

SHIKSHA CLASSES, BHANDARA

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 :

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Phone/Mobile No.

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PART A – CHEMISTRY

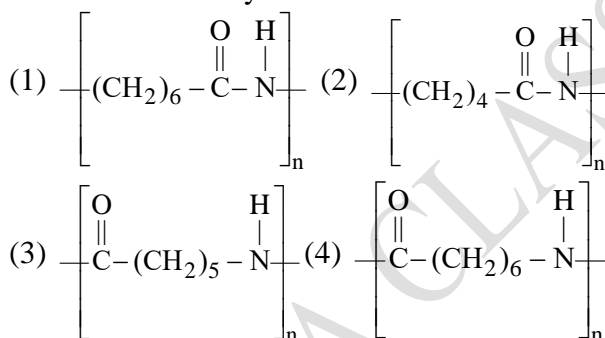
Q.1 The vapour pressures of pure liquids A and B are 400 and 600 mmHg, respectively at 298K. On mixing the two liquids, the sum of their initial volumes is equal to the volume of the final mixture. The mole fraction of liquid B is 0.5 in the mixture. The vapour pressure of the final solution, the mole 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, N₂O, NO₂ and N₂O₃ is :

- (1) NO₂ < N₂O₃ < NO < N₂O
- (2) NO₂ < NO < N₂O₃ < N₂O
- (3) N₂O < N₂O₃ < NO < NO₂
- (4) N₂O < NO < N₂O₃ < NO₂

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) $\sqrt{2}a$

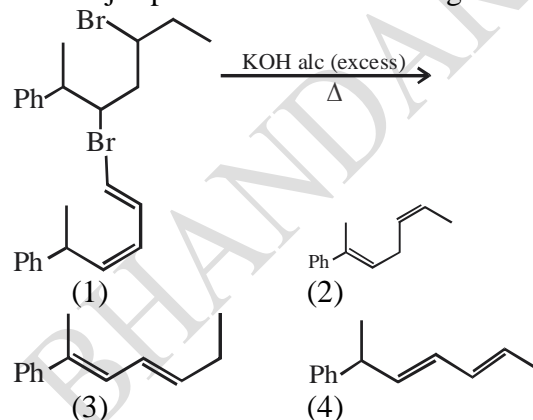
Q.5 K₂HgI₄ is 40% ionised in aqueous solution. The value of its van't Hoff factor (i) is :-

- (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 CO₂ is :

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

Q.7 The major product of the following reaction is



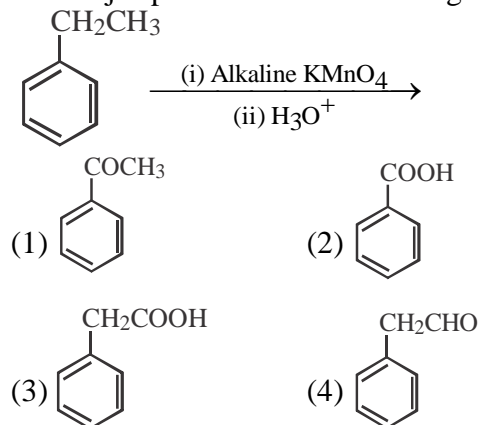
Q.8 The one that is not a carbonate is :

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

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

- (1) Sm³⁺ (2) La³⁺
- (3) Lu³⁺ (4) Gd³⁺

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⁺ > Na⁺ > K⁺ > Rb⁺ > Cs⁺
- (2) Li⁺ > Na⁺ > K⁺ > Cs⁺ > Rb⁺
- (3) Na⁺ > Li⁺ > K⁺ > Rb⁺ > Cs⁺
- (4) Na⁺ > Li⁺ > K⁺ > Cs⁺ > Rb⁺

