100 \text{ kJ mol}^{-1}$   
 (3)  $100 \text{ kJ mol}^{-1}$     (4)  $80 \text{ kJ mol}^{-1}$

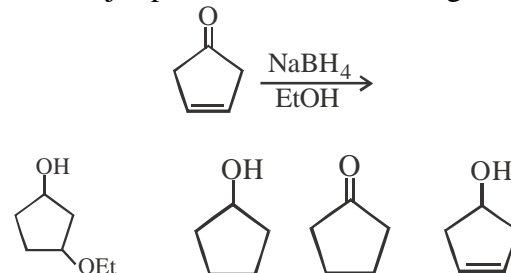
**Q.19** The Mond process is used for the

- (1) extraction of Mo  
 (2) Purification of Ni  
 (3) Purification of Zr and Ti  
 (4) Extraction of Zn

**Q.20** The synonym for water gas when used in the production of methanol is :-

- (1) natural gas    (2) laughing gas  
 (3) syn gas    (4) fuel gas

**Q.21** The major product of the following reaction is:

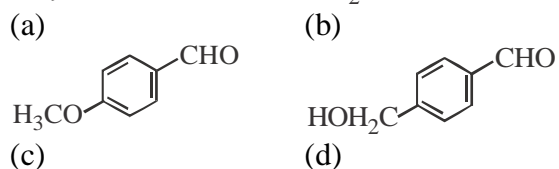


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(1) (2) (3) (4)  
**Q.22** The number of water molecule(s) not coordinated to copper ion directly in  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , is :

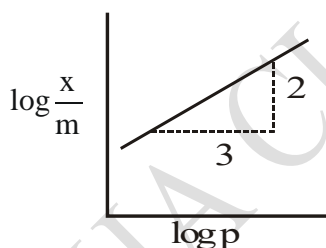
- (1) 4 (2) 3  
 (3) 1 (4) 2

**Q.23** The aldehydes which will not form Grignard product with one equivalent Grignard reagents are :



- (1) b, c, d (2) b, d  
 (3) b, c (4) c, d

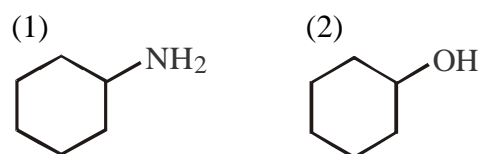
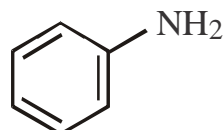
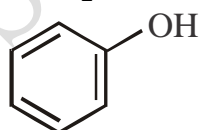
**Q.24** Adsorption of a gas follows Freundlich adsorption isotherm  $x$  is the mass of the gas adsorbed on mass  $m$  of the adsorbent. The plot of  $\log(x/m)$  versus  $\log p$  is shown in the given graph.  $\frac{x}{m}$  is proportional to :



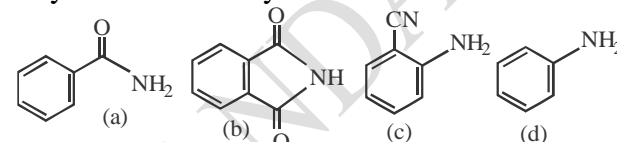
- (1)  $p^{3/2}$  (2)  $p^3$   
 (3)  $p^{2/3}$  (4)  $p^2$

**Q.25** The organic compound that gives following qualitative analysis is :

Test	Inference
(a) Dil. HCl	Insoluble
(b) NaOH solution	Soluble
(c) $\text{Br}_2/\text{water}$	Decolourization

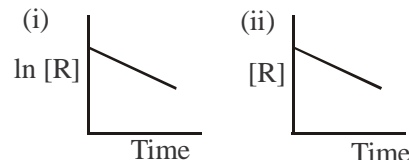


(3) (4)  
**Q.26** The increasing order of reactivity of the following compounds towards reaction with alkyl halides directly is :



- (1) (b) < (a) < (d) < (c)  
 (2) (b) < (a) < (c) < (d)  
 (3) (a) < (c) < (d) < (b)  
 (4) (a) < (b) < (c) < (d)

**Q.27** The given plots represent the variation of the concentration of a reactant R with time for two different reactions (i) and (ii). The respective orders of the reactions are :

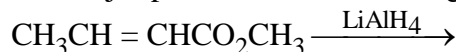


- (1) 1, 0 (2) 1, 1  
 (3) 0, 1 (4) 0, 2

**Q.28** In the Hall-Heroult process, aluminium is formed at the cathode. The cathode is made out of :

- (1) Platinum (2) Carbon  
 (3) Pure aluminium (4) Copper

**Q.29** The major product of the following reaction is :



- (1)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$   
 (2)  $\text{CH}_3\text{CH}=\text{CHCH}_2\text{OH}$   
 (3)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CO}_2\text{CH}_3$   
 (4)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

**Q.30** The effect of lanthanoid contraction in the lanthanoid series of elements by and large means :

- (1) decrease in both atomic and ionic radii.

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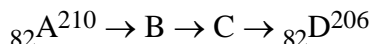
change in colour. What will be the resulting colour?

- (1) White (2) Black  
(3) Silver (4) Golden

**Q.44** If molality of a solution is 0.05 and elevation in boiling point is 0.16 K then, what is the molal elevation constant of the solvent?

- (1) 3.2 (2) 1.6  
(3) 2.2 (4) 2.3

**Q.45** Consider the radioactive disintegration

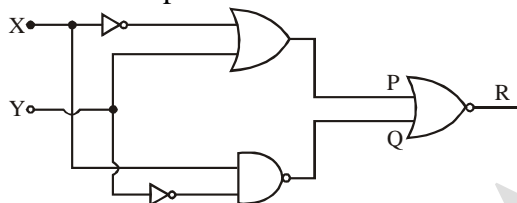


The sequence of emission can be

- (1)  $\beta$ ,  $\beta$ ,  $\beta$  (2)  $\alpha$ ,  $\alpha$ ,  $\beta$   
(3)  $\beta$ ,  $\beta$ ,  $\gamma$  (4)  $\beta$ ,  $\beta$ ,  $\alpha$

### PART B – PHYSICS

**Q.46** To get output '1' at R, for the given logic gate circuit the input values must be :



- (1) X = 0, Y = 1 (2) X = 1, Y = 1  
(3) X = 0, Y = 0 (4) X = 1, Y = 0

**Q.47** The eye can be regarded as a single refracting surface. The radius of curvature of this surface is equal to that of cornea (7.8 mm). This surface separates two media of refractive indices 1 and 1.34. Calculate the distance from the refracting surface at which a parallel beam of light will come to focus.

