# NEET-UG EXAMINATION PAPER-2016

## (Solved)

Time allowed : 3 hours | Maximum Marks : 722

**General Instructions :**

Read the following instructions carefully and follow them :

i. This question paper contains **180 questions.** All questions are **compulsory.**

ii. This question paper is divided into **1 sections.**

iii. **Section A** – questions number **1 to 180** are multiple choice questions

iv. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

v. Use of calculator is NOT allowed.

## Section A

**Question 1.**

If the velocity of a particle is $v = At + Bt^2$, where A and B are constants, then the distance travelled by it between 1s and 2s is :

[4 Marks]

(A) 3/2 A + 4B

(B) A/2 + B/3

(C) 3/2 A+ 7/3 B

(D) 3A + 7B

**Question 2.**

If the magnitude of sum of two vectors is equal to the magnitude of difference of the two vectors, the angle between these vectors is :

[4 Marks]

(A) 90°

(B) 0°

(C) 180°

(D) 45°

**Question 3.**

A particle moves so that its position vector is given by □□ = cos ωtx̂ + sin ωtŷ. Where ω is a constant . Which of the following is true ?

[4 Marks]

(A) Velocity is perpendicular to □□ and acceleration is directed towards the origin

(B) Velocity is perpendicular to □□ and acceleration is directed away from the origin

(C) Velocity and acceleration both are parallel to □□

(D) Velocity and acceleration both are perpendicular to □□

**Question 4.**

A car is negotiating a curved road of radius R. The road is banked at an angle θ. The coefficient of friction between the tyres of the car and the road is $\mu_s$. The maximum safe velocity on this road is:

[4 Marks]

(A) $\sqrt{g/R(\mu_s+\tan\theta/1-\mu_2 \tan\theta)}$

(B) $\sqrt{g/R^2(\mu_s+\tan\theta/1-\mu_s \tan\theta)}$

(C) $\sqrt{gR^2(\mu_s+\tan\theta/1-\mu_s \tan\theta)}$

(D) $\sqrt{gR(\mu_s+\tan\theta/1-\mu_s \tan\theta)}$

**Question 5.**

What is the minimum velocity with which a body of mass m must enter a vertical loop of radius R so that it can complete the loop ?

[4 Marks]

(A) $\sqrt{2gR}$

(B) $\sqrt{3gR}$

(C) $\sqrt{gR}$

(D) $\sqrt{5gR}$

**Question 6.**

A particle of mass 10 g moves along a circle of radius 6.4 cm with a constant tangential acceleration. What is the magnitude of this acceleration if the kinetic energy of the particle becomes equal to $8\times10^{-4}$ J by the end of the second revolution after the beginning of the motion?

[4 Marks]

(A) 0.15 $m/s^2$

(B) 0.1 $m/s^2$

(C) 0.2 $m/s^2$

(D) 0.18 $m/s^2$

**Question 7.**

A body of mass 1 kg begins to move under the action of a time dependent force □□=(2tî+3t2ĵ) N, where î and ĵ are unit vectors along x and y axes. What power will be developed by the force at the time t ?

[4 Marks]

(A) $(2t^3 + 3t^4)W$

(B) $(2t^3 + 3t^5)W$

(C) $(2t^2 + 3t^3)W$

(D) $(2t^2 + 4t^4)W$

**Question 8.**

A uniform circular disc of radius 50 cm at rest is free to turn about an axis which is perpendicular to its plane and passes through its centre. It is subjected to a torque which produces a constant angular acceleration of 2.0 rads$^{-2}$. Its net acceleration in ms$^{-2}$ at the end of 2.0 s is approximately:

[4 Marks]

(A) 6.0

(B) 3.0

(C) 7.0

(D) 8.0

**Question 9.**

From a disc of radius R and mass M, a circular hole of diameter R, whose rim passes through the centre, is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis passing through the centre?

[4 Marks]

(A) 13$MR^2$/32

(B) 15$MR^2$/32

(C) 9$MR^2$/32

(D) 11$MR^2$/32

**Question 10.**

A disk and a sphere of same radius but different masses roll off on two inclined planes of same altitude and length. Which one of the two objects gets to the bottom of the plane first?

