

PYQSide

AIPMT 2012 (MAINS) — QUESTION PAPER

Max. Marks: 480

Questions: 120

Section A (MCQ)

Q.1 The dimensions of $(\mu_0 \epsilon_0)^{-1/2}$ are

[AIPMT 2012 (Mains)]

- (1) $[L^{1/2}T^{-1/2}]$ (2) $[L^{-1}T]$
(3) $[LT^{-1}]$ (4) $[L^{1/2}T^{1/2}]$

Scan or tap for the full solution



Q.2 A stone is dropped from a height h . It hits the ground with a certain momentum P . If the same stone is dropped from a height 100% more than the previous height, the momentum when it hits the ground will change by

[AIPMT 2012 (Mains)]

- (1) 68% (2) 41% (3) 200% (4) 100%

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Q.3 A car of mass m starts from rest and accelerates so that the instantaneous power delivered to the car has a constant magnitude P_0 . The instantaneous velocity of this car is proportional to

[AIPMT 2012 (Mains)]

- (1) $t^2 P_0$ (2) $t^{1/2}$ (3) $t^{-1/2}$ (4) $\frac{t}{\sqrt{m}}$

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Q.4 A car of mass m is moving on a level circular track of radius R . If μ_s represents the coefficient of static friction between the road and tyres of the car, the maximum speed of the car in circular motion is given by

[AIPMT 2012 (Mains)]

- (1) $\sqrt{\mu_s m R g}$ (2) $\sqrt{\frac{R g}{\mu_s}}$
(3) $\sqrt{\frac{m R g}{\mu_s}}$ (4) $\sqrt{\mu_s R g}$

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Q.5 A circular platform is mounted on a frictionless vertical axle. Its radius $R = 2$ m and its moment of inertia about the axle is 200 kg m^2 . It is initially at rest. A 50 kg man stands on the edge of the platform and begins to walk along the edge at the speed of 1 m s^{-1} relative to the ground. Time taken by the man to complete one revolution is

[AIPMT 2012 (Mains)]

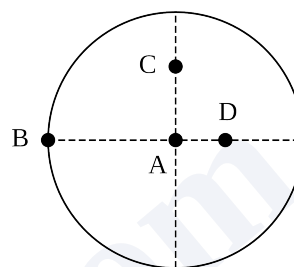
- (1) $\pi \text{ s}$ (2) $\frac{3\pi}{2} \text{ s}$ (3) $2\pi \text{ s}$ (4) $\frac{\pi}{2} \text{ s}$

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Q.6 The moment of inertia of a uniform circular disc is maximum about an axis perpendicular to the disc and passing through

[AIPMT 2012 (Mains)]



- (1) B (2) C (3) D (4) A

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Q.7 Three masses are placed on the x -axis : 300 g at origin, 500 g at $x = 40$ cm and 400 g at $x = 70$ cm. The distance of the centre of mass from the origin is

[AIPMT 2012 (Mains)]

- (1) 40 cm (2) 45 cm (3) 50 cm (4) 30 cm

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Q.8 If v_e is escape velocity and v_o is orbital velocity of a satellite for orbit close to the earth's surface, then these are related by

[AIPMT 2012 (Mains)]

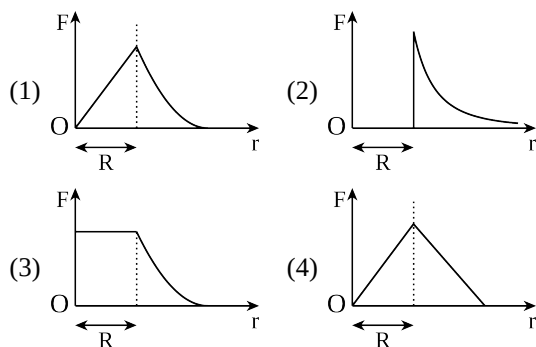
- (1) $v_o = \sqrt{2} v_e$ (2) $v_o = v_e$
(3) $v_e = \sqrt{2} v_o$ (4) $v_e = \sqrt{2} v_o$

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Q.9 Which one of the following plots represents the variation of gravitational field on a particle with distance r due to a thin spherical shell of radius R ? (r is measured from the centre of the spherical shell)

[AIPMT 2012 (Mains)]



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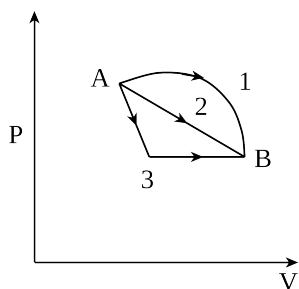
- Q.10** A slab of stone of area 0.36 m^2 and thickness 0.1 m is exposed on the lower surface to steam at 100°C . A block of ice at 0°C rests on the upper surface of the slab. In one hour 4.8 kg of ice is melted. The thermal conductivity of slab is
(Given latent heat of fusion of ice = $3.36 \times 10^5 \text{ J kg}^{-1}$) [AIPMT 2012 (Mains)]

- (1) $1.24 \text{ J/m/s}^\circ\text{C}$ (2) $1.29 \text{ J/m/s}^\circ\text{C}$
(3) $2.05 \text{ J/m/s}^\circ\text{C}$ (4) $1.02 \text{ J/m/s}^\circ\text{C}$

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- Q.11** An ideal gas goes from state A to state B via three different processes as indicated in the P-V diagram.



If Q_1, Q_2, Q_3 indicate the heat absorbed by the gas along the three processes and $\Delta U_1, \Delta U_2, \Delta U_3$ indicate the change in internal energy along the three processes respectively, then

[AIPMT 2012 (Mains)]

- (1) $Q_1 > Q_2 > Q_3$ and $\Delta U_1 = \Delta U_2 = \Delta U_3$
(2) $Q_3 > Q_2 > Q_1$ and $\Delta U_1 = \Delta U_2 = \Delta U_3$
(3) $Q_1 = Q_2 = Q_3$ and $\Delta U_1 > \Delta U_2 > \Delta U_3$
(4) $Q_3 = Q_2 = Q_1$ and $\Delta U_1 > \Delta U_2 > \Delta U_3$

Scan or tap for the full solution



- Q.12** The equation of a simple harmonic wave is given by $y = 3\sin\frac{\pi}{2}(50t - x)$,

where x and y are in metres and t is in seconds. The ratio of maximum particle velocity to the wave velocity is [AIPMT 2012 (Mains)]

- (1) 2π (2) $\frac{3}{2}\pi$ (3) 3π (4) $\frac{2}{3}\pi$

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- Q.13** A parallel plate capacitor has a uniform electric field E in the space between the plates. If the distance between the plates is d and area of each plate is A , the energy stored in the capacitor is [AIPMT 2012 (Mains)]

- (1) $\frac{1}{2}\epsilon_0 E^2$ (2) $\frac{E^2 A d}{\epsilon_0}$
(3) $\frac{1}{2}\epsilon_0 E^2 A d$ (4) $\epsilon_0 E A d$