- (1) 2 cm (2) 1 cm  
(3) 3.1 cm (4) 4.0 cm

**Q.48** A particle undergoing simple harmonic motion has time dependent displacement given by

$$x(t) = A \sin \frac{\pi t}{90}$$

The ratio of kinetic to potential energy of this particle at  $t = 210$  s will be :

- (1) 1/2 (2) 1/9  
(3) 1/3 (4) 1

**Q.49** The force of interaction between two atoms is given by :  $F = \alpha \beta \exp\left(-\frac{x^2}{\alpha kt}\right)$ , where x is the

distance, k is the Boltzmann constant and t is temperature and  $\alpha$  and  $\beta$  are two constants. The dimension of  $\beta$  is :

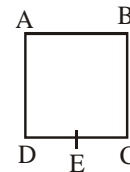
- (1)  $\text{M}^2\text{L}^2\text{T}^{-2}$  (2)  $\text{M}^2\text{LT}^{-4}$   
(3)  $\text{M}^0\text{L}^2\text{T}^{-4}$  (4)  $\text{MLT}^{-2}$

**Q.50** A small speaker delivers 2W of audio output. At what distance from the speaker will one detect 120dB intensity sound ? [Given reference intensity of sound as  $10^{-12} \text{ W/m}^2$ ]

- (1) 10 cm (2) 30 cm  
(3) 40 cm (4) 20 cm

**Q.51** A wire of resistance R is bent to form a square ABCD as shown in the figure. The effective resistance between E and C is :

(E is mid-point of arm CD)



- (1) R (2)  $(1/16) R$   
(3)  $(7/64) R$  (4)  $(3/4) R$

**Q.52** In a radioactive decay chain, the initial nucleus is  ${}_{90}^{232}\text{Th}$ . At the end there are 6  $\alpha$ -particles and 4  $\beta$ -particles which are emitted. If the end nucleus, is  ${}^A_Z\text{X}$ , A and Z are given by :

- (1) A = 208; Z = 80 (2) A = 202; Z = 80  
(3) A = 200; Z = 81 (4) A = 208; Z = 82

**Q.53** An electric field of 1000 V/m is applied to an electric dipole at angle of  $45^\circ$ . The value of electric dipole moment is  $10^{-29} \text{ C.m}$ . What is the potential energy of the electric dipole ?

- (1)  $-9 \times 10^{-20} \text{ J}$  (2)  $-7 \times 10^{-27} \text{ J}$   
(3)  $-10 \times 10^{-29} \text{ J}$  (4)  $-20 \times 10^{-18} \text{ J}$

**Q.54** A particle moves from the point  $(2.0\hat{i} + 4.0\hat{j}) \text{ m}$ , at  $t = 0$ , with an initial velocity

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$(5.0\hat{i} + 4.0\hat{j}) \text{ ms}^{-1}$ . It is acted upon by a constant force which produces a constant acceleration  $(4.0\hat{i} + 4.0\hat{j}) \text{ ms}^{-2}$ . What is the distance of the particle from the origin at time 2s ?

- (1)  $20\sqrt{2}\text{m}$                       (2)  $10\sqrt{2}\text{m}$   
 (3) 5 m                                  (4) 15 m

**Q.55** In a Young's double slit experiment, the path difference, at a certain point on the screen, between two interfering waves is  $(1/8)^{\text{th}}$  of wavelength. The ratio of the intensity at this point to that at the centre of a bright fringe is close to :

- (1) 0.94                                  (2) 0.74  
 (3) 0.86                                  (4) 0.80

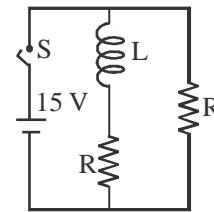
**Q.56** A nucleus A, with a finite de-broglie wavelength  $\lambda_A$ , undergoes spontaneous fission into two nuclei B and C of equal mass. B flies in the same direction as that of A, while C flies in the opposite direction with a velocity equal to half of that of B. The de-Broglie wavelengths  $\lambda_B$  and  $\lambda_C$  of B and C are respectively :-

- (1)  $2\lambda_A, \lambda_A$                       (2)  $\lambda_A, 2\lambda_A$   
 (3)  $\lambda_A, \lambda_A/2$                       (4)  $\lambda_A/2, \lambda_A$

**Q.57** An NPN transistor is used in common emitter configuration as an amplifier with  $1 \text{ k}\Omega$  load resistance. Signal voltage of 10 mV is applied across the base-emitter. This produces a 3 mA change in the collector current and  $15\mu\text{A}$  change in the base current of the amplifier. The input resistance and voltage gain are :

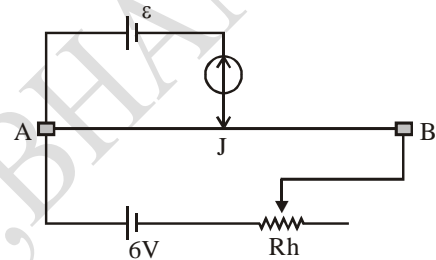
- (1)  $0.33 \text{ k}\Omega, 1.5$                       (2)  $0.67 \text{ k}\Omega, 200$   
 (3)  $0.33 \text{ k}\Omega, 300$                       (4)  $0.67 \text{ k}\Omega, 300$

**Q.58** In the figure shown, a circuit contains two identical resistors with resistance  $R = 5\Omega$  and an inductance with  $L = 2\text{mH}$ . An ideal battery of 15 V is connected in the circuit. What will be the current through the battery long after the switch is closed?



- (1) 6A                                      (2) 7.5A  
 (3) 5.5A                                  (4) 3A

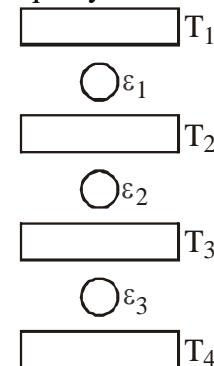
**Q.59** The resistance of the meter bridge AB is given figure is  $4\Omega$ . With a cell of emf  $\varepsilon = 0.5 \text{ V}$  and rheostat resistance  $R_h = 2\Omega$  the null point is obtained at some point J.