[4 Marks]

(A) Both reach at the same time

(B) Depends on their masses

(C) Sphere

(D) Disk

**Question 11.**

At what height from the surface of earth the gravitational potential and the value of g are $-5.4 \times 10^7$ J $kg^{-1}$ and $6.0 ms^{-2}$ respectively? Take the radius of earth as 6400 km:

[4 Marks]

(A) 2600 km

(B) 1600 km

(C) 1400 km

(D) 2000 km

**Question 12.**

The ratio of escape velocity at earth ($v_e$) to the escape velocity at a planet ($v_p$) whose radius and mean density are twice as that of earth is:

[4 Marks]

(A) 1:2

(B) 1:4

(C) $1:2\sqrt{2}$

(D) 1:2

**Question 13.**

Two non-mixing liquids of densities ρ and nρ (n>1) are put in a container. The height of each liquid is h. A solid cylinder of length L and density ρ1 is put in this container. The cylinder floats with its axis vertical and length pL (p<1) in the denser liquid. The density ρ1 is equal to:

[4 Marks]

(A) $\{ 1 + ( n + 1 ) p \}$ □

(B) $\{ 2 + ( n - 1 ) p \}$ □

(C) $\{ 1 + ( n - 1 ) p \}$ □

(D) $\{ 2 + ( n + 1 ) p \}$ □

**Question 14.**

Coefficient of linear expansion of brass and steel rods are $\alpha_1$ and $\alpha_2$. Lengths of brass and steel rods are $\ell_1$ and $\ell_2$ respectively. If $(\ell_2 - \ell_1)$ is maintained same at all temperatures, which one of the following relations holds good?

[4 Marks]

(A) $\square_1 \ell_2 = \square_2 \ell_1$

(B) $\square_1 \ell_1 = \square_2 \ell_2$

(C) $\square_1 \ell_2 = \square_2 \ell_1$

(D) $\square_1 \ell_2 = \square_2 \ell_1$

**Question 15.**

A black body is at a temperature of 5760 K. The energy of radiation emitted by the body at wavelength 250 nm is $U_1$, at wavelength 500 nm is $U_2$, and that at 1000 nm is $U_3$. Wien's constant, b = $2.88 \times 10^6$ nmK. Which of the following is correct?

[4 Marks]

(A) $U_1=0$

(B) $U_1>U_2$

(C) $u_2>U_1$

(D) $U_3=0$

**Question 16.**

A piece of ice falls from a height h so that it melts completely. Only one-quarter of the heat produced is absorbed by the ice and all energy of ice gets converted into heat during its fall. The value of h is: [Latent heat of ice is $3.4 \times 10^5$ J/kg and g=10 N/kg]

[4 Marks]

(A) 34 km

(B) 544 km

(C) 136 km

(D) 68 km

**Question 17.**

A gas is compressed isothermally to half its initial volume. The same gas is compressed separately through an adiabatic process until its volume is again reduced to half. Then:

[6 Marks]

(A) Compressing the gas isothermally or adiabatically will require the same amount of work.

(B) Which of the case (whether compression through isothermal or through adiabatic process) requires more work will depend upon the atomicity of the gas.

(C) Compressing the gas isothermally will require more work to be done.

(D) Compressing the gas through adiabatic process will require more work to be done.

**Question 18.**

A refrigerator works between 4°C and 30°C. It is required to remove 600 calories of heat every second in order to keep the temperature of the refrigerated space constant. The power required is: (Take 1 cal = 4.2 joules)

[4 Marks]

(A) 2365 W

(B) 236.5 W

(C) 23.65 W

(D) 2.365 W

**Question 19.**

The molecules of a given mass of gas have r.m.s. velocity of 200 m $s^{-1}$ at 27°C and $1.0 \times 10^5$ $Nm^{-2}$ pressure. When the temperature and pressure of the gas are respectively, 127°C and $0.05 \times 10^5$ $Nm^{-2}$, the r.m.s. velocity of its molecules in m $s^{-1}$ is:

[4 Marks]

(A) $100\sqrt{2}$

(B) $400/\sqrt{3}$

(C) 100/3

(D) $100\sqrt{2}/3$

**Question 20.**

An air column, closed at one end and open at the other, resonates with a tuning fork when the smallest length of the column is 50 cm. The next larger length of the column resonating with the same tuning fork is:

[4 Marks]

(A) 66.7 cm

(B) 100 cm

(C) 200 cm

(D) 150 cm

**Question 21.**

A uniform rope of length L and mass $m_1$ hangs vertically from a rigid support. A block of mass $m_2$ is attached to the free end of the rope. A transverse pulse of wavelength $\lambda_1$ is produced at the lower end of the rope. The wavelength of the pulse when it reaches the top of the rope is $\lambda_2$. The ratio $\lambda_2/\lambda_1$ is

[4 Marks]

