

# NEET 2020

## FULL TEST-1

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.

Name : .....

Address : .....

.....

Phone/Mobile No. ....

Roll No. ....

**PART A – CHEMISTRY**

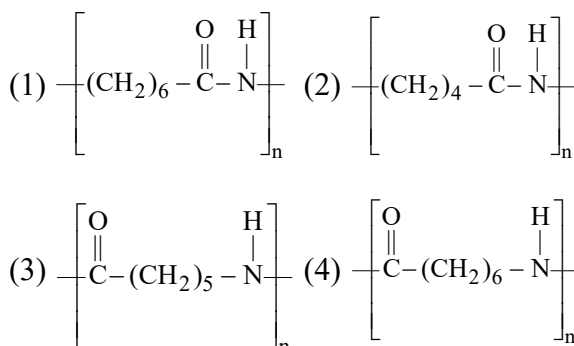
**Q.1** The vapour pressures of pure liquids A and B are 400 and 600 mmHg, respectively at 298K. On mixing the two liquids, the sum of their initial volumes is equal to the volume of the final mixture. The mole fraction of liquid B is 0.5 in the mixture. The vapour pressure of the final solution, the mole fraction of components A and B in vapour phase, respectively are-

- (1) 500 mmHg, 0.5, 0.5  
 (2) 450 mmHg, 0.4, 0.6  
 (3) 450 mmHg, 0.5, 0.5  
 (4) 500 mmHg, 0.4, 0.6

**Q.2** The correct order of the oxidation states of nitrogen in NO, N<sub>2</sub>O, NO<sub>2</sub> and N<sub>2</sub>O<sub>3</sub> is :

- (1) NO<sub>2</sub> < N<sub>2</sub>O<sub>3</sub> < NO < N<sub>2</sub>O  
 (2) NO<sub>2</sub> < NO < N<sub>2</sub>O<sub>3</sub> < N<sub>2</sub>O  
 (3) N<sub>2</sub>O < N<sub>2</sub>O<sub>3</sub> < NO < NO<sub>2</sub>  
 (4) N<sub>2</sub>O < NO < N<sub>2</sub>O<sub>3</sub> < NO<sub>2</sub>

**Q.3** The structure of Nylon-6 is :



**Q.4** An element has a face-centred cubic (fcc) structure with a cell edge of a. The distance between the centres of two nearest tetrahedral voids in the lattice is :

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

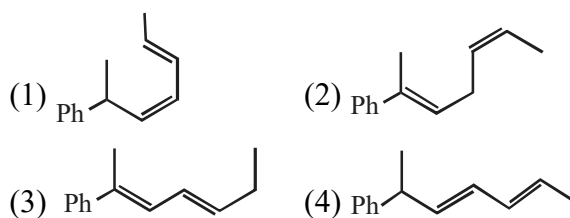
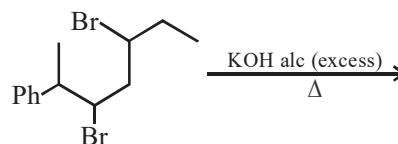
**Q.5** K<sub>2</sub>HgI<sub>4</sub> is 40% ionised in aqueous solution. The value of its van't Hoff factor (i) is :-

- (1) 1.8                                      (2) 2.2  
 (3) 2.0                                      (4) 1.6

**Q.6** In the reaction of oxalate with permanganate in acidic medium, the number of electrons involved in producing one molecule of CO<sub>2</sub> is :

- (1) 10                                      (2) 2  
 (3) 1                                        (4) 5

**Q.7** The major product of the following reaction is



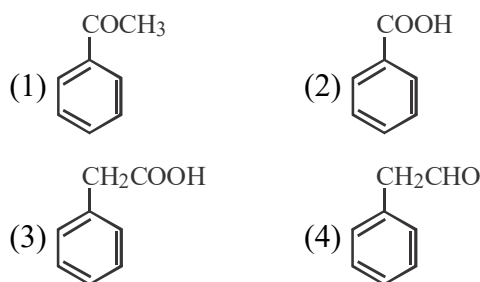
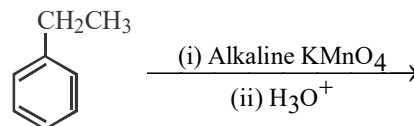
**Q.8** The one that is not a carbonate is :

- (1) bauxite                                (2) siderite  
 (3) calamine                              (4) malachite

**Q.9** The lanthanide ion that would show colour is-

- (1) Sm<sup>3+</sup>                                      (2) La<sup>3+</sup>  
 (3) Lu<sup>3+</sup>                                      (4) Gd<sup>3+</sup>

**Q.10** The major product of the following reaction is :



**Q.11** The correct order of hydration enthalpies of alkali metal ions is -

- (1) Li<sup>+</sup> > Na<sup>+</sup> > K<sup>+</sup> > Rb<sup>+</sup> > Cs<sup>+</sup>  
 (2) Li<sup>+</sup> > Na<sup>+</sup> > K<sup>+</sup> > Cs<sup>+</sup> > Rb<sup>+</sup>  
 (3) Na<sup>+</sup> > Li<sup>+</sup> > K<sup>+</sup> > Rb<sup>+</sup> > Cs<sup>+</sup>  
 (4) Na<sup>+</sup> > Li<sup>+</sup> > K<sup>+</sup> > Cs<sup>+</sup> > Rb<sup>+</sup>

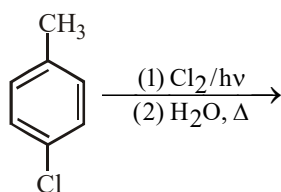
SPACE FOR ROUGH WORK

**Q.12** Thermal decomposition of a Mn compound (X) at 513 K results in compound Y,  $\text{MnO}_2$  and a gaseous product.  $\text{MnO}_2$  reacts with  $\text{NaCl}$  and concentrated  $\text{H}_2\text{SO}_4$  to give a pungent gas Z.

X, Y and Z, respectively are –

- (1)  $\text{K}_2\text{MnO}_4$ ,  $\text{KMnO}_4$  and  $\text{SO}_2$
- (2)  $\text{K}_2\text{MnO}_4$ ,  $\text{KMnO}_4$  and  $\text{Cl}_2$
- (3)  $\text{K}_3\text{MnO}_4$ ,  $\text{K}_2\text{MnO}_4$  and  $\text{Cl}_2$
- (4)  $\text{KMnO}_4$ ,  $\text{K}_2\text{MnO}_4$  and  $\text{Cl}_2$

**Q.13** The major product of the following reaction is:



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

**Q.14** An organic compound neither reacts with neutral ferric chloride solution nor with Fehling solution, It however, reacts with Grignard reagent and gives positive iodoform test. The compound is -

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

**Q.15** The element having greatest difference between its first and second ionization energies, is :

- (1) Ca
- (2) K
- (3) Ba
- (4) Sc

**Q.16** The metal that gives hydrogen gas upon treatment with both acid as well as base is :

- (1) zinc
- (2) iron
- (3) magnesium
- (4) mercury

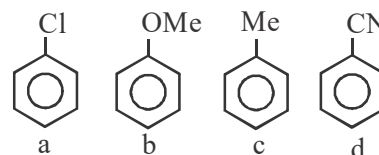
**Q.17** The correct statements among I to III regarding group 13 element oxides are,

- (I) Boron trioxide is acidic.  
 (II) Oxides of aluminium and gallium are amphoteric.  
 (III) Oxides of indium and thallium are basic.
- (1) (I), (II) and (III)
  - (2) (II) and (III) only
  - (3) (I) and (III) only
  - (4) (I) and (II) only

**Q.18**  $\Lambda_m^\circ$  for  $\text{NaCl}$ ,  $\text{HCl}$  and  $\text{NaA}$  are 126.4, 425.9 and  $100.5 \text{ S cm}^2 \text{ mol}^{-1}$ , respectively. If the conductivity of  $0.001 \text{ M HA}$  is  $5 \times 10^{-5} \text{ S cm}^{-1}$ , degree of dissociation of  $\text{HA}$  is :

- (1) 0.75
- (2) 0.125
- (3) 0.25
- (4) 0.50

**Q.19** The increasing order of reactivity of the following compounds towards aromatic electrophilic substitution reaction is :



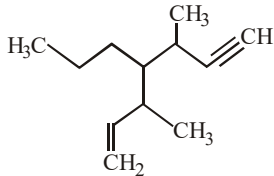
- (1)  $d < b < a < c$
- (2)  $a < b < c < d$
- (3)  $d < a < c < b$
- (4)  $b < c < a < d$

**Q.20** The correct option among the following is :

- (1) Colloidal particles in lyophobic sols can be precipitated by electrophoresis.
- (2) Brownian motion in colloidal solution is faster the viscosity of the solution is very high.
- (3) Colloidal medicines are more effective because they have small surface area.
- (4) Addition of alum to water makes it unfit for drinking.