When the cell is replaced by another one of emf  $\varepsilon = \varepsilon_2$  the same null point J is found for

- $R_h = 6\Omega$ . The emf  $\varepsilon_2$  is  
 (1) 0.6 V                                  (2) 0.5 V  
 (3) 0.3 V                                  (4) 0.4 V

**Q.60** Three Carnot engines operate in series between a heat source at a temperature  $T_1$  and a heat sink at temperature  $T_4$  (see figure). There are two other reservoirs at temperature  $T_2$ , and  $T_3$ , as shown, with  $T_1 > T_2 > T_3 > T_4$ . The three engines are equally efficient if:



- (1)  $T_2 = (T_1^2 T_4)^{1/3}$  ;  $T_3 = (T_1 T_4^2)^{1/3}$

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(2)  $T_2 = (T_1 T_4^2)^{1/3}$  ;  $T_3 = (T_1^2 T_4)^{1/3}$

(3)  $T_2 = (T_1^3 T_4)^{1/4}$  ;  $T_3 = (T_1 T_4^3)^{1/4}$

(4)  $T_2 = (T_1 T_4)^{1/2}$  ;  $T_3 = (T_1^2 T_4)^{1/3}$

**Q.61** Equation of travelling wave on a stretched string of linear density 5 g/m is  $y = 0.03 \sin(450t - 9x)$  where distance and time are measured in SI units. The tension in the string is :

- (1) 10 N (2) 12.5 N  
(3) 7.5 N (4) 5 N

**Q.62** Two coaxial discs, having moments of inertia  $I_1$  and  $I_1/2$ , are rotating with respective angular velocities  $\omega_1$  and  $\omega_1/2$ , about their common axis. They are brought in contact with each other and thereafter they rotate with a common angular velocity. If  $E_f$  and  $E_i$  are the final and initial total energies, then  $(E_f - E_i)$  is :

- (1)  $\frac{I_1 \omega_1^2}{12}$  (2)  $\frac{3}{8} I_1 \omega_1^2$   
(3)  $\frac{I_1 \omega_1^2}{6}$  (4)  $\frac{I_1 \omega_1^2}{24}$

**Q.63** A paramagnetic material has  $10^{28}$  atoms/m<sup>3</sup>. Its magnetic susceptibility at temperature 350 K is  $2.8 \times 10^{-4}$ . Its susceptibility at 300 K is :

- (1)  $3.672 \times 10^{-4}$  (2)  $3.726 \times 10^{-4}$   
(3)  $3.267 \times 10^{-4}$  (4)  $2.672 \times 10^{-4}$

**Q.64** Water from a pipe is coming at a rate of 100 litres per minute. If the radius of the pipe is 5 cm, the Reynolds number for the flow is of the order of : (density of water = 1000 kg/m<sup>3</sup>, coefficient of viscosity of water = 1mPas)

- (1)  $10^6$  (2)  $10^3$   
(3)  $10^4$  (4)  $10^2$

**Q.65** Two stars of masses  $3 \times 10^{31}$  kg each, and at distance  $2 \times 10^{11}$  m rotate in a plane about their common centre of mass O. A meteorite passes through O moving perpendicular to the star's rotation plane. In order to escape from the gravitational field of this double star, the

minimum speed that meteorite should have at O is :

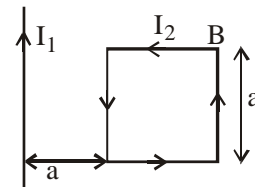
(Take Gravitational constant  $G = 6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$ )

- (1)  $1.4 \times 10^5 \text{ m/s}$  (2)  $24 \times 10^4 \text{ m/s}$   
(3)  $3.8 \times 10^4 \text{ m/s}$  (4)  $2.8 \times 10^5 \text{ m/s}$

**Q.66** A circuit connected to an ac source of emf  $e = e_0 \sin(100t)$  with t in seconds, gives a phase difference of  $\pi/4$  between the emf e and current i. Which of the following circuits will exhibit this ?

- (1) RC circuit with  $R = 1 \text{ k}\Omega$  and  $C = 1 \mu\text{F}$   
(2) RL circuit with  $R = 1 \text{ k}\Omega$  and  $L = 1 \text{ mH}$   
(3) RL circuit with  $R = 1 \text{ k}\Omega$  and  $L = 10 \text{ mH}$   
(4) RC circuit with  $R = 1 \text{ k}\Omega$  and  $C = 10 \mu\text{F}$

**Q.67** A rigid square loop of side 'a' and carrying current  $I_2$  is lying on a horizontal surface near a long current  $I_1$  carrying wire in the same plane as shown in figure. The net force on the loop due to wire will be :



- (1) Attractive and equal to  $\frac{\mu_0 I_1 I_2}{3\pi}$   
(2) Repulsive and equal to  $\frac{\mu_0 I_1 I_2}{4\pi}$   
(3) Repulsive and equal to  $\frac{\mu_0 I_1 I_2}{2\pi}$   
(4) Zero

**Q.68** A current of 5 A passes through a copper conductor (resistivity =  $1.7 \times 10^{-8} \text{ Wm}$ ) of radius of cross-section 5 mm. Find the mobility of the charges if their drift velocity is  $1.1 \times 10^{-3} \text{ m/s}$ .

- (1)  $1.3 \text{ m}^2/\text{Vs}$  (2)  $1.5 \text{ m}^2/\text{Vs}$   
(3)  $1.8 \text{ m}^2/\text{Vs}$  (4)  $1.0 \text{ m}^2/\text{Vs}$

**Q.69** Diameter of the objective lens of a telescope is 250cm. For light of wavelength 600nm coming

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from a distant object, the limit of resolution of the telescope is close to :

- (1)  $1.5 \times 10^{-7}$  rad      (2)  $2.0 \times 10^{-7}$  rad  
 (3)  $3.0 \times 10^{-7}$  rad      (4)  $4.5 \times 10^{-7}$  rad

**Q.70** In a photoelectric experiment, the wavelength of the light incident on a metal is changed from 300nm to 400 nm. The decrease in the stopping potential is close to  $\left(\frac{hc}{e} = 1240 \text{ nm-V}\right)$  :

- (1) 0.5 V      (2) 1.0 V  
 (3) 2.0 V      (4) 1.5 V

**Q.71** Four equal point charges Q each are placed in the xy plane at (0, 2), (4, 2), (4, -2) and (0, -2). The work required to put a fifth charge Q at the origin of the coordinate system will be :

- (1)  $\frac{Q^2}{2\sqrt{2}\pi\epsilon_0}$       (2)  $\frac{Q^2}{4\pi\epsilon_0}\left(1 + \frac{1}{\sqrt{5}}\right)$   
 (3)  $\frac{Q^2}{4\pi\epsilon_0}\left(1 + \frac{1}{\sqrt{3}}\right)$       (4)  $\frac{Q^2}{4\pi\epsilon_0}$

**Q.72** A 27 mW laser beam has a cross-sectional area of  $10 \text{ mm}^2$ . The magnitude of the maximum electric field in this electromagnetic wave is given by [Given permittivity of space  $\epsilon_0 = 9 \times 10^{-12}$  SI units,

Speed of light  $c = 3 \times 10^8 \text{ m/s}$

- (1) 1 kV/m      (2) 2 kV/m  
 (3) 1.4 kV/m      (4) 0.7 kV/m

**Q.73** The ratio of mass densities of nuclei of  $^{40}\text{Ca}$  and  $^{16}\text{O}$  is close to :

- (1) 1      (2) 2  
 (3) 0.1      (4) 5

**Q.74** A steel wire having a radius of 2.0 mm, carrying a load of 4 kg, is hanging from a ceiling. Given that  $g = 3.1 \pi \text{ ms}^{-2}$ , what will be the tensile stress that would be developed in the wire ?