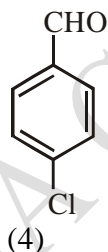
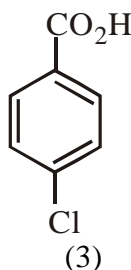
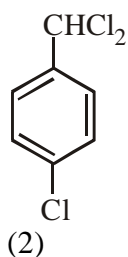
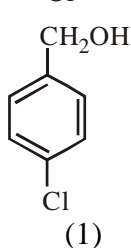
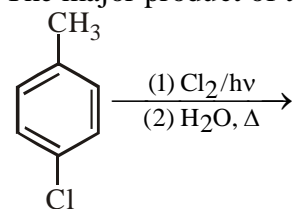
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Q.12 Thermal decomposition of a Mn compound (X) at 513 K results in compound Y, MnO_2 and a gaseous product. MnO_2 reacts with NaCl and concentrated H_2SO_4 to give a pungent gas Z.

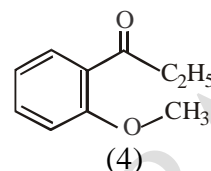
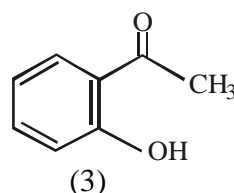
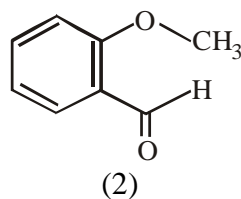
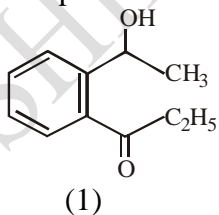
X, Y and Z, respectively are –

- (1) K_2MnO_4 , $KMnO_4$ and SO_2
- (2) K_2MnO_4 , $KMnO_4$ and Cl_2
- (3) K_3MnO_4 , K_2MnO_4 and Cl_2
- (4) $KMnO_4$, K_2MnO_4 and Cl_2

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



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 –



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.

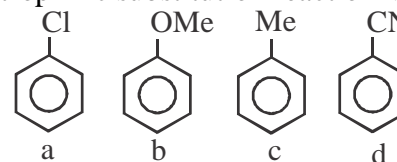
(III) Oxides of indium and thallium are basic.

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

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

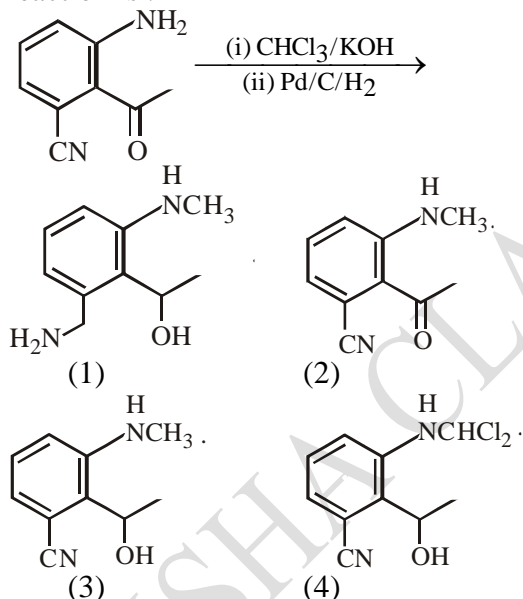
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- (2) Brownian motion in colloidal solution is faster the viscosity of the solution is very high.
- (3) Colloidal medicines are more effective because they have small surface area.
- (4) Addition of alum to water makes it unfit for drinking.

Q.21 The reaction, $\text{MgO(s)} + \text{C(s)} \rightarrow \text{Mg(s)} + \text{CO(g)}$, for which $\Delta_r H^\circ = +491.1 \text{ kJ mol}^{-1}$ and $\Delta_r S^\circ = 198.0 \text{ JK}^{-1} \text{ mol}^{-1}$, is not feasible at 298K. Temperature above which reaction will be feasible is :-

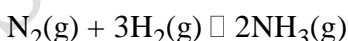
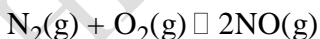
- (1) 1890.0 K (2) 2480.3 K
 (3) 2040.5 K (4) 2380.5 K

Q.22 The major product obtained in the following reaction is :



Q.23 The value of K_p / K_c for the following reactions at 300K are, respectively :