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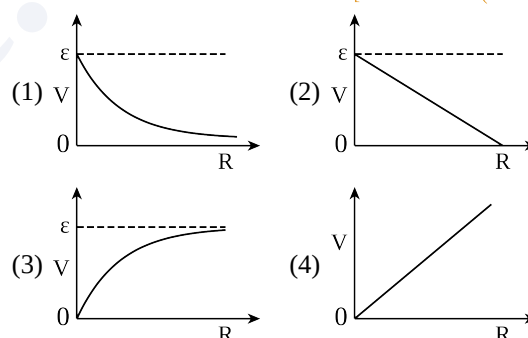
- Q.14** Two metallic spheres of radii 1 cm and 3 cm are given charges of $-1 \times 10^{-2} \text{ C}$ and $5 \times 10^{-2} \text{ C}$, respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is [AIPMT 2012 (Mains)]

- (1) $2 \times 10^{-2} \text{ C}$ (2) $3 \times 10^{-2} \text{ C}$
(3) $4 \times 10^{-2} \text{ C}$ (4) $1 \times 10^{-2} \text{ C}$

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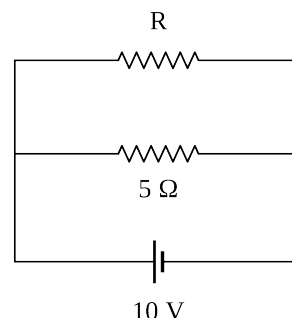
- Q.15** A cell having an emf ϵ and internal resistance r is connected across a variable external resistance R . As the resistance R is increased, the plot of potential difference V across R is given by [AIPMT 2012 (Mains)]



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- Q.16** The power dissipated in the circuit shown in the figure is 30 watts . The value of R is [AIPMT 2012 (Mains)]



- (1) 20Ω (2) 15Ω (3) 10Ω (4) 30Ω

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Q.17 A proton carrying 1 MeV kinetic energy is moving in a circular path of radius R in uniform magnetic field. What should be the energy of an α -particle to describe a circle of same radius in the same field?

[AIPMT 2012 (Mains)]

- (1) 2 MeV (2) 1 MeV
(3) 0.5 MeV (4) 4 MeV

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Q.18 A magnetic needle suspended parallel to a magnetic field requires $\sqrt{3}$ J of work to turn it through 60° . The torque needed to maintain the needle in this position will be

[AIPMT 2012 (Mains)]

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

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Q.19 The instantaneous values of alternating current and voltage in a circuit are given as

$$i = \frac{1}{\sqrt{2}} \sin(100\pi t) \text{ ampere}$$

$$e = \frac{1}{\sqrt{2}} \sin\left(100\pi t + \frac{\pi}{3}\right) \text{ Volt}$$

The average power in watts consumed in the circuit is

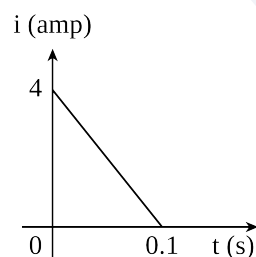
[AIPMT 2012 (Mains)]

- (1) $\frac{1}{4}$ (2) $\frac{\sqrt{3}}{4}$ (3) $\frac{1}{2}$ (4) $\frac{1}{8}$

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Q.20 In a coil of resistance 10Ω , the induced current developed by changing magnetic flux through it, is shown in figure as a function of time. The magnitude of change in flux through the coil in weber is

[AIPMT 2012 (Mains)]



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

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Q.21 The ratio of amplitude of magnetic field to the amplitude of electric field for an electromagnetic wave propagating in vacuum is equal to

[AIPMT 2012 (Mains)]

- (1) the speed of light in vacuum
(2) reciprocal of speed of light in vacuum
(3) the ratio of magnetic permeability to the electric susceptibility of vacuum
(4) unity

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Q.22 For the angle of minimum deviation of a prism to be equal to its refracting angle, the prism must be made of a material whose refractive index

[AIPMT 2012 (Mains)]

- (1) lies between $\sqrt{2}$ and 1
(2) lies between 2 and $\sqrt{2}$
(3) is less than 1
(4) is greater than 2

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Q.23 A rod of length 10 cm lies along the principal axis of a concave mirror of focal length 10 cm in such a way that its end closer to the pole is 20 cm away from the mirror. The length of the image is

[AIPMT 2012 (Mains)]

- (1) 10 cm (2) 15 cm (3) 2.5 cm (4) 5 cm

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Q.24 If the momentum of an electron is changed by P , then the de Broglie wavelength associated with it changes by 0.5%. The initial momentum of electron will be

[AIPMT 2012 (Mains)]

- (1) $200 P$ (2) $400 P$ (3) $\frac{P}{200}$ (4) $100 P$

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Q.25 Two radiations of photons energies 1 eV and 2.5 eV, successively illuminate a photosensitive metallic surface of work function 0.5 eV. The ratio of the maximum speeds of the emitted electrons is

[AIPMT 2012 (Mains)]

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

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Q.26 The transition from the state $n = 3$ to $n = 1$ in a hydrogen like atom results in ultraviolet radiation. Infrared radiation will be obtained in the transition from

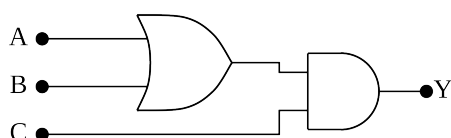
[AIPMT 2012 (Mains)]

- (1) $2 \rightarrow 1$ (2) $3 \rightarrow 2$
(3) $4 \rightarrow 2$ (4) $4 \rightarrow 3$

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- Q.27** To get an output $Y = 1$ in given circuit which of the following input will be correct ?

[AIPMT 2012 (Mains)]



- (1) $A \rightarrow 1, B \rightarrow 0, C \rightarrow 0$
 (2) $A \rightarrow 1, B \rightarrow 0, C \rightarrow 1$
 (3) $A \rightarrow 1, B \rightarrow 1, C \rightarrow 0$
 (4) $A \rightarrow 0, B \rightarrow 1, C \rightarrow 0$

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- Q.28** A train moving at a speed of 220 m s^{-1} towards a stationary object, emits a sound of frequency 1000 Hz . Some of the sound reaching the object gets reflected back to the train as echo. The frequency of the echo as detected by the driver of the train is

(Speed of sound in air is 330 m s^{-1})

[AIPMT 2012 (Mains)]

- (1) 3500 Hz (2) 4000 Hz (3) 5000 Hz (4) 3000 Hz

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- Q.29** The half life of a radioactive nucleus is 50 days. The time interval $(t_2 - t_1)$ between the time t_2 when $\frac{2}{3}$ of it has decayed and the time t_1 when $\frac{1}{3}$ of it had decayed is

[AIPMT 2012 (Mains)]

- (1) 30 days (2) 50 days (3) 60 days (4) 15 days

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- Q.30** The input resistance of a silicon transistor is 100Ω . Base current is changed by $40 \mu\text{A}$ which results in a change in collector current by 2 mA . This transistor is used as a common emitter amplifier with a load resistance of $4 \text{ k}\Omega$. The voltage gain of the amplifier is

[AIPMT 2012 (Mains)]

- (1) 2000 (2) 3000 (3) 4000 (4) 1000

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- Q.31** The orbital angular momentum of a p-electron is given as

[AIPMT 2012 (Mains)]

- (1) $\frac{h}{\sqrt{2}\pi}$ (2) $\sqrt{3} \frac{h}{2\pi}$ (3) $\sqrt{\frac{3}{2}} \frac{h}{\pi}$ (4) $\sqrt{6} \frac{h}{2\pi}$

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- Q.32** During change of O_2 to O_2^- ion, the electron adds on which one of the following orbitals ?