(A) $\sqrt{m_1/m_2}$

(B) $\sqrt{m_1+m_2/m_2}$

(C) $\sqrt{m_1+m_2/m_1}$

(D) $\sqrt{m_2/m_1}$

**Question 22.**

A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of 15 m $s^{-1}$. Then, the frequency of sound that the observer hears in the echo reflected from the cliff is: (Take velocity of sound in air = 330 m $s^{-1}$)

[4 Marks]

(A) 765 Hz

(B) 838 Hz

(C) 800 Hz

(D) 885 Hz

**Question 23.**

Two identical charged spheres suspended from a common point by two massless strings of lengths l, are initially at a distance d (d≪l) apart because of their mutual repulsion. The charges begin to leak from both the spheres at a constant rate. As a result, the spheres approach each other with a velocity v. Then v varies as a function of the distance x between the spheres, as:

[4 Marks]

(A) $v \propto x^{1/2}$

(B) $v \propto x^{1/2}$

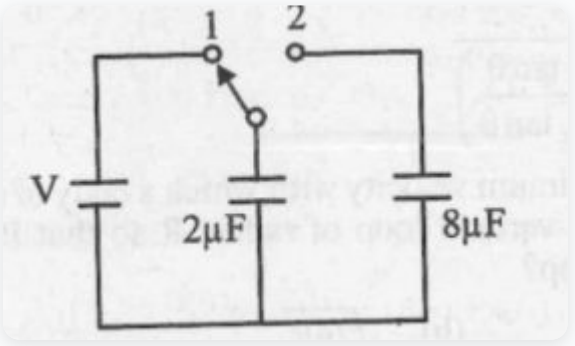
(C) $v \propto x^{-1}$

(D) $v \propto x$

**Question 24.**

A capacitor of 2μF is charged as shown in the diagram. When the switch S is turned to position 2, the percentage of its stored energy dissipated is :

[4 Marks]




(A) 75%

(B) 80%

(C) 20%

(D) 0%

**Question 25.**

The charge flowing through a resistance R varies with time t as $Q=at-bt^2$ where a and b are positive constants. The total heat produced in R is:

[4 Marks]

(A) $a^3R/b$

(B) $a^3R/2b$

(C) $a^3R/3b$

(D) $a^3R/6b$

**Question 26.**

A potentiometer wire is 100 cm long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at 50 cm and 10 cm from the positive end of the wire in the two cases. The ratio of e.m.f.s is:

[4 Marks]

(A) 5 : 1

(B) 5 : 4

(C) 3 : 2

(D) 3 : 4

**Question 27.**

A long straight wire of radius a carries a steady current I. The current is uniformly distributed over its cross-section. The ratio of the magnetic fields B and B′, at radial distances a/2 and 2a respectively, from the axis of the wire is:

[4 Marks]

(A) 1

(B) 4

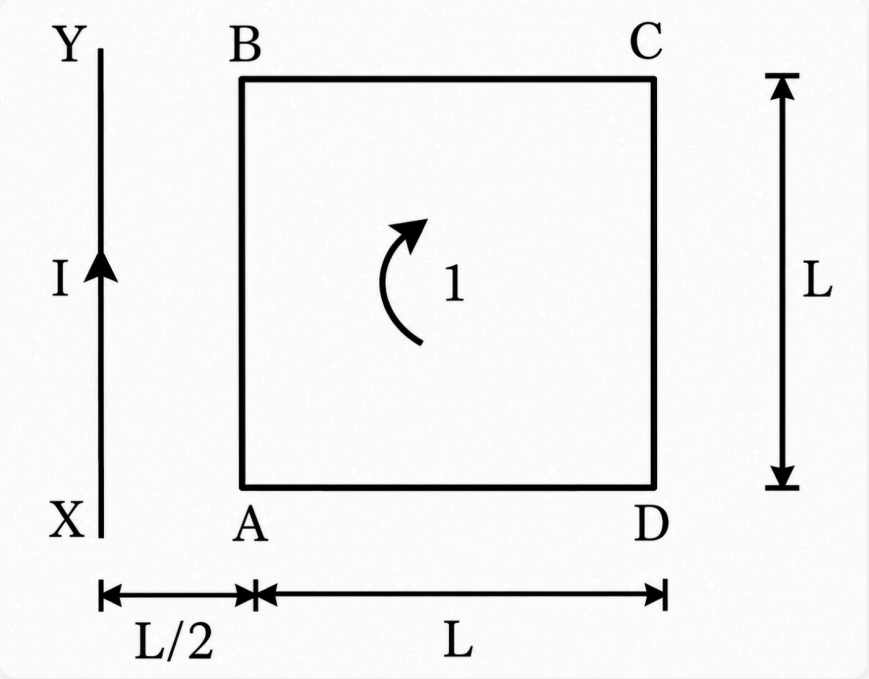
(C) 1/4

(D) 1/2

**Question 28.**

A square loop ABCD carrying a current i, is placed near and coplanar with a long straight conductor XY carrying a current I. The net force on the loop will be:

[4 Marks]




(A) $2\mu_0 Ii/3\pi$

(B) $\mu_0 IiL/2\pi$

(C) $\mu_0 Ii/2\pi$

(D) $2\mu_0 IiL/3\pi$

**Question 29.**

The magnetic susceptibility is negative for:

[4 Marks]

(A) paramagnetic material only

(B) diamagnetic material only

(C) ferromagnetic material only

(D) paramagnetic and ferromagnetic materials

**Question 30.**

A long solenoid has 1000 turns. When a current of 4A flows through it, the magnetic flux linked with each turn of the solenoid is $4\times10^{-3}$ Wb. The self inductance of the solenoid is:

[4 Marks]

(A) 4H

(B) 2H

(C) 3H

(D) 1H

**Question 31.**

A small signal voltage $V(t)=V_0 \sin \omega t$ is applied across an ideal capacitor C:

[4 Marks]

(A) Current $I$ (t) leads voltage V(t) by 180°

(B) Current $I$ (t) is in phase with voltage V(t)

(C) Over a full cycle the capacitor $C$ does not consume any energy from the voltage source.

(D) Current $I$ ( $t$ ) lags voltage $V$ ( $t$ ) by 90°.

**Question 32.**

An inductor 20 mH, a capacitor 50 μF and a resistor 40Ω are connected in series across a source of emf V=10sin340t. The power loss in A.C. circuit is:

[4 Marks]

(A) 0.51 W

(B) 0.67 W

(C) 0.76 W

(D) 0.89 W

**Question 33.**

Out of the following options which one can be used to produce a propagating electromagnetic wave?

[4 Marks]

(A) An accelerating charge

(B) A chargeless particle

(C) A charge moving at constant velocity

(D) A stationary charge

**Question 34.**

Match the corresponding entries of column-1 with column-2 (Where m is the magnification produced by the mirror):

[4 Marks]

| | Column-1 | | Column-2 |
|---|---|---|---|
| (P) | $m = -2$ | (A) | Convex mirror |
| (Q) | $m = -\frac{1}{2}$ | (B) | Concave mirror |
| (R) | $m = +2$ | (C) | Real image |
| (S) | $m = +\frac{1}{2}$ | (D) | Virtual image |

(a) P → B and C, Q → B and C, R → B and D, S → A and D.

(b) P → A and C, Q → A and D, R → A and B, S → C and D

(c) P → A and D, Q → B and C, R → B and D, S → B and C

(d) P → C and D, Q → B and D, R → B and C, S → A and D

(A) a

(B) b

(C) c

(D) d

**Question 35.**

The angle of incidence for a ray of light at a refracting surface of a prism is 45°. The angle of prism is 60°. If the ray suffers minimum deviation through the prism, the angle of minimum deviation and refractive index of the material of the prism respectively, are:

[4 Marks]

(A) 30°,1/√2

(B) 30°,√2

(C) 45°,√2

(D) 45°,1/√2

**Question 36.**

An astronomical telescope has objective and eyepiece of focal lengths 40 cm and 4 cm respectively. To view an object 200 cm away from the objective, the lenses must be separated by a distance:

[4 Marks]

(A) 50.0cm

(B) 54.0cm

(C) 37.3cm

(D) 46.0cm

**Question 37.**

The intensity at the maximum in a Young's double slit experiment is $I_0$. Distance between two slits is d = 5λ, where λ is the wavelength of light used in the experiment. What will be the intensity in front of one of the slits on the screen placed at a distance D = 10d?