- (1)  $4.8 \times 10^6 \text{ Nm}^{-2}$       (2)  $5.2 \times 10^6 \text{ Nm}^{-2}$   
 (3)  $6.2 \times 10^6 \text{ Nm}^{-2}$       (4)  $3.1 \times 10^6 \text{ Nm}^{-2}$

**Q.75** What will be the molar specific heat at constant volume of an ideal gas consisting of rigid diatomic molecules?

- (1)  $(3/2) R$       (2)  $(5/2) R$   
 (3) R      (4) 3R

**Q.76** We have two spheres, one of which is hollow shell and the other solid. They have identical masses and moment of inertia about their respective diameters. The ratio of their radius is given by:-

- (1) 5 : 7      (2) 3 : 5  
 (3)  $\sqrt{5} : \sqrt{3}$       (4)  $\sqrt{3} : \sqrt{7}$

**Q.77** A particle of mass m is projected with a velocity u making an angle  $\theta$  with the horizontal. The magnitude of angular momentum of projectile about the point of projection, when the particle is at its maximum height H is :-

- (1)  $\mu H$       (2)  $\mu H \cos \theta$   
 (3)  $\mu H \sin \theta$       (4)  $\mu H \tan \theta$

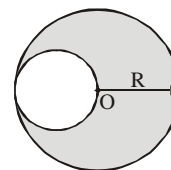
**Q.78** A body of mass m moving with velocity v collides head on with another body of mass 2 m which is initially at rest. The ratio of K.E. of the colliding body before and after collision will be :-

- (1) 1 : 1      (2) 2 : 1  
 (3) 4 : 1      (4) 9 : 1

**Q.79** The ratio of thermal conductivity of two rods of different materials is 5 : 4. The two rods of same area and same thermal resistance will have lengths is the ratio :

- (1) 5 : 4      (2) 1 : 9  
 (3) 9 : 1      (4) 4 : 5

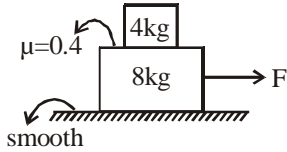
**Q.80** A circular disc of radius R has a uniform thickness. A circular hole of diameter equal to the radius of disc has been cut out as shown. Distance of centre of mass of the remaining disc from point O is :-



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- (1)  $R/14$                       (2)  $R/12$   
 (3)  $R/8$                          (4)  $R/6$

**Q.81** Find the maximum force for which both the block will move with same acceleration.



- (1) 16 N                         (2) 32 N  
 (3) 48 N                         (4) 8 N

**Q.82** When the frequency of the light used is changed from  $4 \times 10^{14} \text{ s}^{-1}$  to  $5 \times 10^{14} \text{ s}^{-1}$ , then angular width of the principal (central) maximum in a single slit Fraunhofer diffraction pattern changes by 0.6 radian. What is the width of the slit (assume that the experiment is performed in vacuum)?

- (1)  $1.5 \times 10^{-7} \text{ m}$             (2)  $3 \times 10^{-7} \text{ m}$   
 (3)  $5 \times 10^{-7} \text{ m}$             (4)  $6 \times 10^{-7} \text{ m}$

**Q.83** A road is 10 m wide. Its radius of curvature is 50m. The outer edge is above the lower edge by a distance of 1.5 m. this road is most suited for the velocity :-

- (1) 2.5 m/s                      (2) 4.5 m/s  
 (3) 6.5 m/s                      (4) 8.5 m/s

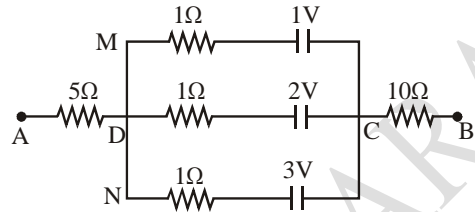
**Q.84** Two balls are projected from the same point simultaneously. First ball is projected vertically upwards and the second ball at an angle of projection  $60^\circ$  to the ground level. Both the balls reach the ground simultaneously. The ratio of their velocities are :

- (1) 1 : 2                         (2) 3 : 2  
 (3)  $\sqrt{3} : 2$                       (4) 2 : 3

**Q.85** An uniform thick string of length 8 m is resting on a horizontal frictionless surface. It is pulled by a horizontal force of 8 N from one end. The tension in the string at 3 m from the force applied is -

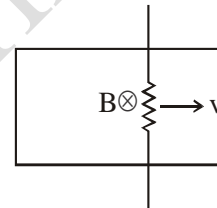
- (1) zero                         (2) 5 N  
 (3) 4 N                         (4) 1 N

**Q.86** In the circuit , the potential difference between A and B is :



- (1) 6 V                         (2) 1 V  
 (3) 3 V                         (4) 2 V

**Q.87** A conducting bar is pulled with a constant speed  $v$  on a smooth conducting rail. The region has a steady magnetic field of induction  $B$  as shown in the figure. If the speed of the bar is doubled then the rate of heat dissipation will



- (1) Remain constant  
 (2) Become quarter of the initial value  
 (3) Become four fold  
 (4) Get doubled

**Q.88** When two sound sources of the same amplitude but of slightly different frequencies  $\nu_1$  and  $\nu_2$  are sounded simultaneously, the sound one hears has a frequency equal to :

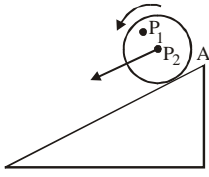
- (1)  $|\nu_1 - \nu_2|$                       (2)  $\left[ \frac{\nu_1 + \nu_2}{2} \right]$   
 (3)  $\sqrt{\nu_1 \nu_2}$                       (4)  $[\nu_1 + \nu_2]$

**Q.89** In which of the following the final image is erect?

- (1) Simple microscope  
 (2) Compound microscope  
 (3) Astronomical telescope  
 (4) none of the above

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- Q.90** For a rolling body, the velocity of  $P_1$  and  $P_2$  are  $\vec{v}_1$  and  $\vec{v}_2$ , respectively :



- (1)  $|\vec{v}_1| = |\vec{v}_2|$       (2)  $\vec{v}_1 = \vec{v}_2$   
 (3)  $|\vec{v}_1| \neq |\vec{v}_2|$       (4) None of these

### PART C – BIOLOGY

- Q.91** What is common between platypus, Kangaroo, and whale ?

- (1) Aquatic habitat      (2) Oviparity  
 (3) Viviparity      (4) Mammary glands

- Q.92** Clover leaf model of RNA represents :-

- (1) Structure of r-RNA  
 (2) Secondary structure of t-RNA  
 (3) Three dimensional structure of t-RNA  
 (4) Structure of m-RNA

- Q.93** In which phylum, the coelom is formed by the splitting of a mesodermal mass ?

- (1) Platyhelminthes      (2) Aschelminthes  
 (3) Mollusca      (4) Echinodermata

- Q.94** Which of the following hormones are related to osteoporosis ?