[AIPMT 2012 (Mains)]

- (1) π^* orbital (2) π orbital (3) σ^* orbital (4) σ orbital

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- Q.33** Four diatomic species are listed below. Identify the correct order in which the bond order is increasing in them

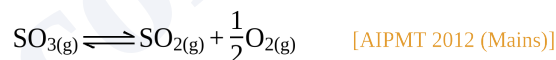
[AIPMT 2012 (Mains)]

- (1) $\text{NO} < \text{O}_2^- < \text{C}_2^{2-} < \text{He}_2^+$
 (2) $\text{O}_2^- < \text{NO} < \text{C}_2^{2-} < \text{He}_2^+$
 (3) $\text{C}_2^{2-} < \text{He}_2^+ < \text{O}_2^- < \text{NO}$
 (4) $\text{He}_2^+ < \text{O}_2^- < \text{NO} < \text{C}_2^{2-}$

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- Q.34** Given that the equilibrium constant for the reaction, $2\text{SO}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{SO}_{3(g)}$ has a value of 278 at a particular temperature. What is the value of the equilibrium constant for the following reaction at the same temperature ?



[AIPMT 2012 (Mains)]

- (1) 1.8×10^{-3} (2) 3.6×10^{-3}
 (3) 6.0×10^{-2} (4) 1.3×10^{-5}

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- Q.35** Given the reaction between 2 gases represented by A_2 and B_2 to give the compound AB(g) , $\text{A}_2(\text{g}) + \text{B}_2(\text{g}) \rightleftharpoons 2\text{AB(g)}$

At equilibrium, the concentration of $\text{A}_2 = 3.0 \times 10^{-3} \text{ M}$, of $\text{B}_2 = 4.2 \times 10^{-3} \text{ M}$, of $\text{AB} = 2.8 \times 10^{-3} \text{ M}$

If the reaction takes place in a sealed vessel at 527°C , then the value of K_c will be

[AIPMT 2012 (Mains)]

- (1) 2.0 (2) 1.9 (3) 0.62 (4) 4.5

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- Q.36** Which of the following reagents will be able to distinguish between 1-butyne and 2-butyne?

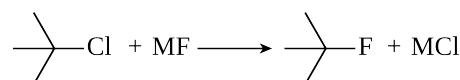
[AIPMT 2012 (Mains)]

- (1) NaNH_2 (2) HCl (3) O_2 (4) Br_2

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- Q.37** In the replacement reaction



The reaction will be most favourable if M happens to be

[AIPMT 2012 (Mains)]

- (1) Na (2) K (3) Rb (4) Li

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Q.38 Which of the following compounds can be used as antifreeze in automobile radiators?

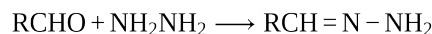
[AIPMT 2012 (Mains)]

- (1) Methyl alcohol (2) Glycol
(3) Nitrophenol (4) Ethyl alcohol

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Q.39 Consider the reaction :



What sort of reaction is it? [AIPMT 2012 (Mains)]

- (1) Electrophilic addition-elimination reaction
(2) Free radical addition-elimination reaction
(3) Electrophilic substitution-elimination reaction
(4) Nucleophilic addition-elimination reaction

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Q.40 Which of the following compounds will give a yellow precipitate with iodine and alkali?

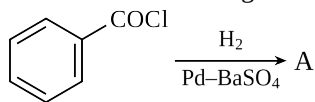
[AIPMT 2012 (Mains)]

- (1) Acetophenone (2) Methyl acetate
(3) Acetamide (4) 2-Hydroxypropane

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Q.41 Consider the following reaction



The product A is

[AIPMT 2012 (Mains)]

- (1) $\text{C}_6\text{H}_5\text{CHO}$ (2) $\text{C}_6\text{H}_5\text{OH}$
(3) $\text{C}_6\text{H}_5\text{COCH}_3$ (4) $\text{C}_6\text{H}_5\text{Cl}$

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Q.42 An organic compound ($\text{C}_3\text{H}_9\text{N}$) (A), when treated with nitrous acid, gave an alcohol and N_2 gas was evolved. (A) on warming with CHCl_3 and caustic potash gave (C) which on reduction gave isopropylmethylamine. Predict the structure of (A)

[AIPMT 2012 (Mains)]

- (1) $\begin{array}{c} \text{H}_3\text{C} \\ \diagdown \\ \text{CH}-\text{NH}_2 \\ \diagup \\ \text{H}_3\text{C} \end{array}$ (2) $\text{CH}_3\text{CH}_2-\text{NH}-\text{CH}_3$
(3) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{N}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$ (4) $\text{CH}_3\text{CH}_2\text{CH}_2-\text{NH}_2$

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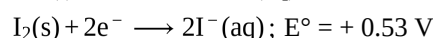
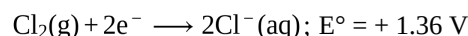
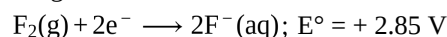
Q.43 Vapour pressure of chloroform (CHCl_3) and dichloromethane (CH_2Cl_2) at 25°C are 200 mm Hg and 41.5 mm Hg respectively. Vapour pressure of the solution obtained by mixing 25.5 g of CHCl_3 and 40 g of CH_2Cl_2 at the same temperature will be (Molecular mass of $\text{CHCl}_3 = 119.5$ u and molecular mass of $\text{CH}_2\text{Cl}_2 = 85$ u) [AIPMT 2012 (Mains)]

- (1) 173.9 mm Hg (2) 615.0 mm Hg
(3) 90.6 mm Hg (4) 285.5 mm Hg

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Q.44 Standard reduction potentials of the half reactions are given below :



The strongest oxidising and reducing agents respectively are

[AIPMT 2012 (Mains)]

- (1) F_2 and I^- (2) Br_2 and Cl^-
(3) Cl_2 and Br^- (4) Cl_2 and I_2

Scan or tap for the full solution



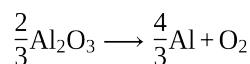
Q.45 Molar conductivities (Λ°_m) at infinite dilution of NaCl , HCl and CH_3COONa are 126.4, 425.9 and $91.0 \text{ S cm}^2 \text{ mol}^{-1}$ respectively. (Λ°_m) for CH_3COOH will be [AIPMT 2012 (Mains)]

- (1) $425.5 \text{ S cm}^2 \text{ mol}^{-1}$ (2) $180.5 \text{ S cm}^2 \text{ mol}^{-1}$
(3) $290.8 \text{ S cm}^2 \text{ mol}^{-1}$ (4) $390.5 \text{ S cm}^2 \text{ mol}^{-1}$