[4 Marks]

(A) $I_0/2$

(B) $I_0/4$

(C) $(3/4)I_0$

(D) $I_0$

**Question 38.**

In a diffraction pattern due to a single slit of width 'a', the first minimum is observed at an angle 30° when light of wavelength 5000 Å is incident on the slit. The first secondary maximum is observed at an angle of:

[4 Marks]

(A) $\sin^{-1}(1/4)$

(B) $\sin^{-1}(2/3)$

(C) $\sin^{-1}(1/2)$

(D) $\sin^{-1}(3/4)$

**Question 39.**

An electron of mass m and a photon have same energy E. The ratio of de-Broglie wavelengths associated with them is:

[4 Marks]

(A) $(1/c)\ (E/2m)^{1/2}$

(B) $(E/2m)^{1/2}$

(C) $c(2mE)^{1/2}$

(D) $(1/xc)\ (2m/E)^{1/2}$

**Question 40.**

When a metallic surface is illuminated with radiation of wavelength λ, the stopping potential is V. If the same surface is illuminated with radiation of wavelength 2λ, the stopping potential is V/4. The threshold wavelength for the metallic surface is:

[4 Marks]

(A) 3λ

(B) (5/2)λ

(C) 4λ

(D) 5λ

**Question 41.**

When an α-particle of mass 'm' moving with velocity 'v' bombards on a heavy nucleus of charge 'Ze', its distance of closest approach from the nucleus depends on m as:

[4 Marks]

(A) 1/m

(B) $1/\sqrt{m}$

(C) m

(D) $1/m^2$

**Question 42.**

Given the value of Rydberg constant is $10^7$ m $^{-1}$, the wave number of the last line of the Balmer series in hydrogen spectrum will be:

[4 Marks]

(A) $0.025 \times 10^4$ m $^{-1}$

(B) $0.5 \times 10^7$ m $^{-1}$

(C) $0.25 \times 10^7$ m $^{-1}$

(D) $2.5 \times 10^7$ m $^{-1}$

**Question 43.**

Consider the junction diode as ideal. The value of current flowing through AB is:

[4 Marks]




(A) $10^{-3}$ A

(B) $10^{-2}$ A

(C) $10^{-1}$ A

(D) 0A

**Question 44.**

A npn transistor is connected in common emitter configuration in a given amplifier. A load resistance of 800Ω is connected in the collector circuit and the voltage drop across it is 0.8V. If the current amplification factor is 0.96 and the input resistance of the circuit is 192Ω, the voltage gain and the power gain of the amplifier will respectively be:

[4 Marks]

(A) 4, 3.69

(B) 4, 4

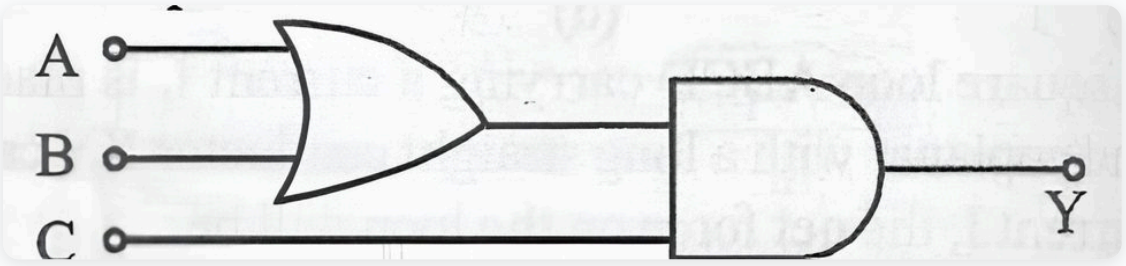
(C) 3.69, 3.84

(D) 4, 3.84

**Question 45.**

To get output 1 for the following circuit, the correct choice for the input is:

[4 Marks]




(A) A = 1, B = 0, C = 1

(B) A = 1, B = 1, C = 0

(C) A = 1, B = 0, C = 0

(D) A = 0, B = 1, C = 0

**Question 46.**

Two electrons occupying the same orbital are distinguished by

[4 Marks]

(A) Spin quantum number

(B) Principal quantum number

(C) Magnetic quantum number

(D) Azimuthal quantum number

**Question 47.**

In which of the following options the order of arrangement does not agree with the variation of property indicated against it?

[4 Marks]

(A) $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ (increasing ionic size)

(B) I < Br < F < Cl (increasing electron gain enthalpy)

(C) Li < Na < K < Rb (increasing metallic radius)

(D) B < C < N < O (increasing first ionisation enthalpy)

**Question 48.**

Consider the molecules $CH_4$, $NH_3$ and $H_2O$. Which of the given statements is false?

[4 Marks]

(A) The H–C–H bond angle in $CH_4$, the H–N–H bond angle in $NH_3$, and the H–O–H bond angle in $H_2O$ are all greater than 90°.

(B) The H–O–H bond angle in $H_2O$ is larger than the H–C–H bond angle in $CH_4$.