- (1) Progesterone and Aldosterone  
 (2) Estrogen and Aldosterone  
 (3) Estrogen and parathormone  
 (4) Parathormone and prolactin

- Q.95** Difference between systolic and diastolic pressure is :

- (1) Blood pressure      (2) Pulse pressure  
 (3) Cardiac output      (4) Pulse

- Q.96** In which of the following male heterogamety occurs in :-

- (1) Birds      (2) Human  
 (3) Moths      (4) Honey bee

- Q.97** Which one of the following is not the function of placenta ?

- (1) Secretion of oxytocin during parturition.

- (2) Facilitates supply of oxygen and nutrient to embryo  
 (3) Secretion of oestrogen.  
 (4) Facilitates removal of  $\text{CO}_2$  & waste material from embryo.

- Q.98** The 20 different amino acid have different :-

- (1) R-group      (2) Carboxylic group  
 (3) Peptide bond      (4) Amino group

- Q.99** The region of the eye where optic nerve leave the eye is called :-

- (1) Fovea      (2) Blind spot  
 (3) Iris      (4) Optic chiasma

- Q.100** Which is main replicating enzyme in E.coli ?

- (1) DNA polymerase-III      (2) DNA ligase  
 (3) Topoisomerase      (4) Primase

- Q.101** Which of the following pairs are correctly matched

- |                 |                                |
|-----------------|--------------------------------|
| I. S-phase      | DNA replication                |
| II. Zygotene    | Synapsis                       |
| III. Pachytene  | Crossing over                  |
| IV. Meiosis     | Both haploid and diploid cells |
| V. $G_2$ -phase | Quiescent state                |

- (1) I, II & III      (2) III & IV  
 (3) III & V      (4) I, III & V

- Q.102** Read the given statements

- (a) CO affects the lungs activity  
 (b) CO affects the diaphragm and inter-costal muscles  
 (c) CO affinity to Hb is equal to oxygen  
 (d) CO combines with Hb and its product cannot be dissociated

Select appropriate answer

- (1) a-True, b-True, c-False, d-False  
 (2) a-True, b-False, c-True, d-False  
 (3) a-False, b-False, c-True, d-True  
 (4) a-False, b-False, c-False, d-True

- Q.103** Light and non-sticky pollen grains are favourable for :-

- (1) Insect pollinated plants  
 (2) Bird pollinated plants  
 (3) Bat pollinated plants  
 (4) Wind pollinated plants

**Q.104** Which of the following is showing adaptive radiation

- (1) Lemur - sugar glider
- (2) Wombat - bandicoot
- (3) Kangaroo - Koala
- (4) (2) & (3) both

**Q.105** Read the following four statements (a-d) carefully:

- (a) In five kingdom classification, bacteria are included in kingdom protista.
- (b) Bacteria may be autotrophic or heterotrophic in their mode of nutrition.
- (c) Members of kingdom fungi show a great diversity in structure and habitat.
- (d) The kingdom plantae includes all multicellular eukaryotic chlorophyll containing organisms.

How many of the above statement are not correct?

- (1) 3
- (2) 4
- (3) 2
- (4) 1

**Q.106** Read the following statement :-

- (a) The hepatic portal vein carries blood from intestine to the liver.
- (b) Heart failure means the state of heart when it is not pumping blood effectively enough to meet the need of the body part.
- (c) Adrenal medullary hormones can also decrease the cardiac output.
- (d) During a cardiac cycle, both ventricle pumps out approximately 5 L of blood.

How many statements are correct ?

- (1) One
- (2) Two
- (3) Three
- (4) Four

**Q.107** How many of these hormones help in increasing RBC count :-

Renin, erythropoietin, growth hormone, cortisol, thyroxine, estrogen, epinephrine.

- (1) Three
- (2) Four
- (3) Two
- (4) Five

**Q.108** Which of the following statement incorrect about satellite DNA ?

- (1) Satellite DNA shows high degree of

polymorphism

- (2) Highly repetitive DNA
- (3) Satellite DNA is non-coding
- (4) Satellite DNA codes for specific proteins

**Q.109** In potato, genotype aabbccdd produces 50g potatoes and AABBCCDD produces 90 gm. potatoes what is the production of potatoes in plant with genotype AAbbccdD :-

- (1) 35g
- (2) 65g
- (3) 82.5 g
- (4) 75 g

**Q.110** Match the following column I with column II:-

**Column I**

**Column II**

- |               |                                 |
|---------------|---------------------------------|
| a. Chromatin  | i. Secondary constriction       |
| b. Nucleolus  | ii. Primary constriction        |
| c. Centromere | iii. Nucleoprotein fibre        |
| d. NOR        | iv. Active r-RNA synthesis site |

- (1) a-iv, b-iii, c-ii, d-i
- (2) a-iii, b-iv, c-ii, d-i
- (3) a-iv, b-iii, c-i, d-ii
- (4) a-iii, b-iv, c-i, d-ii

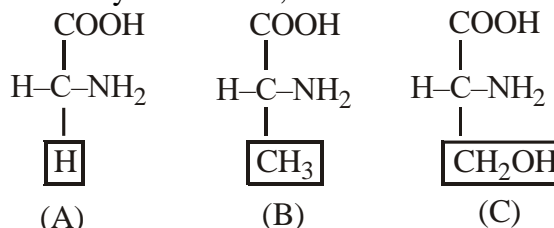
**Q.111** Which of the following statement is false ?

- (1) Multipolar neuron found in the cerebral cortex
- (2) unipolar neuron found usually in embryonic stage.
- (3) Bipolar neuron found in Retina
- (4) The Axons transmit nerve impulses towards the cell body.

**Q.112** Both erythrocytes and leucocytes are formed in :-

- (1) Lymph nodes
- (2) Bone marrow
- (3) Thymus
- (4) Arterial wall

**Q.113** Identify structure A, B and C ?



Option :

- (1) A-Alanine, B-Serine, C-Glycine
- (2) A-Glycine, B-Serine, C-Alanine
- (3) A-Glycine, B-Alanine, C-Serine
- (4) A-Glycine, B-Alanine, C-Valine