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Q.46 The Gibbs energy for the decomposition of Al_2O_3 at 500°C is as follows



$$\Delta_r G = +960 \text{ kJ mol}^{-1}$$

The potential difference needed for the electrolytic reduction of aluminium oxide (Al_2O_3) at 500°C is at least

[AIPMT 2012 (Mains)]

- (1) 4.5 V (2) 3.0 V (3) 2.5 V (4) 5.0 V

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Q.47 Activation energy (E_a) and rate constants (k_1 and k_2) of a chemical reaction at two different temperatures (T_1 and T_2) are related by

[AIPMT 2012 (Mains)]

- (1) $\ln \frac{k_2}{k_1} = -\frac{E_a}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$
 (2) $\ln \frac{k_2}{k_1} = -\frac{E_a}{R} \left(\frac{1}{T_2} - \frac{1}{T_1} \right)$
 (3) $\ln \frac{k_2}{k_1} = -\frac{E_a}{R} \left(\frac{1}{T_2} + \frac{1}{T_1} \right)$
 (4) $\ln \frac{k_2}{k_1} = \frac{E_a}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$

Scan or tap for the
full solution



Q.48 In which of the following arrangements the given sequence is not strictly according to the property indicated against it? [AIPMT 2012 (Mains)]

- (1) $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$: increasing acidic strength
 (2) $\text{H}_2\text{O} < \text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$: increasing $\text{p}K_a$ values
 (3) $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3$: increasing acidic character
 (4) $\text{CO}_2 < \text{SiO}_2 < \text{SnO}_2 < \text{PbO}_2$: increasing oxidising power

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full solution



Q.49 The catalytic activity of transition metals and their compounds is ascribed mainly to [AIPMT 2012 (Mains)]

- (1) their magnetic behaviour
 (2) their unfilled d-orbitals
 (3) their ability to adopt variable oxidation states
 (4) their chemical reactivity

Scan or tap for the
full solution



Q.50 Which of the following exhibits only +3 oxidation state? [AIPMT 2012 (Mains)]

- (1) U (2) Th (3) Ac (4) Pa

Scan or tap for the
full solution



Q.51 Which one of the following does not correctly represent the correct order of the property indicated against it? [AIPMT 2012 (Mains)]

- (1) $\text{Ti} < \text{V} < \text{Cr} < \text{Mn}$: increasing number of oxidation states
 (2) $\text{Ti}^{3+} < \text{V}^{3+} < \text{Cr}^{3+} < \text{Mn}^{3+}$: increasing magnetic moment
 (3) $\text{Ti} < \text{V} < \text{Cr} < \text{Mn}$: increasing melting points
 (4) $\text{Ti} < \text{V} < \text{Mn} < \text{Cr}$: increasing 2nd ionization enthalpy

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full solution



Q.52 Four successive members of the first series of the transition metals are listed below. For which one of them the standard potential ($E^\circ_{\text{M}^{2+}/\text{M}}$) value has a positive sign? [AIPMT 2012 (Mains)]

- (1) Co (Z = 27) (2) Ni (Z = 28)
 (3) Cu (Z = 29) (4) Fe (Z = 26)

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full solution



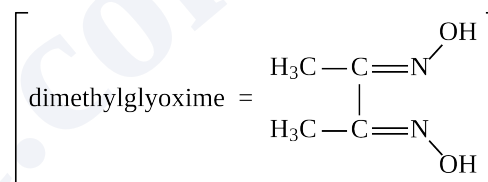
Q.53 Low spin complex of d^6 -cation in an octahedral field will have the following energy [AIPMT 2012 (Mains)]

- (1) $-\frac{12}{5}\Delta_o + P$ (2) $-\frac{12}{5}\Delta_o + 3P$
 (3) $-\frac{2}{5}\Delta_o + 2P$ (4) $-\frac{2}{5}\Delta_o + P$

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full solution



Q.54 Red precipitate is obtained when ethanol solution of dimethylglyoxime is added to ammoniacal Ni(II). Which of the following statements is not true? [AIPMT 2012 (Mains)]



- (1) Red complex has a square planar geometry.
 (2) Complex has symmetrical H-bonding.
 (3) Red complex has a tetrahedral geometry.
 (4) Dimethylglyoxime functions as bidentate ligand.

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full solution



Q.55 A certain gas takes three times as long to effuse out as helium. Its molecular mass will be [AIPMT 2012 (Mains)]

- (1) 27 u (2) 36 u (3) 64 u (4) 9 u

Scan or tap for the
full solution



Q.56 For real gases van der Waals equation is written as $\left(p + \frac{an^2}{V^2} \right) (V - nb) = nRT$

where a and b are van der Waals constants. Two sets of gases are

- (I) O_2 , CO_2 , H_2 and He
 (II) CH_4 , O_2 and H_2

The gases given in set-I in increasing order of b and gases given in set-II in decreasing order of a, are arranged below. Select the correct order from the following [AIPMT 2012 (Mains)]

- (1) (I) $\text{He} < \text{H}_2 < \text{CO}_2 < \text{O}_2$ (II) $\text{CH}_4 > \text{H}_2 > \text{O}_2$
 (2) (I) $\text{O}_2 < \text{He} < \text{H}_2 < \text{CO}_2$ (II) $\text{H}_2 > \text{O}_2 > \text{CH}_4$
 (3) (I) $\text{H}_2 < \text{He} < \text{O}_2 < \text{CO}_2$ (II) $\text{CH}_4 > \text{O}_2 > \text{H}_2$
 (4) (I) $\text{H}_2 < \text{O}_2 < \text{He} < \text{CO}_2$ (II) $\text{O}_2 > \text{CH}_4 > \text{H}_2$

Scan or tap for the
full solution



Q.57 Equal volumes of two monoatomic gases, A and B at same temperature and pressure are mixed. The ratio of specific heats (C_p/C_v) of the mixture will be

[AIPMT 2012 (Mains)]

- (1) 0.83 (2) 1.50 (3) 3.3 (4) 1.67

Scan or tap for the
full solution



Q.58 Which one of the following sets forms the biodegradable polymer? [AIPMT 2012 (Mains)]

- (1) $\text{CH}_2=\text{CH}-\text{CN}$ and $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$
 (2) $\text{H}_2\text{N}-\text{CH}_2-\text{COOH}$ and $\text{H}_2\text{N}-(\text{CH}_2)_5-\text{COOH}$

- (3) $\text{HO}-\text{CH}_2-\text{CH}_2-\text{OH}$ and



- (4) and $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$

Scan or tap for the
full solution



Q.59 Structure of a mixed oxide is cubic close packed (ccp). The cubic unit cell of mixed oxide is composed of oxide ions. One fourth of the tetrahedral voids are occupied by divalent metal A and the octahedral voids are occupied by a monovalent metal B. The formula of the oxide is

[AIPMT 2012 (Mains)]

- (1) ABO_2 (2) A_2BO_2 (3) $\text{A}_2\text{B}_3\text{O}_4$ (4) AB_2O_2

Scan or tap for the
full solution



Q.60 Chloramphenicol is an

[AIPMT 2012 (Mains)]

- (1) antifertility drug
 (2) antihistaminic
 (3) antiseptic and disinfectant
 (4) antibiotic-broad spectrum

Scan or tap for the
full solution



Q.61 Which one of the following organisms is scientifically correctly named, correctly printed according to the international Rules of Nomenclature and correctly described?