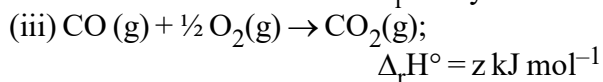
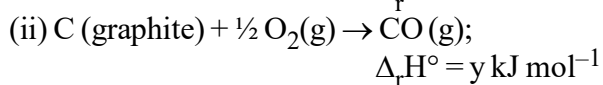
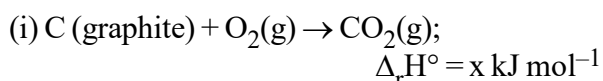
SPACE FOR ROUGH WORK



- Q.28** The correct statement among the following is  
 (1)  $(\text{SiH}_3)_3\text{N}$  is pyramidal and more basic than  $(\text{CH}_3)_3\text{N}$ .  
 (2)  $(\text{SiH}_3)_3\text{N}$  is planar and more basic than  $(\text{CH}_3)_3\text{N}$ .  
 (3)  $(\text{SiH}_3)_3\text{N}$  is pyramidal and less basic than  $(\text{CH}_3)_3\text{N}$ .  
 (4)  $(\text{SiH}_3)_3\text{N}$  is planar and less basic than  $(\text{CH}_3)_3\text{N}$ .
- Q.29** 8g of NaOH is dissolved in 18g of  $\text{H}_2\text{O}$ . Mole fraction of NaOH in solution and molality (in  $\text{mol kg}^{-1}$ ) of the solutions respectively are :  
 (1) 0.167, 11.11 (2) 0.2, 22.20  
 (3) 0.2, 11.11 (4) 0.167, 22.20
- Q.30** In the Kjeldahl's method for estimation of nitrogen present in a soil sample, ammonia evolved from 0.75 g of sample neutralized 10mL of 1 M  $\text{H}_2\text{SO}_4$ . The percentage of nitrogen in the soil is –  
 (1) 37.33 (2) 45.33  
 (3) 35.33 (4) 43.33
- Q.31** 25 ml of the given HCl solution requires 30 mL of 0.1 M sodium carbonate solution. What is the volume of this HCl solution required to titrate 30mL of 0.2 M aqueous NaOH solution?  
 (1) 25 mL (2) 50 mL  
 (3) 12.5 mL (4) 75 mL
- Q.32** Enthalpy of sublimation of iodine is 24  $\text{cal g}^{-1}$  at 200°C. If specific heat of  $\text{I}_2(\text{s})$  and  $\text{I}_2(\text{vap})$  are 0.055 and 0.031  $\text{cal g}^{-1}\text{K}^{-1}$  respectively, then enthalpy of sublimation of iodine at 250°C in  $\text{cal g}^{-1}$  is :  
 (1) 2.85 (2) 11.4  
 (3) 5.7 (4) 22.8
- Q.33** Given that :  $E^0_{\text{O}_2/\text{H}_2\text{O}} = +1.23 \text{ V}$ ,  
 $E^0_{\text{S}_2\text{O}_8^{2-}/\text{SO}_4^{2-}} = +2.05 \text{ V}$ ,  
 $E^0_{\text{Br}_2/\text{Br}^-} = +1.09 \text{ V}$ ,  $E^0_{\text{Au}^{3+}/\text{Au}} = +1.4 \text{ V}$
- The strongest oxidizing agent is -  
 (1)  $\text{O}_2$  (2)  $\text{Br}_2$   
 (3)  $\text{S}_2\text{O}_8^{2-}$  (4)  $\text{Au}^{3+}$
- Q.34** The highest possible oxidation states of uranium and plutonium, respectively, are :  
 (1) 6 and 4 (2) 7 and 6  
 (3) 4 and 6 (4) 6 and 7
- Q.35** Fructose and glucose can be distinguished by :  
 (1) Fehling's test (2) Barfoed's test  
 (3) Benedict's test (4) Seliwanoff's test
- Q.36** A hydrated solid X on heating initially gives a monohydrated compound Y. Y upon heating above 373K leads to an anhydrous white powder Z. X and Z, respectively, are:  
 (1) Washing soda and soda ash.  
 (2) Washing soda and dead burnt plaster.  
 (3) Baking soda and dead burnt plaster.  
 (4) Baking soda and soda ash.
- Q.37** The maximum prescribed concentration of copper in drinking water is:  
 (1) 5 ppm (2) 0.5 ppm  
 (3) 0.05 ppm (4) 3 ppm
- Q.38** Noradrenaline is a/an  
 (1) Neurotransmitter (2) Antidepressant  
 (3) Antihistamine (4) Antacid
- Q.39** The IUPAC name of the following compound is :
- 
- (1) 3,5-dimethyl-4-propylhept-6-en-1-yne  
 (2) 3-methyl-4-(3-methylprop-1-enyl)-1-heptyne  
 (3) 3-methyl-4-(1-methylprop-2-ynyl)-1-heptyne  
 (4) 3,5-dimethyl-4-propylhept-1-en-6-yne
- Q.40** The correct option with respect to the Pauling electronegativity values of the elements is :-  
 (1)  $\text{Ga} < \text{Ge}$  (2)  $\text{Si} < \text{Al}$   
 (3)  $\text{P} > \text{S}$  (4)  $\text{Te} > \text{Se}$

SPACE FOR ROUGH WORK

**Q.41** Given:



Based on the above thermochemical equations, find out which one of the following algebraic relationships is correct?

- (1)  $z = x + y$                       (2)  $x = y - z$   
 (3)  $x = y + z$                       (4)  $y = 2z - x$

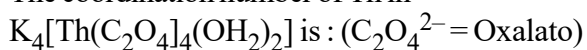
**Q.42** The compound that inhibits the growth of tumors is

- (1) cis-[Pd(Cl)<sub>2</sub>(NH<sub>3</sub>)<sub>2</sub>]  
 (2) cis-[Pt(Cl)<sub>2</sub>(NH<sub>3</sub>)<sub>2</sub>]  
 (3) trans-[Pt(Cl)<sub>2</sub>(NH<sub>3</sub>)<sub>2</sub>]  
 (4) trans-[Pd(Cl)<sub>2</sub>(NH<sub>3</sub>)<sub>2</sub>]

**Q.43** Which one of the following alkenes when treated with HCl yields majorly an antiMarkovnikov product?

- (1)  $F_3C - CH = CH_2$   
 (2)  $Cl - CH = CH_2$   
 (3)  $CH_3O - CH = CH_2$   
 (4)  $H_2N - CH = CH_2$

**Q.44** The coordination number of Th in



- (1) 6                                      (2) 10  
 (3) 14                                      (4) 8

**Q.45** The ratio of the shortest wavelength of two spectral series of hydrogen spectrum is found to be about 9. The spectral series are:

- (1) Paschen and Pfund  
 (2) Lyman and Paschen  
 (3) Brackett and Pfund  
 (4) Balmer and Brackett

## PART B – PHYSICS

**Q.46** A solid metal cube of edge length 2 cm is moving in a positive y direction at a constant speed of 6 m/s. There is a uniform magnetic field of 0.1 T in the positive z-direction. The potential difference between the two faces of the cube perpendicular to the x-axis, is :

- (1) 6 mV                                      (2) 1 mV  
 (3) 12 mV                                      (4) 2 mV

**Q.47** Two radioactive materials A and B have decay constants  $10\lambda$  and  $\lambda$ , respectively. It initially they have the same number of nuclei, then the ratio of the number of nuclei of A to that of B will be  $1/e$  after a time :