(At 300 K, $RT = 24.62 \text{ dm}^3 \text{ atm mol}^{-1}$)



- (1) $1, 24.62 \text{ dm}^3 \text{ atm mol}^{-1}$,
 $606.0 \text{ dm}^6 \text{ atm}^2 \text{ mol}^{-2}$

- (2) $1, 4.1 \times 10^{-2} \text{ dm}^{-3} \text{ atm}^{-1} \text{ mol}^{-1}$,
 $606.0 \text{ dm}^6 \text{ atm}^2 \text{ mol}^{-2}$
 (3) $606.0 \text{ dm}^6 \text{ atm}^2 \text{ mol}^{-2}$,
 $1.65 \times 10^{-3} \text{ dm}^3 \text{ atm}^{-2} \text{ mol}^{-1}$
 (4) $1, 24.62 \text{ dm}^3 \text{ atm mol}^{-1}$,
 $1.65 \times 10^{-3} \text{ dm}^{-6} \text{ atm}^{-2} \text{ mol}^2$

Q.24 NO_2 required for a reaction is produced by the decomposition of N_2O_5 in CCl_4 as per the equation : $2\text{N}_2\text{O}_5(\text{g}) \rightarrow 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$

The initial concentration of N_2O_5 is 3.00 mol L^{-1} and it is 2.75 mol L^{-1} after 30 minutes. The rate of formation of NO_2 is :

- (1) $2.083 \times 10^{-3} \text{ mol L}^{-1} \text{ min}^{-1}$
 (2) $4.167 \times 10^{-3} \text{ mol L}^{-1} \text{ min}^{-1}$
 (3) $8.333 \times 10^{-3} \text{ mol L}^{-1} \text{ min}^{-1}$
 (4) $1.667 \times 10^{-2} \text{ mol L}^{-1} \text{ min}^{-1}$

Q.25 An open vessel at 27°C is heated until two fifth of the air (assumed as an ideal gas) in it has escaped from the vessel. Assuming that the volume of the vessel remains constant, the temperature at which the vessel has been heated is :

- (1) 750°C (2) 500°C
 (3) 750 K (4) 500 K

Q.26 Consider the following statements

- (a) The pH of a mixture containing 400 mL of 0.1M H_2SO_4 and 400 mL of 0.1 M NaOH will be approximately 1.3.
- (b) Ionic product of water is temperature dependent.
- (c) A monobasic acid with $K_a = 10^{-5}$ has a $\text{pH}=5$. The degree of dissociation of this acid is 50%.
- (d) The Le Chatelier's principle is not applicable to common-ion effect.

The correct statement are :

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

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- Q.27** The reagents a and b in the reaction sequence

$$\text{CH}_3\text{COOC}_2\text{H}_5 \xrightarrow{\text{a}} \text{CH}_3\text{COOC}(\text{CH}_3)_3$$

$$\downarrow \text{b}$$

$$\text{CH}_3\text{CONHNH}_2$$
are given by the set
(1) Isopropyl alcohol, hydrazine
(2) Isopropyl alcohol, hydroxylamine
(3) t-butyl alcohol, hydrazine
(4) t-butyl alcohol, hydroxylamine
- 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 H_2O . Mole fraction of NaOH in solution and molality (in 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 H_2SO_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 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 cal $\text{g}^{-1}\text{K}^{-1}$ respectively, then enthalpy of sublimation of iodine at 250°C in

cal g^{-1} is :

- (1) 2.85 (2) 11.4
(3) 5.7 (4) 22.8

Q.33 Given that :

$$E_{\text{O}_2/\text{H}_2\text{O}}^0 = +1.23 \text{ V},$$

$$E_{\text{S}_2\text{O}_8^{2-}/\text{SO}_4^{2-}}^0 = +2.05 \text{ V},$$

$$E_{\text{Br}_2/\text{Br}^-}^0 = +1.09 \text{ V}, \quad E_{\text{Au}^{3+}/\text{Au}}^0 = +1.4 \text{ V}$$

The strongest oxidizing agent is -

- (1) O_2 (2) Br_2
(3) $\text{S}_2\text{O}_8^{2-}$ (4) 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.