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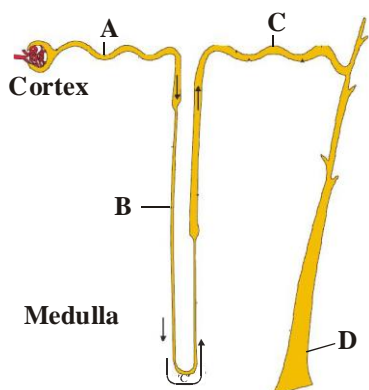
- Q.114** Oral contraceptive pills have :  
 (1) Progestogens alone  
 (2) Estrogen alone  
 (3) Progestogen-estrogen combination  
 (4) Either (1) or (3)
- Q.115** Arrange the following plant groups in ascending order with respect to the gradual reduction of gametophytic stage :  
 a. Bryophyta                      b. Pteridophytes  
 c. Angiosperm                    d. Gymnosperm  
 (1) a, b, c, d                      (2) b, c, d, a  
 (3) a, b, d, c                      (4) b, d, c, a
- Q.116** Water transport system is characteristic feature of which phylum ?  
 (1) Annelida                      (2) Porifera  
 (3) Coelenterata                (4) Mollusca
- Q.117** The exocrine portion of pancreas secretes :  
 (1) Insulin and Glucagon  
 (2) Trypsinogen and nucleases  
 (3) Nucleosides  
 (4) Pepsin & Chymotrypsin
- Q.118** Which of the following species has adaptation of meeting all its water requirements by internal fat oxidation ?  
 (1) Kangaroo rat                (2) Snail  
 (3) Cactus                        (4) Humming bird
- Q.119** Habitat together with function of species constitute its :  
 (1) Trophic level                (2) Boundary  
 (3) Topography                 (4) Niche
- Q.120** Identify the correct match from the column-I, II and III.

Column-I		Column-II		Column-III	
(I)	Wheat	(a)	<i>Homo</i>	(i)	Monocotyledonae
(II)	Man	(b)	<i>Musca</i>	(ii)	Dicotyledonae
(III)	Mango	(c)	<i>Mangifera</i>	(iii)	Insecta
(IV)	Housefly	(d)	<i>Triticum</i>	(iv)	Mammalia

- (1) I-d-i, II-a-iv, III-c-ii, IV-b-iii  
 (2) I-c-ii, II-b-iii, III-d-ii, IV-a-iv  
 (3) I-b-iii, II-c-ii, III-a-iv, IV-d-i  
 (4) I-a-iv, II-d-i, III-b-iii, IV-c-ii

- Q.121** Which of the following epithelial tissue is present in fallopian tube ?  
 (1) Ciliated cuboidal epithelium  
 (2) Ciliated columnar epithelium  
 (3) Steriociliated columnar epithelium  
 (4) Brush bordered columnar epithelium
- Q.122** Which one is **wrongly** matched ?  
 (1) 1<sup>st</sup> step of PCR – Denaturation  
 (2) 1<sup>st</sup> clinical gene therapy – AIDS  
 (3) Recognition sequence of EcoRI  
 –5'GAATTC3', 3'CTTAAG 5'  
 (4) Secondary treatment of STP  
 – Reduce BOD of effluent
- Q.123** Primary structure of a protein relates to ?  
 (1)  $\alpha$ -helical folding of a polypeptide  
 (2) Association of two polypeptides  
 (3) The sequence of amino acid  
 (4)  $\beta$ -pleated sheet folding of a polypeptide
- Q.124** Which of the following is the correct match of salivary gland with its location ?  
 (1) Parotid-below tongue  
 (2) Sub-maxillary-below ear  
 (3) Sub-mandibular-lower jaw  
 (4) Sub lingual-cheek
- Q.125** 70-80% of electrolyte and water reabsorbed in which part of nephron :-  
 (1) PCT                              (2) DCT  
 (3) Henle's loop                 (4) Collecting duct
- Q.126** How many plants in the list given below are members of Liliaceae family?  
 Tulip, Gloriosa, Petunia, Brinjal, Asparagus, Colchicine, sesbania, Trifolium, Lupin, *Aloe*, Sun-Flower, Grass, Onion, Sun-hemp.  
 (1) Six                                (2) Five  
 (3) Seven                            (4) Eight
- Q.127** Parts A, B, C and D of Nephron are shown in the diagram select the option which is incorrect with it's function

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- (1) A – 70-80% water reabsorption
- (2) B – permeable to salts
- (3) C – Selective secretion of  $H^+$  and  $K^+$  ions and maintain pH
- (4) D– allows passage of small amount of urea into the medullary interstitium and help to produce concentrated urine

**Q.128** Identify the Mis-Match :

- (1) Joseph Priestley – Bell Jar experiment
- (2) Jan Ingenhousz –  $O_2$  Release from green part of plant
- (3) T.W. Engelmann – Action spectrum of photosynthesis
- (4) Van Neil – Light reaction

**Q.129** Which of the following is incorrectly matched in the given table ?

	Crop	Variety	Insect pests
1	Rapeseed mustard	Pusa Gaurav	Aphid
2	Flat bean	Pusa sem-2 & 3	Jassid, Aphids and Fruit borer
3	Okra	Pusa sawani	Shoot and fruit borer
4	Maize	Pusa snowball K-1	Leaf beetle

**Q.130** Match the column.

**Column-I**

- A. Sulphur
- B. Zinc
- C. Magnesium
- D. Molybdenum

**Column-II**

- i. Chlorophyll
- ii. Nitrogenase
- iii. Methionine
- iv. Auxin

- (1) A-i; B-ii; C-iii; D-iv
- (2) A-iii; B-iv; C-i; D-ii
- (3) A-ii; B-iv; C-i; D-iii
- (4) A-iv; B-iii; C-ii; D-i

**Q.131** One of the synthetic auxin :-

- (1) IAA
- (2) ABA
- (3) 2, 4-D
- (4) GA

**Q.132** Which one of the following pairs of plants are not seed producers?

- (1) *Ficus* and *Sphagnum*
- (2) *Pinus* and *Azolla*
- (3) *Fern* and *Funaria*
- (4) *Funaria* and *Ficus*

**Q.133** Which of the following drug is a narcotic analgesic?

- (1) Diclofenac sodium
- (2) Paracetamol
- (3) Barbiturates
- (4) Diacetyl morphine

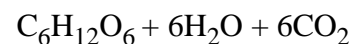
**Q.134** Match the following :

- |  |                     |
|--|---------------------|
| (I) Interval between mitosis and initiation of DNA replication | (a) Synthesis phase |
| (II) Complete separation of daughter chromatids                | (b) Telophase       |
| (III) Doubling of amount of DNA                                | (c) $G_2$ phase     |
| (IV) Chromosome lost their identity as discrete elements       | (d) Anaphase        |
|  | (e) Metaphase       |
|  | (f) $G_1$ phase     |

- (1) I-a, II-b, III-d, IV-e
- (2) I-f, II-d, III-a, IV-b
- (3) I-c, II-e, III-d, IV-b
- (4) I-b, II-a, III-e, IV-d

**Q.135** Fermentation is represented by the equation :

- (1)  $C_6H_{12}O_6 \rightarrow 6CO_2 + 6H_2O + 673 \text{ Kcal}$
- (2)  $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 6CO_2 + 18 \text{ Kcal}$
- (3)  $6CO_2 + 12H_2O \xrightarrow{\text{Light}}$