[AIPMT 2012 (Mains)]

- (1) *Musca domestica*
 – the common house lizard, a reptile
 (2) *Plasmodium falciparum*
 – a protozoan pathogen causing the most serious type of malaria.
 (3) *Felis tigris*
 – the Indian tiger, well protected in Gir forests.
 (4) *E. coli* – full name *Entamoeba coli*, a commonly occurring bacterium in human intestine.

Scan or tap for the
full solution



Q.62 In the five kingdom classification, *Chlamydomonas* and *Chlorella* have been included in

[AIPMT 2012 (Mains)]

- (1) protista (2) algae (3) plantae (4) monera.

Scan or tap for the
full solution



Q.63 Which one of the following pairs is wrongly matched?

[AIPMT 2012 (Mains)]

- (1) *Ginkgo* – Archegonia (2) *Salvinia* – Prothallus
 (3) Viroids – RNA (4) Mustard – Synergids

Scan or tap for the
full solution



Q.64 Read the following five statements (A – E) and answer as asked next to them.

How many of the above statements are correct?

- A. In *Equisetum*, the female gametophyte is retained on the parent sporophyte.
 B. In *Ginkgo*, male gametophyte is not independent.
 C. The sporophyte in *Riccia* is more developed than that in *Polytrichum*.
 D. Sexual reproduction in *Volvox* is isogamous.
 E. The spores of slime moulds lack cell walls.

[AIPMT 2012 (Mains)]

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

Scan or tap for the
full solution



Q.65 How many organisms in the list given below are autotrophs?

Lactobacillus, *Nostoc*, *Chara*, *Nitrosomonas*, *Nitrobacter*, *Streptomyces*, *Saccharomyces*, *Trypanosoma*, *Porphyra*, *Wolffia*

[AIPMT 2012 (Mains)]

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

Scan or tap for the
full solution



Q.66 Which one of the following organisms is correctly matched with its three characteristics?

[AIPMT 2012 (Mains)]

- (1) Pea : C_3 pathway, endospermic seed, vexillary aestivation
 (2) Tomato : twisted aestivation, axile placentation, berry
 (3) Onion : bulb, imbricate aestivation, axile placentation
 (4) Maize : C_3 pathway, closed vascular bundles, scutellum

Scan or tap for the full solution



Q.67 How many plants in the list given below have marginal placentation?

Mustard, Gram, Tulip, *Asparagus*, Arhar, Sun hemp, Chilli, *Colchicum*, Onion, Moong, Pea, Tobacco, Lupin

[AIPMT 2012 (Mains)]

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

Scan or tap for the full solution



Q.68 Which one of the following biomolecules is correctly characterized? [AIPMT 2012 (Mains)]

- (1) Lecithin – a phosphorylated glyceride found in cell membrane.
 (2) Palmitic acid – an unsaturated fatty acid with 18 carbon atoms.
 (3) Adenylic acid – adenosine with a glucose phosphate molecule.
 (4) Alanine amino acid – contains an amino group and an acidic group anywhere in the molecule.

Scan or tap for the full solution



Q.69 Identify the meiotic stage in which the homologous chromosomes separate while the sister chromatids remain associated at their centromeres.

[AIPMT 2012 (Mains)]

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

Scan or tap for the full solution



Q.70 Read the following four statements (A – D). How many of the above statements are right?

- A. Both photophosphorylation and oxidative phosphorylation involve uphill transport of protons across the membrane.
 B. In dicot stems, a new cambium originates from cells of pericycle at the time of secondary growth.
 C. Stamens in flowers of *Gloriosa* and *Petunia* are polyandrous.
 D. Symbiotic nitrogen fixers occur in free-living state also in soil.

[AIPMT 2012 (Mains)]

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

Scan or tap for the full solution



Q.71 Through their effects on plant growth regulators, what do the temperature and light control in the plants? [AIPMT 2012 (Mains)]

- (1) Apical dominance (2) Flowering
 (3) Closure of stomata (4) Fruit elongation

Scan or tap for the full solution



Q.72 Which one of the following generally acts as an antagonist to gibberellins? [AIPMT 2012 (Mains)]

- (1) Zeatin (2) Ethylene
 (3) ABA (4) IAA

Scan or tap for the full solution



Q.73 Vernalization stimulates flowering in

[AIPMT 2012 (Mains)]

- (1) zamikand (2) turmeric
 (3) carrot (4) ginger.

Scan or tap for the full solution



Q.74 What is the function of germ pore?

[AIPMT 2012 (Mains)]

- (1) Emergence of radicle
 (2) Absorption of water for seed germination
 (3) Initiation of pollen tube
 (4) Release of male gametes

Scan or tap for the full solution



Q.75 Which one of the following statements is wrong?

[AIPMT 2012 (Mains)]

- (1) When pollen is shed at two-celled stage, double fertilization does not take place.
 (2) Vegetative cell is larger than generative cell.
 (3) Pollen grains in some plants remain viable for months.
 (4) Intine is made up of cellulose and pectin.

Scan or tap for the full solution



Q.76 Plants with ovaries having only one or a few ovules, are generally pollinated by

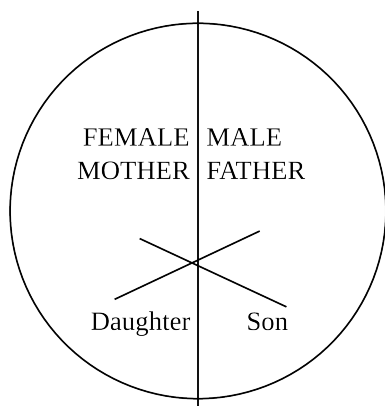
[AIPMT 2012 (Mains)]

- (1) bees (2) butterflies
 (3) birds (4) wind

Scan or tap for the full solution



- Q.77** Represented below is the inheritance pattern of a certain type of traits in humans. Which one of the following conditions could be an example of this pattern ? [AIPMT 2012 (Mains)]



- (1) Haemophilia (2) Sickle cell anaemia
(3) Thalassemia (4) Phenylketonuria

Scan or tap for the full solution 

- Q.78** A test cross is carried out to : [AIPMT 2012 (Mains)]
- (1) Determine whether two species or varieties will breed successfully
 - (2) Determine the genotype of a plant at F_2
 - (3) Predict whether two traits are linked
 - (4) Assess the number of alleles of a gene

Scan or tap for the full solution 

- Q.79** In gobar gas, the maximum amount is that of : [AIPMT 2012 (Mains)]