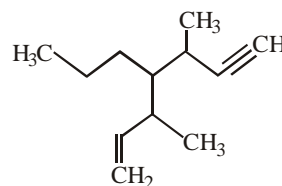
Q.37 The maximum prescribed concentration of copper in drinking water is:

- (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 :



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- (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-heptene
 (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) Ga < Ge (2) Si < Al
 (3) P > S (4) Te > Se

Q.41 Given :

- (i) $C(\text{graphite}) + O_2(g) \rightarrow CO_2(g)$;
 $\Delta_f H^\circ = x \text{ kJ mol}^{-1}$
 (ii) $C(\text{graphite}) + \frac{1}{2} O_2(g) \rightarrow CO(g)$;
 $\Delta_f H^\circ = y \text{ kJ mol}^{-1}$
 (iii) $CO(g) + \frac{1}{2} O_2(g) \rightarrow CO_2(g)$;
 $\Delta_f H^\circ = z \text{ kJ mol}^{-1}$

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)₂(NH₃)₂]
 (2) cis-[Pt(Cl)₂(NH₃)₂]
 (3) trans-[Pt(Cl)₂(NH₃)₂]
 (4) trans-[Pd(Cl)₂(NH₃)₂]

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

- (1) F₃C – CH = CH₂
 (2) Cl – CH = CH₂
 (3) CH₃O – CH = CH₂
 (4) H₂N – CH = CH₂

Q.44 The coordination number of Th in

$K_4[Th(C_2O_4)_4(OH_2)_2]$ is : ($C_2O_4^{2-} = \text{Oxalato}$)

- (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 10λ and λ , 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 ms^{-1} (2) 379 ms^{-1}
 (3) 384 ms^{-1} (4) 338 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 11V 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 \AA . The radius of the atom in the excited state, in terms of Bohr radius a_0 , will be :

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

- (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

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

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

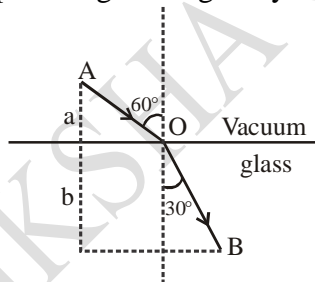
Q.52 Two particles are projected from the same point with the same speed u such that they have the same range R , but different maximum heights, h_1 and h_2 . Which of the following is correct ?

- (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 \AA is used, the minimum separation between two points, to be seen as distinct, will be :

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

Q.54 A ray of light AO in vacuum is incident on a glass slab at angle 60° and refracted at angle 30° 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 2m^3 at a pressure of $3 \times 10^6 \text{ Pa}$. The energy of the gas is:

- (1) 3×10^2 (2) 10^8 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 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) 2.3×10^{-2} (2) 3.3×10^{-2}
 (3) 3.3×10^{-4} (4) 4.3×10^{-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 2eV . The stopping potential of the photo-electrons is :

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

- (1) 0.48 V (2) 2.0 V
 (3) 2.48 V (4) 0.72 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 ms^{-1} with respect to the ground. If an observer in car A detects a frequency 2000 Hz of the sound coming from car B, what is the natural frequency of the sound source in car B ?

$$\text{(Speed of sound in air} = 340 \text{ ms}^{-1}\text{)}$$

- (1) 2250 Hz (2) 2060 Hz
 (3) 2150 Hz (4) 2300 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 cm^2 at its bottom. If the height of the water in the tank remains steady, then this height is:

- (1) 4 cm (2) 2.9 cm
 (3) 1.7 cm (4) 5.1 cm

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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 MeV & 7.06 MeV, respectively. In the nuclear reaction ${}^7_3\text{Li} + {}^1_1\text{H} \rightarrow {}^4_2\text{He} + {}^4_2\text{He} + Q$, the value of energy Q released is –