- (1)  $11 / 10\lambda$                                       (2)  $1 / 9\lambda$   
 (3)  $1 / 10\lambda$                                       (4)  $1 / 11\lambda$

**Q.48** A tuning fork of frequency 480 Hz is used in an experiment for measuring speed of sound ( $v$ ) in air by resonance tube method. Resonance is observed to occur at two successive lengths of the air column,  $l_1 = 30 \text{ cm}$  and  $l_2 = 70 \text{ cm}$ . Then  $v$  is equal to :

- (1)  $332 \text{ ms}^{-1}$                                       (2)  $379 \text{ ms}^{-1}$   
 (3)  $384 \text{ ms}^{-1}$                                       (4)  $338 \text{ ms}^{-1}$

**Q.49** A current of 2 mA was passed through an unknown resistor which dissipated a power of 4.4 W. Dissipated power when an ideal power supply of 11 V is connected across it is :

- (1)  $11 \times 10^{-5} \text{ W}$                                       (2)  $11 \times 10^{-4} \text{ W}$   
 (3)  $11 \times 10^5 \text{ W}$                                       (4)  $11 \times 10^{-3} \text{ W}$

**Q.50** A hydrogen atom, initially in the ground state is excited by absorbing a photon of wavelength  $980 \text{ \AA}$ . The radius of the atom in the excited state, in terms of Bohr radius  $a_0$ , will be :

$(hc = 12500 \text{ eV} - \text{ \AA})$

- (1)  $9a_0$                                       (2)  $25a_0$   
 (3)  $4a_0$                                       (4)  $16a_0$

**Q.51** A rigid diatomic ideal gas undergoes an adiabatic process at room temperature. The relation between temperature and volume of this process is

$TV^x = \text{constant}$ , then  $x$  is :

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

SPACE FOR ROUGH WORK

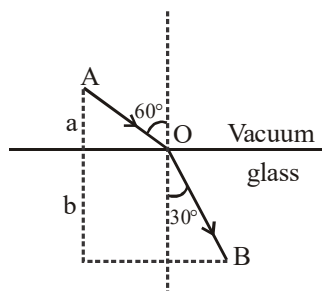
**Q.52** Two particles are projected from the same point with the same speed  $u$  such that they have the same range  $R$ , but different maximum heights,  $h_1$  and  $h_2$ . Which of the following is correct ?

- (1)  $R^2 = 2 h_1 h_2$                       (2)  $R^2 = 16 h_1 h_2$   
 (3)  $R^2 = 4 h_1 h_2$                       (4)  $R^2 = h_1 h_2$

**Q.53** The value of numerical aperture of the objective lens of a microscope is 1.25. If light of wavelength  $5000 \text{ \AA}$  is used, the minimum separation between two points, to be seen as distinct, will be :

- (1)  $0.24 \text{ \mu m}$                       (2)  $0.48 \text{ \mu m}$   
 (3)  $0.12 \text{ \mu m}$                       (4)  $0.38 \text{ \mu m}$

**Q.54** A ray of light  $AO$  in vacuum is incident on a glass slab at angle  $60^\circ$  and refracted at angle  $30^\circ$  along  $OB$  as shown in the figure. The optical path length of light ray from  $A$  to  $B$  is :



- (1)  $2a + 2b$                       (2)  $2a + \frac{2b}{3}$   
 (3)  $\frac{2\sqrt{3}}{a} + 2b$                       (4)  $2a + \frac{2b}{\sqrt{3}}$

**Q.55** An ideal monoatomic gas occupies a volume of  $2\text{m}^3$  at a pressure of  $3 \times 10^6 \text{ Pa}$ . The energy of the gas is:

- (1)  $3 \times 10^2$                       (2)  $10^8 \text{ J}$   
 (3)  $6 \times 10^4 \text{ J}$                       (4)  $9 \times 10^6 \text{ J}$

**Q.56** A paramagnetic substance in the form of a cube with sides  $1 \text{ cm}$  has a magnetic dipole moment of  $20 \times 10^{-6} \text{ J/T}$  when a magnetic intensity of  $60 \times 10^3 \text{ A/m}$  is applied. Its magnetic susceptibility is:

- (1)  $2.3 \times 10^{-2}$                       (2)  $3.3 \times 10^{-2}$   
 (3)  $3.3 \times 10^{-4}$                       (4)  $4.3 \times 10^{-2}$

**Q.57** The electric field of light wave is given as

$$\vec{E} = 10^{-3} \cos \left( \frac{2\pi x}{5 \times 10^{-7}} - 2\pi \times 6 \times 10^{14} t \right) \hat{x} \frac{\text{N}}{\text{C}}.$$

This light falls on a metal plate of work function  $2\text{eV}$ . The stopping potential of the photo-electrons

is : Given,  $E \text{ (in eV)} = \frac{12375}{\lambda \text{ (in \AA)}}$

- (1)  $0.48 \text{ V}$                       (2)  $2.0 \text{ V}$   
 (3)  $2.48 \text{ V}$                       (4)  $0.72 \text{ V}$

**Q.58** Two cars A and B are moving away from each other in opposite directions. Both the cars are moving with a speed of  $20 \text{ ms}^{-1}$  with respect to the ground. If an observer in car A detects a frequency  $2000 \text{ Hz}$  of the sound coming from car B, what is the natural frequency of the sound source in car B ? (Speed of sound in air =  $340 \text{ ms}^{-1}$ )

- (1)  $2250 \text{ Hz}$                       (2)  $2060 \text{ Hz}$   
 (3)  $2150 \text{ Hz}$                       (4)  $2300 \text{ Hz}$

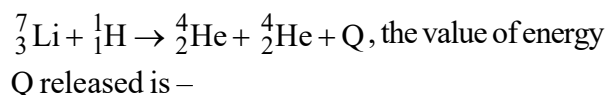
**Q.59** Water flows into a large tank with flat bottom at the rate of  $10^{-4} \text{ m}^3\text{s}^{-1}$ . Water is also leaking out of a hole of area  $1 \text{ cm}^2$  at its bottom. If the height of the water in the tank remains steady, then this height is:

- (1)  $4 \text{ cm}$                       (2)  $2.9 \text{ cm}$   
 (3)  $1.7 \text{ cm}$                       (4)  $5.1 \text{ cm}$

**Q.60** Two satellites, A and B, have masses  $m$  and  $2m$  respectively. A is in a circular orbit of radius  $R$ , and B is in a circular orbit of radius  $2R$  around the earth. The ratio of their kinetic energies,  $T_A/T_B$ , is:

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

**Q.61** The binding energy per nucleon of  ${}^7_3\text{Li}$  and  ${}^4_2\text{He}$  nuclei are  $5.60 \text{ MeV}$  &  $7.06 \text{ MeV}$ , respectively. In the nuclear reaction



- (1)  $19.6 \text{ MeV}$                       (2)  $-2.4 \text{ MeV}$   
 (3)  $8.4 \text{ MeV}$                       (4)  $17.3 \text{ MeV}$

SPACE FOR ROUGH WORK

**Q.62** A monochromatic light is incident at a certain angle on an equilateral triangular prism and suffers minimum deviation. If the refractive index of the material of the prism is  $\sqrt{3}$ , then the angle of incidence is :

- (1)  $30^\circ$  (2)  $45^\circ$   
(3)  $90^\circ$  (4)  $60^\circ$

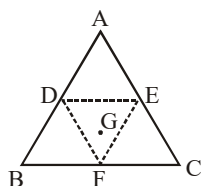
**Q.63** A system of three polarizers  $P_1, P_2, P_3$  is set up such that the pass axis of  $P_3$  is crossed with respect to that of  $P_1$ . The pass axis of  $P_2$  is inclined at  $60^\circ$  to the pass axis of  $P_3$ . When a beam of unpolarized light of intensity  $I_0$  is incident on  $P_1$ , the intensity of light transmitted by the three polarizers is  $I$ . The ratio  $(I_0/I)$  equals (nearly) :

- (1) 16.00 (2) 1.80  
(3) 5.33 (4) 10.67

**Q.64** A body of mass 2 kg makes an elastic collision with a second body at rest and continues to move in the original direction but with one fourth of its original speed. What is the mass of the second body?