- (1) Propane (2) Butane
(3) Methane (4) Carbon dioxide

Scan or tap for the full solution 

- Q.80** Read the following four statements (A-D) : How many of the above statements are right ?
- A. In transcription, adenine pairs with uracil
 - B. Regulation of lac operon by repressor is referred to as positive regulation
 - C. The human genome has approximately 50,000 genes
 - D. Haemophilia is a sex-linked recessive disease

[AIPMT 2012 (Mains)]

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

Scan or tap for the full solution 

- Q.81** The domestic sewage in large cities : [AIPMT 2012 (Mains)]

- (1) has very high amounts of suspended solids and dissolved salts
- (2) has a high BOD as it contains both aerobic and anaerobic bacteria.
- (3) is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plant (STPs)
- (4) When treated in STPs does not really require the aeration step as the sewage contains adequate oxygen

Scan or tap for the full solution 

- Q.82** Consider the following four statements (a-d) and select the option which includes all the correct ones only :

- A. Single cell *Spirulina* can produce large quantities of food rich in protein, minerals, vitamins etc.
- B. Body weight-wise the microorganisms *Methylophilus methylotrophus* may be able to produce several times more proteins than the cow per day
- C. Common button mushrooms are a very rich source of vitamin C
- D. A rice variety has been developed which is very rich in calcium

[AIPMT 2012 (Mains)]

- (1) Statements B, C and D
- (2) Statements C, D
- (3) Statements A, C and D
- (4) Statements A, B

Scan or tap for the full solution 

- Q.83** What is it that forms the basis of DNA Fingerprinting ? [AIPMT 2012 (Mains)]

- (1) The relative proportions of purines and pyrimidines in DNA
- (2) The relative amount of DNA in the ridges and grooves of the fingerprints
- (3) The relative difference in the DNA occurrence in blood, skin and saliva
- (4) Satellite DNA occurring as highly repeated short DNA segments

Scan or tap for the full solution 

- Q.84** *Cuscuta* is an example of : [AIPMT 2012 (Mains)]

- (1) Ectoparasitism (2) Predation
- (3) Endoparasitism (4) Brood parasitism

Scan or tap for the full solution 

- Q.85** The rate of formation of new organic matter by rabbit in a grassland, is called :

[AIPMT 2012 (Mains)]

- (1) Net productivity
- (2) Gross primary productivity
- (3) Secondary productivity
- (4) Net primary productivity

Scan or tap for the full solution



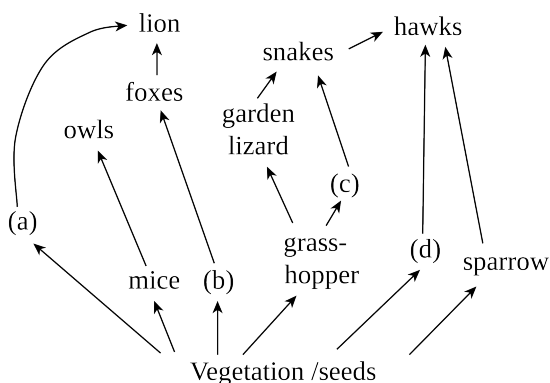
Q.86 The second stage of hydrosere is occupied by plants like [AIPMT 2012 (Mains)]

- (1) *Vallisneria* (2) *Typha*
- (3) *Azolla* (4) *Salix*

Scan or tap for the full solution



Q.87 Identify the likely organisms (a), (b), (c) and (d) in the food web shown below : [AIPMT 2012 (Mains)]



- (1) (a) → deer, (b) → rabbit, (c) → frog, (d) → rat
- (2) (a) → squirrel, (b) → cat, (c) → rat, (d) → pigeon
- (3) (a) → dog, (b) → squirrel, (c) → bat, (d) → deer
- (4) (a) → rat, (b) → dog, (c) → tortoise, (d) → crow

Scan or tap for the full solution



Q.88 Select the correct statement about biodiversity :

[AIPMT 2012 (Mains)]

- (1) Western Ghats have a very high degree of species richness and endemism
- (2) The desert areas of Rajasthan and Gujarat have a very high level of desert animal species as well as numerous rare animals
- (3) Large scale planting of Bt cotton has no adverse effect on biodiversity
- (4) Conservation of biodiversity is just a fad pursued by the developed countries

Scan or tap for the full solution



Q.89 Sacred groves are specially useful in

[AIPMT 2012 (Mains)]

- (1) year-round flow of water in rivers
- (2) conserving rare and threatened species
- (3) preventing soil erosion
- (4) generating environmental awareness

Scan or tap for the full solution



Q.90 As compared to a dicot root, a monocot root has

[AIPMT 2012 (Mains)]

- (1) More abundant secondary xylem
- (2) Relatively thicker periderm
- (3) Many xylem bundles
- (4) Inconspicuous annual rings

Scan or tap for the full solution



Q.91 Which one of the following cellular parts is correctly described ? [AIPMT 2012 (Mains)]

- (1) Lysosomes - optimally active at a pH of about 8.5
- (2) Centrioles - sites for active RNA synthesis
- (3) Thylakoids - flattened membranous sacs forming the grana of chloroplasts
- (4) Ribosomes - those on chloroplasts are larger (80S) while those in the cytoplasm are smaller (70S)

Scan or tap for the full solution



Q.92 Which one of the following structures is an organelle within an organelle ?

[AIPMT 2012 (Mains)]

- (1) Mesosome (2) Peroxisome
- (3) Ribosome (4) ER

Scan or tap for the full solution



Q.93 Which one of the following sets of items in the option A – D are correctly categorized with one exception in it ? [AIPMT 2012 (Mains)]

	ITEMS	CATEGORY	EXCEPTION
(1)	Kangaroo, Koala, Wombat	Australian marsupials	Wombat
(2)	Typhoid, Pneumonia, Diphtheria	Bacterial diseases	Diphtheria
(3)	UAA, UAG, UGA	Stop codons	UAG
(4)	Plasmodium, Cuscuta, Trypanosoma	Protozoan parasites	Cuscuta

Scan or tap for the full solution



Q.94 Read the following four statements (A-D) :
How many of the above statements are wrong ?

- A. Colostrum is recommended for the newborn because it is rich in antigen
 B. Chikungunya is caused by a Gram negative bacterium
 C. Tissue culture has proved useful in obtaining virus-free plants
 D. Beer is manufactured by distillation of fermented grape juice [AIPMT 2012 (Mains)]
- (1) Two (2) One (3) Four (4) Three

Scan or tap for the full solution



Q.95 Which one of the following is a wrong statement regarding mutations ? [AIPMT 2012 (Mains)]

- (1) UV and gamma rays are mutagens
 (2) Deletion and insertion of base pairs cause frame-shift mutations
 (3) Cancer cells commonly show chromosomal aberrations
 (4) Change in a single base pair of DNA does not cause mutation

Scan or tap for the full solution



Q.96 For its action, nitrogenase requires

[AIPMT 2012 (Mains)]

- (1) high input of energy (2) light
 (3) Mn^{2+} (4) super oxygen radicals

Scan or tap for the full solution



Q.97 For its activity, carboxypeptidase requires

[AIPMT 2012 (Mains)]

- (1) Zinc (2) iron (3) niacin (4) copper

Scan or tap for the full solution



Q.98 Green revolution in India occurred during -

[AIPMT 2012 (Mains)]

- (1) 1980's (2) 1950's (3) 1960's (4) 1970's

Scan or tap for the full solution



Q.99 Which one of the following pairs of animals are similar to each other pertaining to the feature stated against them? [AIPMT 2012 (Mains)]

- (1) *Pteropus* and *Ornithorhynchus* – Viviparity
 (2) Garden lizard and crocodile – Three chambered heart
 (3) *Ascaris* and *Ancylostoma* – Metameric segmentation
 (4) Sea horse and flying fish – Cold blooded (poikilothermal)

Scan or tap for the full solution



Q.100 Which one of the following categories of animals, is correctly described with no single exception in it?