- (4)  $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6CO_2$

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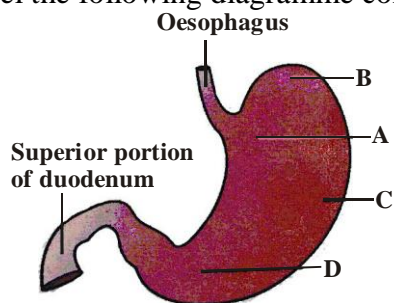
**Q.136** If stomach does not produce HCl the which enzyme will work for longer time period than its usual time

- (1) Amylopsin (2) Rennin  
(3) Ptyalin (4) Gastric lipase

**Q.137** Which of the following is not the characteristics of species susceptible to extinction :

- (1) Large body size  
(2) High reproductive rate  
(3) Feeding at top consumer level  
(4) Fixed habitat

**Q.138** Label the following diagramme correctly :



- (1) A-fundic part, B-cardiac part, C-body, D-pyloric part  
(2) A-cardiac part, B-fundic part, C-body, D-pyloric part  
(3) A-body, B-fundic part, C-cardiac part, D-pyloric part  
(4) A-fundic part, B-body, C-cardiac part, D-pyloric part

**Q.139** The Abingdon tortoise in Galapagos island become extinct within decade after goats were introduced on the island is an example of :

- (1) Competitive release  
(2) Resource partitioning  
(3) Competition direct  
(4) Competitive exclusion

**Q.140** Mitochondrial matrix contains the enzymes for:-

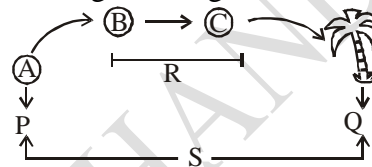
- (1) Photosynthesis  
(2) Glycolysis and TCA cycle  
(3) TCA cycle  
(4) TCA cycle and electron transport

**Q.141** Arrange the following events of life cycle of Bryophyte in correct sequence :

- I. Germination of spore  
II. Gametes formation  
III. Formation of Gametophyte  
IV. Fertilization  
V. Embryo formation

- (1) I, III, IV, V, II (2) II, IV, I, V, III  
(3) III, II, IV, V, I (4) V, I, II, III, IV

**Q.142** In the given diagram S is ?



- (1) Seral Community (2) Sere  
(3) Pioneer Community (4) Climax Community

**Q.143** Calculate the frequency of  $L^N$  alleles :

Blood group	Genotype	No. of individual
M	$L^M L^M$	1787
MN	$L^M L^N$	3089
N	$L^N L^N$	1303

- (1) 54% (2) 64%  
(3) 46% (4) 36%

**Q.144** Which of the following is correctly match :-

- (1) Iron – Plant obtain in the form of  $Fe^{+2}$   
(2) Potassium – Involve in protein synthesis  
(3) Sulphur – Activates enzyme carboxylase  
(4) Molybdenum – Splitting of water during photosynthesis

**Q.145** The method in which alien DNA is directly injected into the nucleus of an animal cell is known as :

- (1) Biolistic (2) Micro-injection  
(3) Electroporation (4) Heat-shock treatment

**Q.146** Ecosystems need a constant supply of energy to synthesise the molecules they require to

- (1) Increase the photosynthetic efficiency.  
(2) Reduce respiratory loss.  
(3) Counteract the universal tendency toward increasing disorderliness.  
(4) Control the worst impacts of predation.

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**Q.147** Consider the following statements and select the correct ones.

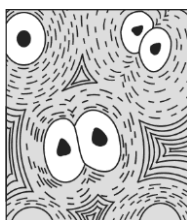
- The most obvious and technically complicated features are metabolism and consciousness.
- Growth and reproduction are mutually inclusive events for euglenoids and chrysophytes.
- Generally, families and orders are identified on the basis of aggregates of vegetative characters only.
- Herbarium serves as quick referral system in taxonomical studies.

- (1) b, c & d                      (2) a, c & d  
 (3) b & d                         (4) a, b, c & d

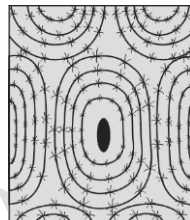
**Q.148** If father is affected with defective enamel of teeth and mother is normal then :-

- All children will be affected.
- Only male child will be affected.
- Only female child will be affected.
- One male and all female children will be affected

**Q.149** Presence of lamellae is the characteristic feature of



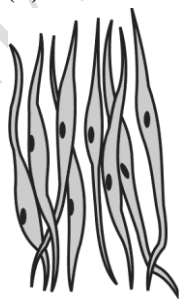
(1)



(2)



(3)



(4)

**Q.150** Plants of coastal biome have special structure for breathing, that is modified \_\_\_\_ in \_\_\_\_.

- (1) Tap root, *Pandanus*

- Adventitious root, *Avicennia*
- Tap root, *Rhizophora*
- Fibrous root, *Sonneratia*

**Q.151** What type of ecological succession would operate often a volcanic eruption and forest fire?

- Primary succession
- Primary and secondary succession respectively
- Secondary succession
- Secondary & primary succession respectively

**Q.152** Chargaff's rule is applicable's to :

- Single stranded RNA
- Double stranded DNA
- Single stranded DNA
- Single stranded DNA and RNA

**Q.153** Hydroponics is a system of growing plants in:-

- Soil less culture of solution culture
- Acidic soil
- Soil less culture with alkaline pH
- Soil less culture with acidic pH

**Q.154** Which of the following plant is found in Mangroove forest ?

- Shorea robusta*
- Rhizophora*
- Tectona grandis*
- Pinus*

**Q.155** A very effective sedative and painkiller which is useful for patients who have undergone surgery is

- Opium in raw form
- Morphine
- Diacetylmorphine
- Barbiturates

**Q.156** Find out the correct developmental sequence in embryogeny for the following structures:

- Heart shaped stage
  - Two-celled stage
  - Globular stage
  - Mature embryo
- b, a, c, d
  - c, b, a, d
  - b, c, d, a
  - b, c, a, d

**Q.157** Parasitic worm which is dioecious and have internal fertilization is

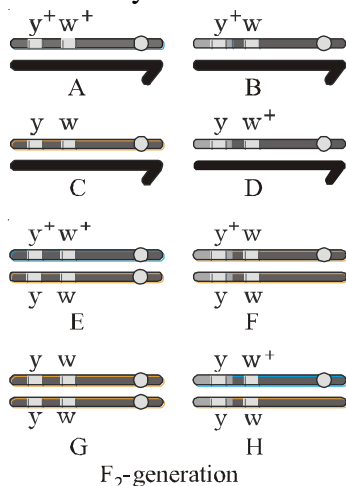
- Hirudinaria*
- Ascaris*
- Taenia*
- Nereis*

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**Q.158** DNA fingerprinting involves identifying differences in some specific regions in DNA sequences called as :

- (1) Repetitive DNA (2) Non-repetitive DNA  
(3) Satellite DNA (4) (1) & (3) both

**Q.159** Select recombinant progenies from  $F_2$ -generation of dihybrid cross performed by Morgan in fruitfly.



- (1) B, D, F, H (2) A, C, E, G  
(3) B, C, F, G (4) A, D, F, G

**Q.160** Which of the following is a viral disease :-

- (1) Malaria (2) Typhoid  
(3) Hepatitis B (4) Plague

**Q.161** 'Pomato' has been produced as the result of :-

- (1) Interspecific hybridisation between potato and tomato.  
(2) Somatic hybridisation.  
(3) Mutation breeding.  
(4) Recombinant DNA technique.