- (1) 19.6 MeV (2) -2.4 MeV
 (3) 8.4 MeV (4) 17.3 MeV

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° (2) 45°
 (3) 90° (4) 60°

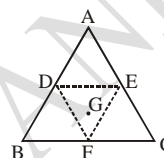
Q.63 A system of three polarizers P_1, P_2, P_3 is set up such that the pass axis of P_3 is crossed with respect to that of P_1 . The pass axis of P_2 is inclined at 60° to the pass axis of P_3 . When a beam of unpolarized light of intensity I_0 is incident on P_1 , the intensity of light transmitted 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) $I = \frac{15}{16} I_0$

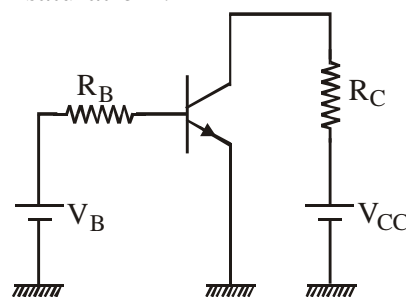
Q.66 A simple harmonic motion is represented by:

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

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 ?

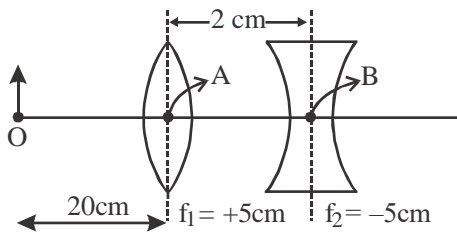


- (1) $100 \mu\text{A}$ (2) $7 \mu\text{A}$
 (3) $40 \mu\text{A}$ (4) $10 \mu\text{A}$

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)

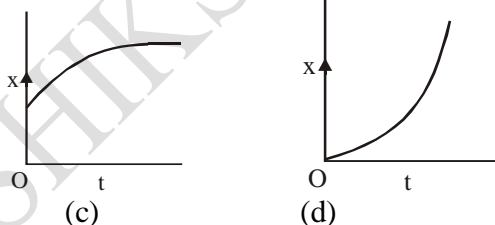
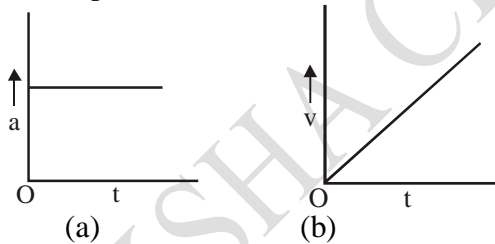
- (1) R/3 (2) R/2
 (3) R/4 (4) R/9

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

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)

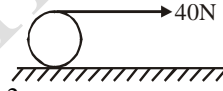


- (1) (a), (b), (c) (2) (a)
 (3) (a), (b), (d) (4) (b), (c)

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 :

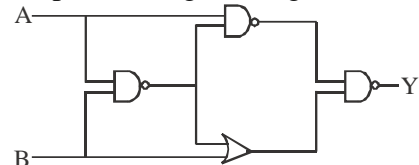
- (1) 16.6 cm (2) 20.0 cm
 (3) 10.0 cm (4) 33.3 cm

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^2 (2) 16 rad/s^2
 (3) 10 rad/s^2 (4) 20 rad/s^2

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



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

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

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

Q.75 An alternating voltage $v(t) = 220 \sin 100 \pi t$ volt is applied to a purely resistance load of 50Ω . 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

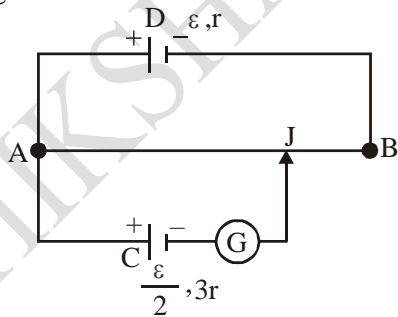
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- Q.76** In a Young's double slit experiment with slit separation 0.1 mm, one observes a bright fringe at angle $(1/40)$ rad by using light of wavelength λ_1 . When the light of wavelength λ_2 is used a bright fringe is seen at the same angle in the same set up. Given that λ_1 and λ_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 θ with each other. If the force Q is doubled, then their resultant also gets doubled. Then, the angle is :
- (1) 30° (2) 60°
 (3) 90° (4) 120°