[AIPMT 2012 (Mains)]

- (1) All reptiles possess scales, have a three chambered heart and are cold blooded (poikilothermal).
 (2) All bony fishes have four pairs of gills and an operculum on each side.
 (3) All sponges are marine and have collared cells.
 (4) All mammals are viviparous and possess diaphragm for breathing.

Scan or tap for the full solution



Q.101 Which one of the following human organs is often called the "graveyard" of RBCs?

[AIPMT 2012 (Mains)]

- (1) Gall bladder (2) Kidney
 (3) Spleen (4) Liver

Scan or tap for the full solution



Q.102 Which one of the following options gives the correct categorization of six animals according to the type of nitrogenous waste they give out?

[AIPMT 2012 (Mains)]

	Ammonotelic	Ureotelic	Uricotelic
(1)	Pigeon, humans	Aquatic amphibia, lizards	Cockroach
	Ammonotelic	Ureotelic	Uricotelic
(2)	Frog, lizards	Aquatic amphibia, humans	Cockroach
	Ammonotelic	Ureotelic	Uricotelic
(3)	Aquatic amphibia	Frog, humans	Pigeon, lizards, cockroach
	Ammonotelic	Ureotelic	Uricotelic
(4)	Aquatic amphibia	Cockroach, humans	Frog, pigeon,

Scan or tap for the full solution



Q.103 A fall in glomerular filtration rate (GFR) activates

[AIPMT 2012 (Mains)]

- (1) juxtaglomerular cells to release renin
 (2) adrenal cortex to release aldosterone
 (3) adrenal medulla to release adrenaline
 (4) posterior pituitary to release vasopressin.

Scan or tap for the full solution



Q.104 Which one of the following characteristics is common both in humans and adult frogs?

[AIPMT 2012 (Mains)]

- (1) Four chambered heart
- (2) Internal fertilization
- (3) Nucleated RBCs
- (4) Ureotelic mode of excretion

Scan or tap for the full solution



Q.105 The secretory phase in the human menstrual cycle is also called : [AIPMT 2012 (Mains)]

- (1) Follicular phase lasting for about 6 days
- (2) Luteal phase and lasts for about 13 days
- (3) Follicular phase and lasts for about 13 days
- (4) Luteal phase and lasts for about 6 days

Scan or tap for the full solution



Q.106 The idea of mutations was brought forth by :

[AIPMT 2012 (Mains)]

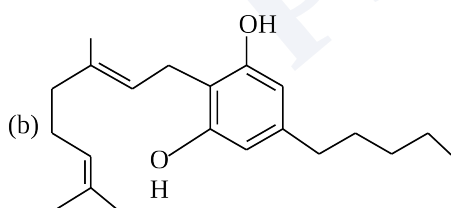
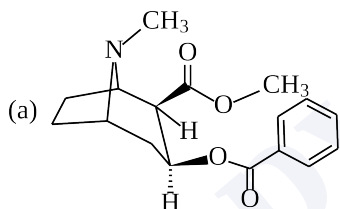
- (1) Charles Darwin, who observed a wide variety of organisms during sea voyage
- (2) Hugo de Vries, who worked on evening primrose
- (3) Gregor Mendel, who worked on *Pisum sativum*
- (4) Hardy and Weinberg, who worked on allele frequencies in a population

Scan or tap for the full solution



Q.107 Identify the molecules (a) and (b) shown below and select the right option giving their source and use.

[AIPMT 2012 (Mains)]



- (1) Molecule → (b) Heroin, Source → *Cannabis sativa*, Use → Depressant and slows down body functions
- (2) Molecule → (a) Morphine, Source → *Papaver somniferum*, Use → Sedative and pain killer
- (3) Molecule → (a) Cocaine, Source → *Erythroxylum coca*, Use → Accelerates the transport of dopamine
- (4) Molecule → (b) Cannabinoid, Source → *Atropa belladonna*, Use → Produces hallucinations

Scan or tap for the full solution



Q.108 Biolistics (gene-gun) is suitable for

[AIPMT 2012 (Mains)]

- (1) DNA finger printing
- (2) Constructing recombinant DNA by joining with vectors
- (3) Disarming pathogen vectors
- (4) Transformation of plant cells

Scan or tap for the full solution



Q.109 In genetic engineering, the antibiotics are used

[AIPMT 2012 (Mains)]

- (1) As sequences from where replication starts
- (2) As selectable markers
- (3) To keep the cultures free of infection
- (4) To select healthy vectors

Scan or tap for the full solution



Q.110 Which one of the following represents a palindromic sequence in DNA ?

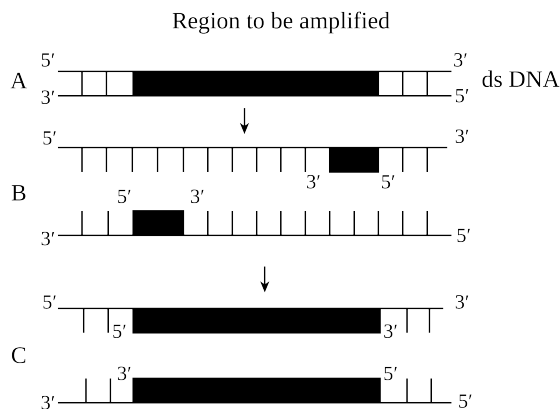
[AIPMT 2012 (Mains)]

- (1) 5'-GAATTC-3'
3'-CTTAAG-5'
- (2) 5'-GATACC-3'
3'-CCTAAG-5'
- (3) 5'-CCAATG-3'
3'-GAATCC-5'
- (4) 5'-CATTAG-3'
3'-GATAAC-5'

Scan or tap for the full solution



Q.111 The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together with what it represents ? [AIPMT 2012 (Mains)]



- (1) C - Extension in the presence of heat stable DNA polymerase
- (2) B - Denaturation at a temperature of about 98°C separating the two DNA strands
- (3) A - Denaturation at a temperature of about 50°C
- (4) A - Annealing with two sets of primers

Scan or tap for the full solution



Q.112 Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells) :

[AIPMT 2012 (Mains)]

- (1) An antifeedant
- (2) A toxic protein
- (3) Both sense and anti-sense RNA
- (4) A particular hormone