- (1) 1.8 kg (2) 1.2 kg  
(3) 1.5 kg (4) 1.0 kg

**Q.65** An equilateral triangle ABC is cut from a thin solid sheet of wood. (see figure) D, E and F are the mid-points of its sides as shown and G is the centre of the triangle. The moment of inertia of the triangle about an axis passing through G and perpendicular to the plane of the triangle is  $I_0$ . If the smaller triangle DEF is removed from ABC, the moment of inertia of the remaining figure about the same axis is  $I$ . Then:



- (1)  $I = \frac{9}{16} I_0$  (2)  $I = \frac{3}{4} I_0$   
(3)  $I = \frac{I_0}{4}$  (4)  $I = \frac{15}{16} I_0$

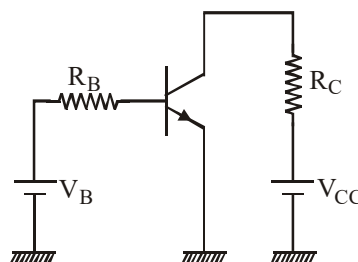
**Q.66** A simple harmonic motion is represented by:

$$y = 5 (\sin 3\pi t + \sqrt{3} \cos 3\pi t) \text{ cm}$$

The amplitude and time period of the motion are:

- (1) 5 cm,  $(3/2)$  s (2) 5 cm,  $(2/3)$  s  
(3) 10 cm,  $(3/2)$  s (4) 10 cm,  $(2/3)$  s

**Q.67** A common emitter amplifier circuit, built using an npn transistor, is shown in the figure. Its dc current gain is 250,  $R_C = 1\text{k}\Omega$  and  $V_{CC} = 10\text{V}$ . What is the minimum base current for  $V_{CE}$  to reach saturation ?

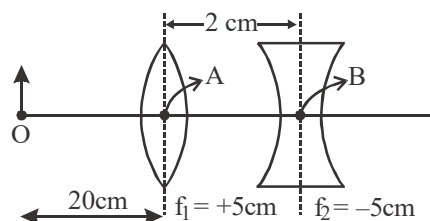


- (1)  $100 \mu\text{A}$  (2)  $7 \mu\text{A}$   
(3)  $40 \mu\text{A}$  (4)  $10 \mu\text{A}$

**Q.68** The ratio of the weights of a body on the Earth's surface to that on the surface of a planet is 9 : 4. The mass of the planet is  $1/9^{\text{th}}$  of that of the Earth. If 'R' is the radius of the Earth, what is the radius of the planet ? (Take the planets to have the same mass density)

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

**Q.69** What is the position and nature of image formed by lens combination shown in figure? ( $f_1, f_2$  are focal lengths)

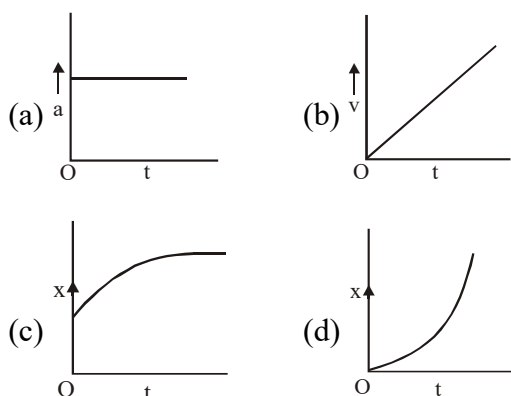


- (1) 70 cm from point B at left; virtual  
(2) 40 cm from point B at right; real  
(3)  $(20/3)$  cm from point B at right, real  
(4) 70 cm from point B at right, real

SPACE FOR ROUGH WORK



**Q.70** A particle starts from origin O from rest and moves with a uniform acceleration along the positive x-axis. Identify all figures that correctly represent the motion qualitatively. (a = acceleration, v = velocity, x = displacement, t = time)

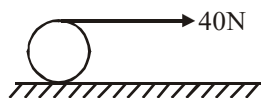


- (1) (a), (b), (c)                      (2) (a)  
 (3) (a), (b), (d)                      (4) (b), (c)

**Q.71** A string of length 1 m and mass 5 g is fixed at both ends. The tension in the string is 8.0 N. The string is set into vibration using an external vibrator of frequency 100 Hz. The separation between successive nodes on the string is close to :

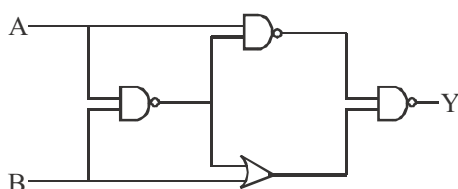
- (1) 16.6 cm                      (2) 20.0 cm  
 (3) 10.0 cm                      (4) 33.3 cm

**Q.72** A string is wound around a hollow cylinder of mass 5 kg and radius 0.5 m. If the string is now pulled with a horizontal force of 40 N, and the cylinder is rolling without slipping on a horizontal surface (see figure), then the angular acceleration of the cylinder will be (Neglect the mass and thickness of the string)



- (1) 12 rad/s<sup>2</sup>                      (2) 16 rad/s<sup>2</sup>  
 (3) 10 rad/s<sup>2</sup>                      (4) 20 rad/s<sup>2</sup>

**Q.73** The output of the given logic circuit is :



SPACE FOR ROUGH WORK

- (1)  $\overline{AB}$                       (2)  $A\overline{B}$   
 (3)  $AB + \overline{AB}$                       (4)  $A\overline{B} + \overline{AB}$

**Q.74** A 5000 kg rocket is set for vertical firing. The relative speed of burnt gas is  $800 \text{ ms}^{-1}$ . To give an initial upwards acceleration of  $20 \text{ ms}^{-2}$ , the amount of gas ejected per second to supply the needed thrust will be

- (1)  $127.5 \text{ kg s}^{-1}$                       (2)  $187.5 \text{ kg s}^{-1}$   
 (3)  $185.5 \text{ kg s}^{-1}$                       (4)  $137.5 \text{ kg s}^{-1}$

**Q.75** An alternating voltage  $v(t) = 220 \sin 100\pi t$  volt is applied to a purely resistance load of  $50 \Omega$ . The time taken for the current to rise from half of the peak value to the peak value is :

- (1) 2.2 ms                      (2) 5 ms  
 (3) 3.3 ms                      (4) 7.2 ms

**Q.76** In a Young's double slit experiment with slit separation 0.1 mm, one observes a bright fringe at angle  $(1/40)$  rad by using light of wavelength  $\lambda_1$ . When the light of wavelength  $\lambda_2$  is used a bright fringe is seen at the same angle in the same set up. Given that  $\lambda_1$  and  $\lambda_2$  are in visible range (380 nm to 740 nm), their values are :

- (1) 380 nm, 500 nm                      (2) 625 nm, 500 nm  
 (3) 380 nm, 525 nm                      (4) 400 nm, 500 nm

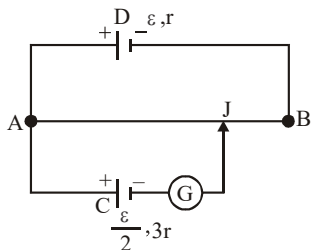
**Q.77** Two forces P and Q of magnitude 2F and 3F, respectively, are at an angle  $\theta$  with each other. If the force Q is doubled, then their resultant also gets doubled. Then, the angle is :

- (1)  $30^\circ$                       (2)  $60^\circ$   
 (3)  $90^\circ$                       (4)  $120^\circ$

**Q.78** A proton and an  $\alpha$ -particle (with their masses in the ratio of 1 : 4 and charges in the ratio of 1 : 2) are accelerated from rest through a potential difference V. If a uniform magnetic field (B) is set up perpendicular to their velocities, the ratio of the radii  $r_p : r_\alpha$  of the circular paths described by them will be :

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

**Q.79** A potentiometer wire AB having length L and resistance  $12r$  is joined to a cell D of emf  $\epsilon$  and internal resistance  $r$ . A cell C having emf  $\epsilon/2$  and internal resistance  $3r$  is connected. The length AJ at which the galvanometer as shown in fig. shows no deflection is :