**Q.162** Forelimbs of cat, lizard used in walking; forelimbs of whale used in swimming and forelimbs of bats used in flying are an example of :

- (1) Analogous organs (2) Vestigial organ  
(3) Homologous organs (4) Convergent evolution

**Q.163** Choose the **incorrectly** matched pair:

- (1) Syncarpous pistil – *Hibiscus*  
(2) Apocarpous pistil – *Michelia*

(3) Monosporic embryo sac – *Polygonum*

(4) Cleistogamous flower – *Mirabilis*

**Q.164** Removal of RNA polymerase -II from nucleoplasm will affect the synthesis of :

- (1) tRNA (2) 5s rRNA  
(3) hnRNA (4) 28s rRNA

**Q.165** Which one of the following option gives the correct categorisation of three examples according to the type of species (A, B, C) they give out ?

	A Key stone species	B Critical link species	C Endemic species
(1)	Meta sequoia in china valley	lion in forest	Mycorrhizal fungi
(2)	Kangaroo in Australia	Fig tree in tropical forest	Pollinator insect
(3)	Kangaroo Rat in Desert	Mycorrhizal fungi	Meta sequoia in china valley
(4)	Lion in forest	Kangaroo in Australia	Pollinator Insect

**Q.166** The immunity responsible for graft rejection is

- (1) Humoral immunity  
(2) Antibody mediated immunity  
(3) Cell mediated immunity  
(4) Both (2) & (3)

**Q.167** The redox equivalents as two hydrogen atoms are released from 5-C substrate in aerobic respiration by the activity of enzyme

- (1) Pyruvate dehydrogenase  
(2) Phosphoglyceraldehyde dehydrogenase  
(3)  $\alpha$ -Ketoglutarate dehydrogenase  
(4) Malate dehydrogenase

**Q.168** Temperature variation in Pacific ocean in present time is called :

- (1) Cyclone effect (2) ElNino effect  
(3) Green house effect (4) Gaudikov's effect

**Q.169** Common cold differs from pneumonia in that –

- (1) Pneumonia is caused by a virus while the common cold is caused by the bacterium *Haemophilus influenzae*.

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- (2) Pneumonia pathogen infects alveoli whereas the common cold affects nose and respiratory passage but not the lungs.
- (3) Pneumonia is a communicable disease whereas the common cold is a nutritional deficiency disease
- (4) Pneumonia can be prevented by a live attenuated bacterial vaccine whereas the common cold has no effective vaccine.

**Q.170** Select the **incorrect** statement w.r.t. ringworm infection in humans.

- (1) Ringworm infections thrive in body parts having high moisture and high temperature conditions.
- (2) Ringworms in groin area is called *Tinea cruris*
- (3) Ringworm disease is caused by nematode parasites or round worms which have circular bodies in cross section.
- (4) Ringworms spread through direct contact or by sharing clothes and towels with infected individuals.

**Q.171** An antibiotic resistance gene of plasmid vector which get inactivated due to insertion of alien DNA, helps in the selection of–

- (1) Transformants (2) Recombinants  
(3) Non-Transformants (4) 2 & 3 both

**Q.172** Which of the following set of products are produced by bacteria?

- a. Curd b. Penicillin  
c. Acetic acid d. Streptokinase
- (1) b, c and d (2) a, c and d  
(3) a, b and c (4) a, b and d

**Q.173** Himgiri is a variety of wheat. It is resistant for :

- (1) White rust (2) Leaf rust  
(3) Black rot (4) Leaf curl

**Q.174** Mosses have –

- (1) Dependent gametophyte possessing spore forming stage.
- (2) Elaborate mechanism of spores dispersal.
- (3) Unicellular rhizoids
- (4) Mitospores producing structure known as capsule.

**Q.175** Consider the following statements and select the correct ones.

- a. Total number of N-glycosidic linkages in bacteriophage  $\phi \times 174$  is 5386.
- b. Two nucleotides are linked through 5'-3' phosphodiester bond.
- c. The pitch of the DNA helix is 3.4 Å.
- d. Stability of the DNA helical structure is conferred by H-bonds and the plane of one base pair stacks over the other.
- e. The average rate of polymerisation of DNA polymerase III is 2000 bp per second.

- (1) a, b & c (2) a, d & e only  
(3) a, b, d & e (4) a, c, d & e

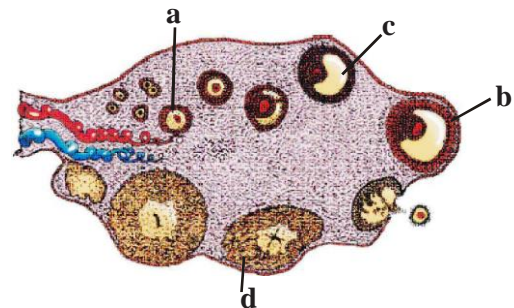
**Q.176** The continued formation and accumulation of secondary xylem leads to

- (1) Obliteration of primary xylem.  
(2) Gradual crushing of primary phloem only.  
(3) Crushing of primary and secondary phloem gradually.  
(4) Loss of heartwood and pith.

**Q.177** In case of a female who suffers from anovulation but has normal physiological conditions available for carrying out fertilization and embryonic development; the preferred ART should be

- (1) ZIFT (2) GIFT  
(3) ET (4) ICSI

**Q.178** The figure given below shows section view of ovary which describe development of follicle (A, B, C and D). Select the option with correct identification.



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	a	b	c	d
(1)	Secondary follicle	Tertiary follicle	Graafian follicle	Corpus luteum
(2)	Primary follicle	Graafian follicle	Tertiary follicle	Corpus luteum
(3)	Secondary follicle	Graafian follicle	Tertiary follicle	Corpus luteum
(4)	Primary follicle	Tertiary follicle	Graafian follicle	Corpus luteum

**Q.179** The interval between mitosis and synthesis phase is characterised by

- (1) Replication of DNA
- (2) Synthesis of tubulin proteins
- (3) Synthesis of deoxyribonucleotides
- (4) Centrioles duplication

**Q.180** Which one of the following is incorrectly matched?

- (1) Turner's syndrome – AA + XO
- (2) Intersex *Drosophila* – AAA + XXY
- (3) Sickle cell anaemia – Transition mutation
- (4) Thalassaemia – Frameshift mutation

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