Scan or tap for the full solution



Q.113 The first clinical gene therapy was given for treating

[AIPMT 2012 (Mains)]

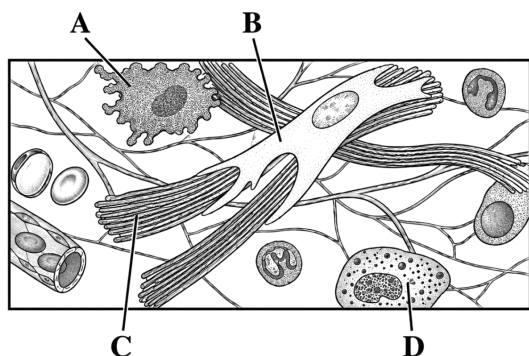
- (1) Rheumatoid arthritis
- (2) Adenosine deaminase deficiency
- (3) Diabetes mellitus
- (4) Chicken pox

Scan or tap for the full solution



Q.114 Given below is the diagrammatic sketch of a certain type of connective tissue. Identify the parts labeled A, B, C and D and select the right option about them

[AIPMT 2012 (Mains)]



- (1) A → Mast cell, B → Collagen fibres, C → Fibroblast, D → Macrophage
- (2) A → Mast cell, B → Macrophage, C → Fibroblast, D → Collagen fibres
- (3) A → Macrophage, B → Fibroblast, C → Collagen fibres, D → Mast cell
- (4) A → Macrophage, B → Collagen fibres, C → Fibroblast, D → Mast cell

Scan or tap for the full solution



Q.115 The supportive skeletal structures in the human external ears and in the nose tip are examples of

[AIPMT 2012 (Mains)]

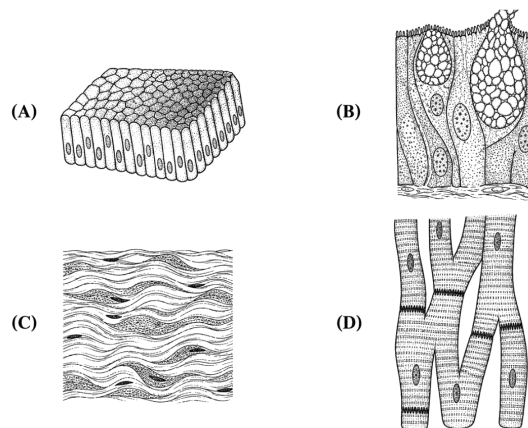
- (1) Ligament
- (2) Areolar tissue
- (3) Cartilage
- (4) Bone

Scan or tap for the full solution



Q.116 The four sketches (A, B, C and D) given below, represent four different types of animal tissues. Which one of these is correctly identified in the options given, along with its correct location and function ?

[AIPMT 2012 (Mains)]



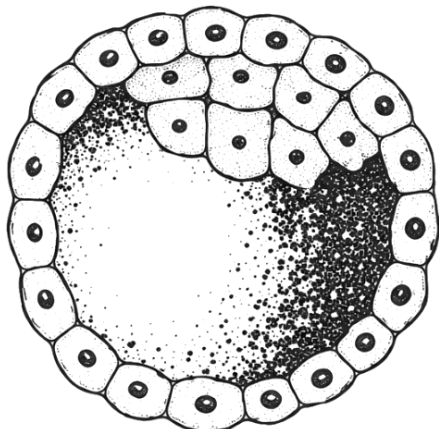
- (1) (A) Tissue → Columnar epithelium, Location → Nephron, Function → Secretion and absorption
- (2) (C) Tissue → Collagen fibres, Location → Cartilage, Function → Attach skeletal muscles to bones
- (3) (B) Tissue → Glandular epithelium, Location → Intestine, Function → Secretion
- (4) (D) Tissue → Smooth muscle tissue, Location → Heart, Function → Heart contraction

Scan or tap for the full solution



Q.117 Identify the human developmental stage shown below as well as the related right place of its occurrence in a normal pregnant woman, and select the right option for the two, together.

[AIPMT 2012 (Mains)]



- (1) Developmental stage → Late morula, Site of occurrence → Middle part of Fallopian tube
- (2) Developmental stage → Blastula, Site of occurrence → End part of Fallopian tube
- (3) Developmental stage → 8-celled morula, Site of occurrence → Starting point of Fallopian tube
- (4) Developmental stage → Blastocyst, Site of occurrence → Uterine wall

Scan or tap for the full solution



Q.118 Which one of the following pairs of chemical substances, is correctly categorised ?

[AIPMT 2012 (Mains)]

- (1) Secretin and rhodopsin - Polypeptide hormones
- (2) Pepsin and prolactin - Two digestive enzymes secreted in stomach
- (3) Troponin and myosin - Complex proteins in striated muscles
- (4) Calcitonin and thymosin - Thyroid hormones

Scan or tap for the full solution



Q.119 Which one of the following statements is correct with respect to immunity? [AIPMT 2012 (Mains)]

- (1) Rejection of a kidney graft is the function of B-lymphocytes.
- (2) Preformed antibodies need to be injected to treat the bite by a viper snake.
- (3) The antibodies against smallpox pathogen are produced by T-lymphocytes
- (4) Antibodies are protein molecules, each of which has four light chains.

Scan or tap for the full solution



Q.120 Where do certain symbiotic microorganisms normally occur in human body?

[AIPMT 2012 (Mains)]

- (1) Caecum
- (2) Oral lining and tongue surface
- (3) Vermiform appendix and rectum
- (4) Duodenum

Scan or tap for the full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7
Ans.	3	2	2	4	3	1	1
Ques.	8	9	10	11	12	13	14
Ans.	4	2	1	1	2	3	2
Ques.	15	16	17	18	19	20	21
Ans.	3	3	2	2	4	2	2
Ques.	22	23	24	25	26	27	28
Ans.	2	4	1	2	4	2	3
Ques.	29	30	31	32	33	34	35
Ans.	2	1	1	1	4	3	3
Ques.	36	37	38	39	40	41	42
Ans.	1	3	2	4	1, 4	1	1
Ques.	43	44	45	46	47	48	49
Ans.	3	1	4	3	2, 4	2	3
Ques.	50	51	52	53	54	55	56
Ans.	3	3	3	2	3	2	3
Ques.	57	58	59	60	61	62	63
Ans.	4	2	4	4	2	1	2
Ques.	64	65	66	67	68	69	70
Ans.	4	3	3	3	1	3	1
Ques.	71	72	73	74	75	76	77
Ans.	2	3	3	3	1	4	1
Ques.	78	79	80	81	82	83	84
Ans.	2	3	2	3	4	4	1
Ques.	85	86	87	88	89	90	91
Ans.	3	1	1	1	2	3	3
Ques.	92	93	94	95	96	97	98
Ans.	3	4	4	4	1	1	3
Ques.	99	100	101	102	103	104	105
Ans.	4	2	3	3	1	4	2
Ques.	106	107	108	109	110	111	112
Ans.	2	2	4	2	1	1	3
Ques.	113	114	115	116	117	118	119
Ans.	2	3	3	3	4	3	2
Ques.	120						
Ans.	1						