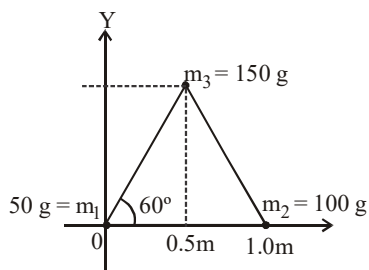


- (1)  $(5/12)L$                       (2)  $(11/24)L$   
 (3)  $(11/12)L$                     (4)  $(13/24)L$

**Q.80** The bob of a simple pendulum has mass  $2g$  and a charge of  $5.0 \mu C$ . It is at rest in a uniform horizontal electric field of intensity  $2000 V/m$ . At equilibrium, the angle that the pendulum makes with the vertical is : (take  $g = 10 m/s^2$ )

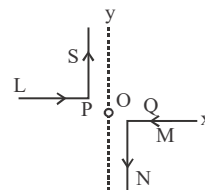
- (1)  $\tan^{-1}(5.0)$                     (2)  $\tan^{-1}(2.0)$   
 (3)  $\tan^{-1}(0.5)$                     (4)  $\tan^{-1}(0.2)$

**Q.81** Three particles of masses  $50 g$ ,  $100 g$  and  $150 g$  are placed at the vertices of an equilateral triangle of side  $1 m$  (as shown in the figure). The  $(x, y)$  coordinates of the centre of mass will be :



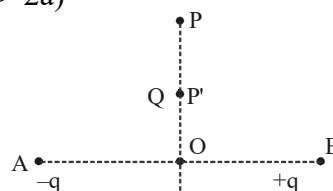
- (1)  $\left(\frac{7}{12}m, \frac{\sqrt{3}}{8}m\right)$                     (2)  $\left(\frac{\sqrt{3}}{4}m, \frac{5}{12}m\right)$   
 (3)  $\left(\frac{7}{12}m, \frac{\sqrt{3}}{4}m\right)$                     (4)  $\left(\frac{\sqrt{3}}{8}m, \frac{7}{12}m\right)$

**Q.82** As shown in the figure, two infinitely long, identical wires are bent by  $90^\circ$  and placed in such a way that the segments LP and QM are along the x-axis, while segments PS and QN are parallel to the y-axis. If  $OP = OQ = 4cm$ , and the magnitude of the magnetic field at O is  $10^{-4} T$ , and the two wires carry equal currents (see figure), the magnitude of the magnetic field at O will be ( $\mu_0 = 4\pi \times 10^{-7} NA^{-2}$ )



- (1)  $40 A$ , perpendicular into the page.  
 (2)  $40 A$ , perpendicular out of the page.  
 (3)  $20 A$ , perpendicular out of the page.  
 (4)  $20 A$ , perpendicular into the page.

**Q.83** Charges  $-q$  and  $+q$  located at A and B, respectively, constitute an electric dipole. Distance  $AB = 2a$ , O is the mid point of the dipole and OP is perpendicular to AB. A charge Q is placed at P where  $OP = y$  and  $y \gg 2a$ . The charge Q experiences an electrostatic force F. If Q is now moved along the equatorial line to P' such that  $OP' = y/3$ , the force on Q will be close to : ( $y/3 \gg 2a$ )



- (1)  $F/3$                                       (2)  $3F$   
 (3)  $9F$                                       (4)  $27F$

**Q.84** A body starts from rest, under the action of an engine working at a constant power and moves along a straight line. The displacement S is given as a function of time (t) as

- (1)  $S = at + bt^2$ , a, b are constants  
 (2)  $S = bt^2$ , b is a constant  
 (3)  $S = at^{3/2}$ , a is a constant  
 (4)  $S = at$ , a is a constant

SPACE FOR ROUGH WORK

**Q.85** A rubber ball is taken to a 100 m deep lake and its volume changes by 0.1 %. The bulk modulus of rubber is nearly :-

- (1)  $1 \times 10^{-6} \text{ N/m}^2$       (2)  $1 \times 10^{-8} \text{ N/m}^2$   
 (3)  $1 \times 10^7 \text{ N/m}^2$       (4)  $1 \times 10^9 \text{ N/m}^2$

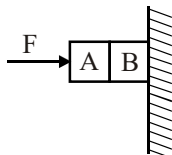
**Q.86** The dimensional formula of effective torsional constant of spring is –

- (1)  $M^1L^2T^{-3}$       (2)  $M^1L^2T^{-2}A^{-2}$   
 (3)  $M^1L^2T^{-2}$       (4)  $M^0L^0T^0$

**Q.87** Two black bodies A and B have equal surface areas and are maintained at temperatures  $27^\circ\text{C}$  and  $177^\circ\text{C}$  respectively. What will be the ratio of the thermal energy radiated per second by A to that by B?

- (1) 4 : 9      (2) 2 : 3  
 (3) 16 : 81      (4) 27 : 177

**Q.88** Given in the figure are two blocks A and B of weight 20 N and 100 N, respectively. These are being pressed against a wall by a force F such that the system does not slide as shown. If the coefficient of friction between the blocks is 0.1 and between block B and the wall is 0.15, the frictional force applied by the wall on block B is :-



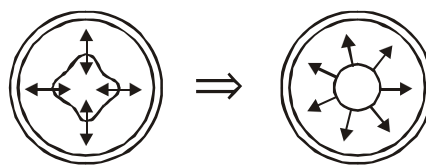
- (1) 120 N      (2) 150 N  
 (3) 100 N      (4) 80 N

**Q.89** To increase de-Broglie wavelength of an electron from  $0.5 \times 10^{-10} \text{ m}$  to  $10^{-10} \text{ m}$ , its energy should be –

- (1) increased to 4 times  
 (2) halved  
 (3) doubled  
 (4) decreased to fourth part

**Q.90** A soap film is formed on a circular frame. A loop of thread is lying on film. If the film inside the loop is broken, then tension in the thread will be :

(R = radius of loop, T = surface tension of liquid)



- (1)  $2\pi RT$       (2)  $\pi RT$   
 (3)  $RT$       (4)  $\pi R^2 T$

### PART C – BIOLOGY

**Q.91** In mollusca, mantle cavity is found in between:-

- (1) Mantle and shell  
 (2) Shell and visceral Hump  
 (3) Visceral Hump and mantle  
 (4) Coelom and body wall

**Q.92** Which scientist reported that cells had a thin outer layer which is today known as the 'plasma membrane' ?

- (1) Rudolf virchow      (2) Theodore schwann  
 (3) Matthias schleiden      (4) Robert Hooke

**Q.93** From given statement a to e, which of the following option is correct ?

- (a) C.B. Bridges proposed genic balance theory of sex determination in honey bees.  
 (b) An unfertilised egg of honey bee develops as a male (drone) by mean of parthenogenesis.  
 (c) In honey bees the females are diploid having 16 chromosomes and males are haploid having 8 chromosomes.  
 (d) In honey bees a maternal grand father can have grandsons.  
 (e) Due to false notion the in our society women are blamed for giving birth to female children and they have been ostracised and ill-treated

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

**Q.94** Which of the following cell junction help to stop substances from leaking across the tissue?

- (1) Adhering junction      (2) Tight junction  
 (3) Gap junction      (4) Desmosomes