- Q.78** A proton and an α -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) $1 : \sqrt{3}$

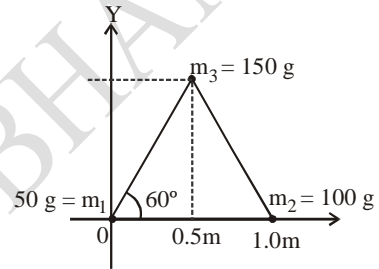
- Q.79** A potentiometer wire AB having length L and resistance 12 r is joined to a cell D of emf ε and internal resistance r. A cell C having emf $\varepsilon/2$ and internal resistance 3r is connected. The length AJ at which the galvanometer as shown in fig. shows no deflection is :



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

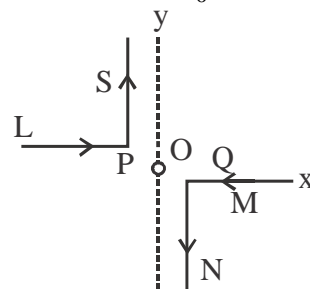
- Q.80** The bob of a simple pendulum has mass 2g and a charge of $5.0 \mu\text{C}$. It is at rest in a uniform horizontal electric field of intensity 2000 V/m. At equilibrium, the angle that the pendulum makes with the vertical is : (take $g = 10 \text{ m/s}^2$)
- (1) $\tan^{-1} (5.0)$ (2) $\tan^{-1} (2.0)$
 (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) $\left(\frac{7}{12} \text{ m}, \frac{\sqrt{3}}{8} \text{ m} \right)$ (2) $\left(\frac{\sqrt{3}}{4} \text{ m}, \frac{5}{12} \text{ m} \right)$
 (3) $\left(\frac{7}{12} \text{ m}, \frac{\sqrt{3}}{4} \text{ m} \right)$ (4) $\left(\frac{\sqrt{3}}{8} \text{ m}, \frac{7}{12} \text{ m} \right)$

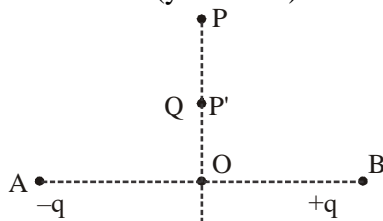
- Q.82** As shown in the figure, two infinitely long, identical wires are bent by 90° and placed in such a way that the segments LP and QM are along the x-axis, while segments PS and QN are parallel to the y-axis. If $OP = OQ = 4 \text{ cm}$, and the magnitude of the magnetic field at O is 10^{-4} T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



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- (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

- 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) $1 \times 10^9 \text{ N/m}^2$

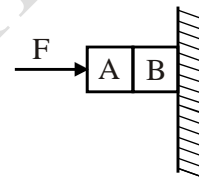
- Q.86** The dimensional formula of effective torsional constant of spring is -

- (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°C and 177°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 :-

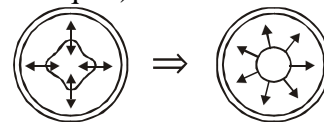


- (1) 120 N (2) 150 N
 (3) 100 N (4) 80 N

- Q.89** To increase de-Broglie wavelength of an electron from $0.5 \times 10^{-10} \text{ m}$ to 10^{-10} 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) πRT
 (3) RT (4) $\pi R^2 T$

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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
- 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) Pelycosaurs
- 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) Medullo 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) Archesporial 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

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- 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