SPACE FOR ROUGH WORK

- Q.95** High threshold substance in the renal tubule is:-  
 (1) water (2) glucose  
 (3) inulin (4) urea
- Q.96** Which one confer stability of in addition to hydrogen bond for double helix :-  
 (1) Phosphodiester bond  
 (2) Base pair stacking over other  
 (3) Antiparallel nature  
 (4) All of these
- Q.97** Which of the following is a secondary producer :-  
 (1) Grass (2) Goat  
 (3) Wolf (4) Lion
- Q.98** All animals have closed circulatory system, except:-  
 (1) Annelids (2) Cephalopods  
 (3) Hemichordates (4) Urochordates
- Q.99** Which one of the following is a common ancestor of Birds, mammals and crocodiles :-  
 (1) Sauropsids (2) Synapsids  
 (3) Early reptiles (4) Pelycosaur
- Q.100** Volume of air remaining in the lungs even after a forcible expiration is called :  
 (1) Tidal volume (2) Residual volume  
 (3) Inspiratory capacity (4) Inspiratory volume
- Q.101** Mr. Rahul was unable to walk normally after taking alcohol, which of the following part of brain probably get effected by alcohol ?  
 (1) Cerebellum (2) Cerebrum  
 (3) Mid brain (4) Medulla oblongata
- Q.102** Heart beat is accelerated by :-  
 (1) Sympathetic nerves and acetylcholine  
 (2) Cranial nerves and adrenaline  
 (3) Cranial nerves and acetylcholine  
 (4) Sympathetic nerves and epinephrine
- Q.103** When the anther is young, a group of compactly arranged homogenous cells occupy the centre of each microsporangium. These cells are called the :  
 (1) Megaspore mother cells (2) Archisporial cells  
 (3) Primary parietal cells (4) Sporogenous tissue
- Q.104** The unequivocal proof for DNA as the genetic material came from the experiment of :-  
 (1) Hershey and chase  
 (2) H.G. Khurana  
 (3) Griffith  
 (4) Avery, Macleod and McCarty
- Q.105** Which of the following is an example of day neutral plant ?  
 (1) Spinach (2) radish  
 (3) Sugarcane (4) maize
- Q.106** Copper-T works by :  
 (1) Inhibiting ovulation  
 (2) Preventing fertilization  
 (3) Inhibiting implantation of blastocyst  
 (4) Inhibiting gametogenesis
- Q.107** Which of the following characteristic represent 'Inheritance' of blood group in humans:-  
 (a) ABO blood groups are controlled by the gene I  
 (b) Plasma membrane of the red blood cells has amino polymers that protrude from its surface.  
 (c) The gene I has three alleles i.e.  $I^A$ ,  $I^B$  and  $i$ . Each diploid person possesses all three alleles of gene I.  
 (d) There are eight different possible combinations of three alleles of gene I.  
 (e) 'O' blood group is not possible in the progeny of 'AB' blood group parents.  
 (1) only a and e (2) only b, c and d  
 (3) only b and d (4) only a, c and e
- Q.108** Given below are four statements (a – d) regarding human blood circulatory system :-  
 (a) Arteries are thick-walled and have narrow lumen as compared to veins.  
 (b) Angina is acute chest pain when the blood circulation to the brain is reduced.  
 (c) Calcium ions play a very important role in blood clotting.  
 (d) Persons with blood group AB can donate blood to any person with any blood group.  
 Which two of the above statements are correct ?  
 (1) a and c (2) a and d  
 (3) b and c (4) c and d

---

SPACE FOR ROUGH WORK

---

**Q.109** Match the following

**Column-I**

- (i) Budding  
 (ii) True Regeneration  
 (iii) Fragmentation  
 (iv) Asexual Spore  
 (1) i-D, ii-C, iii-B, iv-A  
 (3) i-B, ii-A, iii-C, iv-D

**Column-II**

- (A) Yeast and *Hydra*  
 (B) Planaria  
 (C) Protonema  
 (D) Fungi  
 (2) i-A, ii-B, iii-D, iv-C  
 (4) i-A, ii-B, iii-C, iv-D

**Q.110** All the given are high in Red muscle fibre, except

- (1) Myoglobin  
 (2) mitochondria  
 (3) Large amount of  $O_2$   
 (4) Sarcoplasmic Reticulum

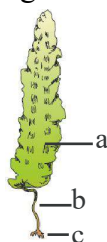
**Q.111** Which hormone is used to speed up the malting process :-

- (1) Zeatin (2) Auxin  
 (3)  $GA_3$  (4) Ethylene

**Q.112** Correct sequence of phases of cell cycle is :-

- (1)  $G_2 \rightarrow S \rightarrow G_1 \rightarrow M$   
 (2)  $G_1 \rightarrow G_2 \rightarrow S \rightarrow M$   
 (3)  $G_1 \rightarrow M \rightarrow G_2 \rightarrow S$   
 (4)  $S \rightarrow G_2 \rightarrow M \rightarrow G_1$

**Q.113** Recognise the figure and find out the correct matching:-



- (1) a = Frond, b = Stipe, c = Holdfast  
 (2) a = Stipe, b = Frond, c = Holdfast  
 (3) a = Frond, b = Holdfast, c = Stipe  
 (4) a = Stipe, b = Holdfast, c = Frond

**Q.114** Identify the incorrect option with reference to high affinity of oxygen to haemoglobin :-

- (1) High  $H^+$  concentration (2) Low  $PCO_2$   
 (3) High  $PO_2$  (4) High pH

**Q.115** Which play a role of store house of calcium ions for muscle fibre ?

- (1) Sarcosome (2) Sarcoplasmic Reticulum  
 (3) Sarcomere (4) Sarcoplasm

**Q.116** A normal vision woman whose father was colourblind marries a colour blind man and give birth to a colour blind daughter. Her husband dies and she again marries a normal man whose father was colourblind what is the probability of her son having abnormality in vision :-

- (1) 0% (2) 50%  
 (3) 100% (4) 25%

**Q.117** Which is not related to secondary metabolites ?

- (1) Ethanol and lactic acid  
 (2) Pigments  
 (3) Drugs  
 (4) Alkaloids

**Q.118** Find out the correct ploidy nature of A, B, C in flowering plants :-

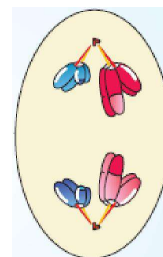
Egg cell – A, Embryo – B, Endosperm – C

- (1) A-n, B-2n, C-2n (2) A-n, B-n, C-2n  
 (3) A-n, B-2n, C-3n (4) A-n, B-3n, C-2n

**Q.119** Testosterone (androgen) is secreted by :-

- (1) Sertoli cell (2) Seminal vesicle  
 (3) Interstitial cell (4) Epididymis

**Q.120** Identify the stage of cell cycle shown below :-



- (1) Anaphase-I (2) Anaphase-II  
 (3) Telophase-I (4) Telophase-II

**Q.121** Observe the given table and choose the correct option :-

- (1) Class : Reptilia  
 Character : Creeping or crawling mode of locomotion  
 Example : *Salamandra*  
 (2) Class : Aves  
 Character : Presence of diaphragm  
 Example : *Psittacula*

SPACE FOR ROUGH WORK

(3) Class : Mammalia  
Character : Skin is unique in possessing hair  
Example : *Macropus*

(4) Class : Aves  
Character : Presence of feathers  
Example : *canis*

**Q.122** The origin of pineal gland is :-

- (1) Ecto-mesodermal (2) Ectodermal  
(3) Mesodermal (4) Endodermal

**Q.123** Match the column-I and II and select the correct option from the codes given below :-

<b>Column-I</b> <b>(Sphincter/valve)</b>	<b>Column-II</b> <b>(Location)</b>
A. Internal sphincter	I. Hepatopancreatic ampulla into duodenum
B. Cardiac sphincter	II. Between duodenum and posterior stomach
C. Sphincter of Oddi	III. Present in anal canal
D. Ileocaecal valve	IV. Between oesophagus and anterior stomach
E. Pyloric sphincter	V. Between small and large intestine

- (1) A-III, B-II, C-IV, D-I, E-V  
(2) A-II, B-V, C-I, D-IV, E-III  
(3) A-III, B-IV, C-I, D-V, E-II  
(4) A-IV, B-III, C-I, D-II, E-V

**Q.124** Identify the cell organelle which is composed of ribonucleic acid and proteins and are not surrounded by any membrane :-

- (1) Centriole (2) Mitochondria  
(3) Ribosome (4) Basal body

**Q.125** Which one of the following bones is the only movable portion of the skull ?

- (1) Maxilla (2) Mandible  
(3) Frontal bone (4) Zygomatic bone

**Q.126** Choose the correct sequence of the layers from outer side to inner side in a dicot stem :

- (1) Cork, Cork cambium, secondary cortex, Primary phloem, Secondary Phloem, Vascular cambium, Secondary xylem, Primary xylem.  
(2) Cork, Cork cambium, Secondary Xylem, Secondary Phloem, Primary Phloem,

Secondary cortex, Vascular cambium, Primary Xylem.

(3) Primary Xylem, Secondary xylem, Vascular cambium, Primary phloem, Secondary Phloem, Secondary cortex, Cork cambium, cork.

(4) Primary phloem, Secondary Phloem, Secondary Xylem, Primary xylem, Vascular cambium, Secondary cortex, Cork cambium, Cork

**Q.127** A neurological disease bovine spongiform encephalitis (BSE) or mad cow disease is caused by

- (1) Prion (2) Viroid  
(3) Virus (4) PPLO

**Q.128** All of the following are part of a lac operon except

- (1) Inducer (2) Regulatory gene  
(3) Co-repressor (4) Operator gene

**Q.129** Which of the following instrument removes 99 percent of Particulate matter from exhaust of thermal Power plant ?

- (1) Cyclonic Separator  
(2) Electrostatic Precipitator  
(3) Wet scrubber  
(4) Dry scrubber

**Q.130** The magnitude of diffusion pressure deficit in normal turgid cell is equal to :

- (1) Osmotic pressure-wall pressure or Turgor pressure  
(2) Osmotic pressure + wall pressure  
(3) Turgor pressure  
(4) Osmotic pressure

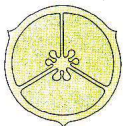
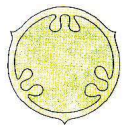
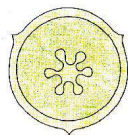

**Q.131** Which of the following statements is not correct :

- (1) *Selaginella* and *Salvinia* are heterosporous.  
(2) In *Cycas* pinnate leaves persist for a few years.  
(3) In gymnosperms the male and female gametophytes do not have an independent free living existence.  
(4) *Fucus* represents haplontic life cycle.

**Q.132** Which characters of maize plant provide resistant to 'Maize stem borer' pest :-

- (1) High aspartic acid (2) Low nitrogen content  
(3) Low sugar content (4) All the above

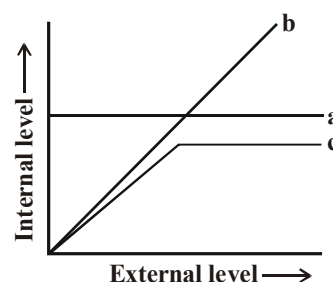
SPACE FOR ROUGH WORK

- Q.133** In which cheese there is large holes due to the production of  $\text{CO}_2$  :
- (1) Swiss cheese (2) Roquefort cheese  
(3) Raw cheese (4) All of the above
- Q.134** All of the following RNAs are synthesise by RNA polymerase III except -
- (1) 5s rRNA (2) sn RNA  
(3) tRNA (4) hnRNA
- Q.135** The factors which are known to affect Hardy-Weinberg equilibrium :
- (1) Gene migration (2) Genetic drift  
(3) Mutation (4) All of the above
- Q.136** Which of the following is not the technique of genetic engineering :
- (1) Transcription  
(2) Creation of Recombinant-DNA  
(3) Gene cloning  
(4) Gene transfer
- Q.137** Match the column I with column II and select out correct option given below :
- P.  A. Argemone
- Q.  B. Primrose
- R.  C. Lemon
- S.  D. Sunflower
- (1) P = C, Q = B, R = A, S = D  
(2) P = C, Q = A, R = B, S = D  
(3) P = A, Q = C, R = D, S = B  
(4) P = D, Q = B, R = A, S = C
- Q.138** How many light quanta or photon required for the reduction of 4- molecule of  $\text{NADP}^+$
- (1) 8 (2) 4  
(3) 12 (4) 16
- Q.139** Which of the following sequence is most likely to be a restriction enzyme recognition site ?
- (1) CGGCTT (2) GGGCCA  
(3) GTAATG (4) GTCGAC
- Q.140** Which of the following is limiting factor for productivity in deep lake ecosystems ?
- (1) Nitrogen (2) Sunlight  
(3) Carbon (4) Phosphorus
- Q.141** Formation of staminal tube in china rose flower is due to ?
- (1) Cohesion of stamens  
(2) Adhesion of stamens  
(3) Aestivation of petals  
(4) Both Cohesion and Adhesion of stamens
- Q.142** Which of the following are major biome determining factor :
- (1) Annual variation in temperature  
(2) Annual variation in rainfall  
(3) Annual variation in snowfall  
(4) All of the above
- Q.143** Which of the following statement is not **incorrect**
- (1) Nobel laureate Norman E. Borlaug at International centre for rice and cotton improvement in Mexico developed semidwarf rice.  
(2) *Saccharum officinarum* had thicker stem and higher sugar content but did not grow well in north India.  
(3) Indian Agricultural research Institute Lucknow, developed vitamin-A enriched bitter gourd, bathua, mustard and tomato.  
(4) Atlas 66 having a high starch content, has been used as a donor for improving cultivated wheat.
- Q.144** Commensalism is :
- (1) +, 0 (2) +, +  
(3) +, - (4) -, 0

SPACE FOR ROUGH WORK



- Q.145** Carolus linnaeus was proposed scientific name of animals in his book *systema naturae* (in 10<sup>th</sup> edition), which was published on 1 Aug. 1758. Which taxonomical aid provides knowledge about these informations :
- (1) Herbarium (2) Flora  
(3) Catalogue (4) Monograph
- Q.146** Glenoid cavity is found in :
- (1) Pelvic girdle (2) Skull  
(3) Pectoral girdle (4) Sternum
- Q.147** In which type of inflorescence, the main axis terminates in a flower and flowers are borne in basipetal order?
- (1) Capitulum (2) Corymb  
(3) Racemose (4) Cymose
- Q.148** Which one statement is incorrect regarding plant cell ?
- (1) Leucoplasts are bound by two membranes and lack pigments.  
(2) The secretions of cell are packed in golgibody.  
(3) Mitochondria help in photophosphorilation.  
(4) In 70 s ribosomes 'S' indirectly is measure of density and size.
- Q.149** Select the correct option in respect of given floral formula  $\% \frac{\text{♂}}{\text{♀}} K_{(5)} C_{1+2+(2)} A_{(9)+1} \underline{G}_1$
- (1) Anterior petals are free  
(2) Floral formula of petunia plant  
(3) Monoadelphous condition  
(4) Anterior petals are fused
- Q.150** Which one of the following pair of hormones, are those that can easily pass through the cell membrane of the target cell ?
- (1) Insulin, glucagon  
(2) Thyroxine, insulin  
(3) Somatostatin, oxytocin  
(4) Cortisol & Testosterone
- Q.151** Which of the following micronutrients is required for pollen germination and carbohydrate translocation ?
- (1) Boron (2) Molybdenum  
(3) Zinc (4) Copper
- Q.152** How many of the following enzymes are present in pancreatic juice Rennin, Pepsinogen, Trypsinogen, Procarboxypeptidase, Lipase, Nucleases and amylase :
- (1) Six (2) Five  
(3) Four (4) Three
- Q.153** Which of the following character is not related to biodiversity hot spot ?
- (1) High species richness  
(2) High Endemism  
(3) Lesser inter specific interaction  
(4) Habitat loss
- Q.154** Aggregated stage of slime moulds is called —a— which differentiates during unfavourable conditions to form —b—
- (1) a-Fruiting bodies, b-Pseudoplasmodium  
(2) a-Plasmodium, b-Sporocarp  
(3) a-Sporocarp, b-Myxamoebae  
(4) a-Plasmodium, b-Cleistothecium
- Q.155** In mature parts of most of the flowering plants, the tissues formed after dedifferentiation are
- (1) Fibres, xylem, phloem  
(2) Sapwood, late wood, secondary phloem  
(3) Phellem, phelloderm, bark  
(4) Interfascicular cambium, phellogen
- Q.156** The protein products of the following Bt toxin genes *cryIAC* and *cryIIAb* are responsible for controlling:-
- (1) Bollworm (2) Roundworm  
(3) Moth (4) Fruit fly
- Q.157** The figure given below is a diagrammatic representation of response of organisms to abiotic factors. Find out a, b and c :



SPACE FOR ROUGH WORK



	(a)	(b)	(c)
(1)	Partial regulator	Conformer	Regulators
(2)	Conformers	Regulators	Partial regulators
(3)	Regulators	Partial regulator	Conformers
(4)	Regulators	Conformers	Partial regulator

**Q.158** Lipids play a role in all of the following except

- (1) Long term energy storage
- (2) Structures in cells
- (3) Enzymes
- (4) Sex hormones

**Q.159** Consider the given statements :

- a. *Salvinia* is a heterosporous terrestrial fern.
- b. The male and female gametophytes do not have an independent free living existence in gymnosperms.
- c. The life cycle of angiosperm is diplontic.