- Q.109** Match the following

Column-I

Column-II

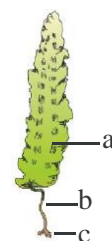
- | | |
|------------------------|----------------------------|
| (i) Budding | (A) Yeast and <i>Hydra</i> |
| (ii) True Regeneration | (B) Planaria |
| (iii) Fragmentation | (C) Protonema |
| (iv) Asexual Spore | (D) Fungi |
- (1) i-D, ii-C, iii-B, iv-A
 - (2) i-A, ii-B, iii-D, iv-C
 - (3) i-B, ii-A, iii-C, iv-D
 - (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 :-

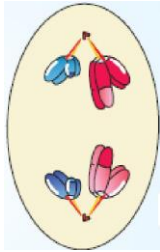
Egg cell – A, Embryo – B, Endosperm – C

- (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*
- (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 :-

Column-I
(Sphincter/valve)

Column-II
(Location)

- 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.

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(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

Q.133 In which cheese there is large holes due to the production of CO₂ :

- (1) Swiss cheese (2) Roquefort cheese

- (3) Raw cheese (4) All of the above

Q.134 All of the following RNAs are synthesised 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

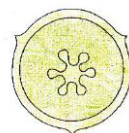
Q.136 Which of the following is not the technique of genetic engineering :

- (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 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

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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 melon, 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

Q.145 Carolus linnaeus was proposed scientific name of animals in his book systema naturae (in 10th 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

$$\% \begin{array}{c} \uparrow \\ \ominus \\ \oplus \end{array} K_{(5)} C_{1+2+(2)} A_{(9)+1} \underline{G}_1$$

- (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

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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

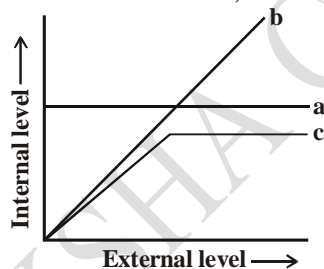
Q.155 In mature parts of most of the flowering plants, the tissues formed after dedifferentiation are

- (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 :



	(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.

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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

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

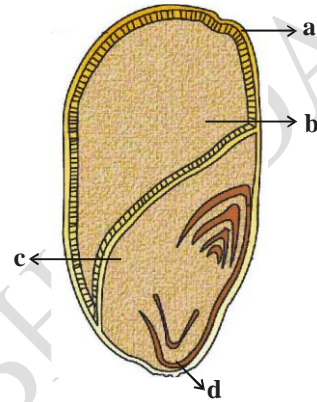
Q.167 Choose the **incorrect** statement w.r.t. life cycle of cockroach

- (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:



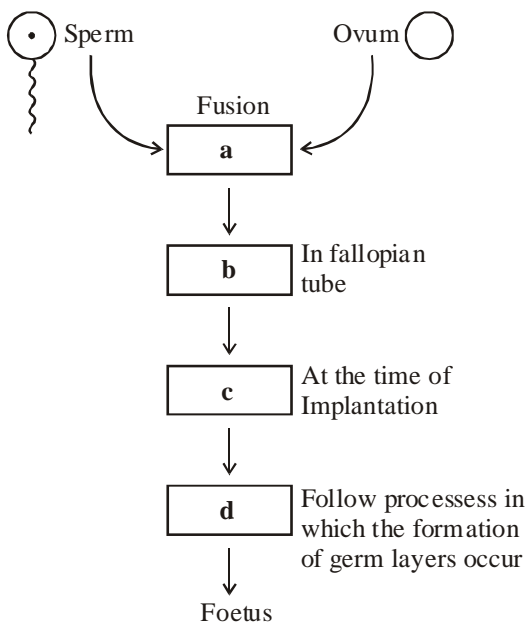
- (1) a-Scutellum, b-Coleorrhiza, c-Hypoblast, d-Coleoptile
(2) a-Scutellum, b-Coleoptile, c-Epiblast, d-Coleorrhiza
(3) a-Aleurone layer, b-Endosperm, c-Scutellum, d-Coleorrhiza
(4) a-Seed coat, b-Aleurone layer, c-Epiblast, d-Coleoptile

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 :

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- (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

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-nitrosodimethyline (2) Caffeine
 (3) Nicotine (4) Dopamin

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

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