- (1) All are correct      (2) Only b is correct
- (3) Only a is incorrect      (4) a and c are correct

**Q.160** Bulk flow of substances through xylem occurs when

- a. A positive pressure is developed during passive absorption.
- b. A negative pressure developed under high transpiration.
- c. Water is forced to move beyond cortex through apoplastic pathway.

- (1) Only b is correct
- (2) Only a is correct
- (3) Both b & c are correct
- (4) All are correct

**Q.161** Pick up the wrong statement :

- (1) Antibiotics are chemical substances, which are produced by some microbes.
- (2) Antibiotics can kill or retard the growth of microbes.

- (3) Penicilline was first antibiotic to be discovered
- (4) Penicilline discovered by Chain and florey.

**Q.162** Select the incorrect statement w.r.t. AIDS.

- (1) The gp 120 in the outermost envelope of the virus binds with CD-4 receptors of target cells.
- (2) HIV multiplies within the macrophages of host which are also called HIV factories.
- (3) The destruction of cytotoxic T cells by HIV causes appearance of syndrome.
- (4) Being HIV positive and having AIDS are two separate conditions as appearance of syndrome does not occur for a long time after virus entry.

**Q.163** Fig can maintain community structure during food scarcity in tropical deciduous forest. These act as

- (1) Exotic species      (2) Pioneer species
- (3) Edge species      (4) Key stone species

**Q.164** Which of the following statement is incorrect?

- (1) Rheumatoid arthritis is an autoimmune disease
- (2) The use of drugs like antihistamine, adrenaline, and steroids quickly reduces the symptoms of bacterial infection.
- (3) Several genes (called cellular oncogenes) have been identified in normal cells which when activated under certain conditions, could lead to oncogenic transformation of the cells.
- (4) The vaccine also generates memory - B and T cells that recognize the pathogen quickly on subsequent exposure and overwhelm the invaders with a massive production of antibodies.

**Q.165** Rate of increase in biomass by consumers per unit time and area is called

- (1) GPP
- (2) NPP
- (3) Secondary productivity
- (4) Net production efficiency

---

SPACE FOR ROUGH WORK

**Q.166** Match the following columns –

Column I	Column II
(i) Dodo	(a) Africa
(ii) Quagga	(b) Bali
(iii) Thylacine	(c) Mauritius
(iv) 3 sub species of tiger	(d) Australia

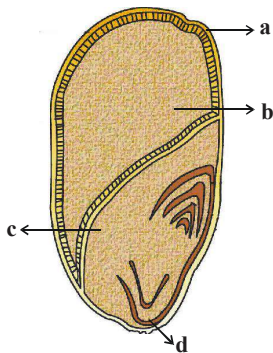
Choose the correct match from following :-

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

**Q.167** Choose the **incorrect** statement w.r.t. life cycle of cockroach

- (1) It undergoes paurometabolous development.
- (2) Eggs are centrolecithal and macrolecithal.
- (3) The nymphs moult 13 times to reach adult stage.
- (4) Moulting is stimulated by ecdysone hormone secreted by corpora allata.

**Q.168** Identify the parts labelled as a, b, c and d in the given diagram and select the correct option:



- (1) a-Scutellum, b-Coleorrhiza, c-Hypoblast, d-Coleoptile
- (2) a-Scutellum, b-Coleoptile, c-Epiblast, d-Coleorrhiza
- (3) a-Aleurone layer, b-Endosperm, c-Scutellum, d-Coleorrhiza
- (4) a-Seed coat, b-Aleurone layer, c-Epiblast, d-Coleoptile

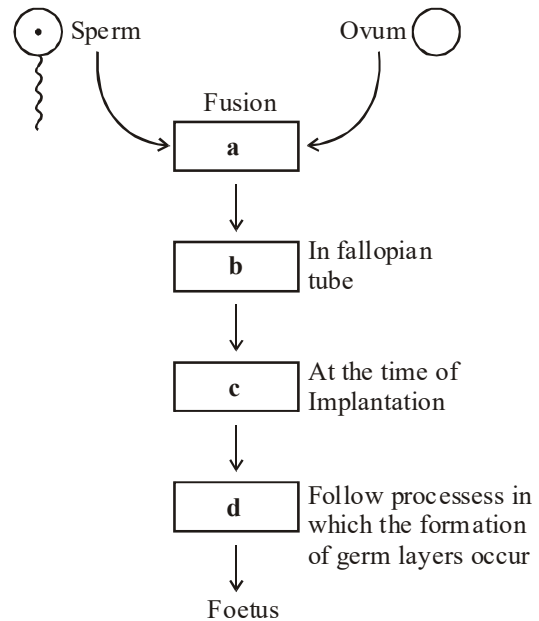
**Q.169** Select the correct statement for coconut fruit

- (1) Entire pericarp is hard and stony
- (2) Develops from tricarpellary ovary of epigynous flower.

(3) Middle layer of pericarp is specialised for food storage.

(4) Endosperm is edible part.

**Q.170** Study the flow chart shown below and select the option which gives correct words for all four blanks a, c, c and d :



- (1) a-Embryo, b-Zygote, c-Morula, d-Gastrula
- (2) a-Zygote, b-Morula, c-Blastocyst, d-Gastrula
- (3) a-Embryo, b-Blastocyst, c-Gastrula, d- Cleavage
- (4) a-Zygote, b-Morula, c-Gastrula, d-Cleavage

**Q.171** Jurassic period of the Mesozoic era is characterised by –

- (1) Gymnosperms are dominant plants and first toothed birds appear.
- (2) Radiation of reptiles and origin of mammal like reptiles.
- (3) Dinosaurs become extinct and angiosperms appear.
- (4) Flowering plants and first dinosaurs appear.

**Q.172** Maximum DDT in birds feeding on ?

- |             |           |
|-------------|-----------|
| (1) Fishes  | (2) Meat  |
| (3) Insects | (4) Seeds |

SPACE FOR ROUGH WORK

- Q.173** Non-cyclic journey of electrons in light reaction is similar to cyclic transfer of electrons in
- (1) Involvement of two types of photosystems.
  - (2) Photolysis of water.
  - (3) Pumping of  $H^+$  from stroma to lumen.
  - (4) Involvement of NADP reductase activity.
- Q.174** The juxta-glomerular cells (JG cells) are stimulated to produce renin in case of
- (1) Fall in GFR
  - (2) Rise in blood pressure
  - (3) Rise in glomerular blood flow
  - (4) Hypoxia
- Q.175** Tobacco consumption is known to stimulate secretion of adrenaline and nor-adrenaline the component causing this could be :
- (1) N-nitrosodimethylamine
  - (2) Caffeine
  - (3) Nicotine
  - (4) Dopamine
- Q.176** Transfer of an ovum collected from a donor into fallopian tube is called :-
- (1) ZIFT
  - (2) GIFT
  - (3) AI
  - (4) IUI
- Q.177** The seven characters of garden pea plant studied by Mendel are present on :
- (1) Four chromosomes
  - (2) Two chromosomes
  - (3) Seven chromosomes
  - (4) Three chromosomes
- Q.178** Which event will be suitable for a person having large amount of myoglobin in his muscles?
- (1) High jump
  - (2) 100 m sprinter
  - (3) Marathon runner
  - (4) All of these
- Q.179** Which enzyme remove the primer in DNA replication ?
- (1) Primase
  - (2) DNA polymerase II
  - (3) DNA polymerase I
  - (4) Helicase
- Q.180** Partial pressure of  $O_2$  of 104 mm of Hg in the alveoli oxygenates the capillary blood. When 1000 ml of this oxygenated blood is pumped to the striated muscle tissue undergoing strenuous exercise, the total amount of oxygen it will release into muscles is \_\_\_ with the oxy-Hb curve shifting to \_\_\_ side. Select the option which fills blanks correctly.
- (1) 15 ml, Left
  - (2) 5 ml, Left
  - (3) 150 ml, Right
  - (4) 50 ml, Right

---

SPACE FOR ROUGH WORK