(C) The H–O–H bond angle in $H_2O$ is smaller than the H–N–H bond angle in $NH_3$.

(D) The H–C–H bond angle in $CH_4$ is larger than the H–N–H bond angle in $NH_3$.

**Question 49.**

Predict the correct order of electron repulsion among the following:

[4 Marks]

(A) lone pair–lone pair > lone pair–bond pair > bond pair–bond pair

(B) lone pair–lone pair > bond pair–bond pair > lone pair–bond pair

(C) bond pair–bond pair > lone pair–bond pair > lone pair–lone pair

(D) lone pair–bond pair > bond pair–bond pair > lone pair–lone pair

**Question 50.**

Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can escape. What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape?

[4 Marks]

(A) 1/8

(B) 1/2

(C) 3/8

(D) 1/4

**Question 51.**

The correct thermodynamic conditions for the spontaneous reaction at all temperatures is

[4 Marks]

(A) $\Delta H < 0$ and $\Delta S < 0$

(B) $\Delta H < 0$ and $\Delta S > 0$

(C) $\Delta H > 0$ and $\Delta S < 0$

(D) $\Delta H > 0$ and $\Delta S > 0$

**Question 52.**

Consider the following liquid-vapour equilibrium.

Liquid $\rightleftharpoons$ Vapour

Which of the following relations is correct?

[4 Marks]

(A) $dlnG/dT^2 = \Delta Hv/RT^2$

(B) $dlnP/dT = \Delta Hv/RT$

(C) $dlnP/dT = -\Delta Hv/RT^2$

(D) $dlnP/dT^2 = -\Delta Hv/T^2$

**Question 53.**

MY and $NY_3$, two nearly insoluble salts, have the same Ksp values of $6.2 \times 10^{-13}$ at room temperature. Which statement would be true in regard to MY and $NY_3$?

[4 Marks]

(A) The molar solubility of MY in water is less than that of $NY_3$.

(B) The molar solubilities of MY and $NY_3$ in water are identical.

(C) The salts MY and $NY_3$ are more soluble in 0.5 M KY than in pure water.

(D) The addition of the salt of KY to solution of MY and $NY_3$ will have no effect on their solubilities.

**Question 54.**

Consider the nitration of benzene using mixed conc of $H_2SO_4$ and $HNO_3$. If a large amount of $KHSO_4$ is added to the mixture, the rate of nitration will be

[4 Marks]

(A) faster

(B) unchanged

(C) slower

(D) doubled

**Question 55.**

Which of the following statements about hydrogen is incorrect?

[4 Marks]

(A) Dihydrogen does not act as a reducing agent.

(B) Hydrogen never acts as cation in ionic salts.

(C) In hydronium ion, $H_3O^+$ exists freely in solution.

(D) Hydrogen has three isotopes of which tritium is the most common.

**Question 56.**

Which of the following statements is false?

[4 Marks]

(A) $Mg^{2+}$ ions form a complex with ATP

(B) $Ca^{2+}$ ions are important in blood clotting

(C) $Ca^{2+}$ ions are not important in maintaining the regular beating of the heart

(D) $Mg^{2+}$ ions are important in the green parts of plants

**Question 57.**

The pair of electron in the given carbanion, $CH_3C \equiv C^-$, is present in which of the following orbitals?

[4 Marks]

(A) $sp^3$

(B) 2p

(C) $sp^2$

(D) sp

**Question 58.**

The correct statement regarding the comparison of staggered and eclipsed conformation of ethane, is

[4 Marks]

(A) The staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain

(B) The eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional strain

(C) The staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain

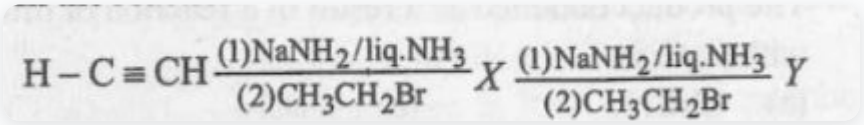
(D) The eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has torsional strain

**Question 59.**

In the reaction

X and Y are

[4 Marks]




(A) X = 1-Butyne; Y = 2-Hexyne

(B) X = 1-Butyne; Y = 3-Hexyne

(C) X = 2-Butyne; Y = 3-Hexyne

(D) X = 2-Butyne; Y = 2-Hexyne

**Question 60.**

Which of the following statement about the composition of the vapour over an ideal 1 : 1 molar mixture of benzene and toluene is correct? Assume that the temperature is constant at 25°C. (Given: Vapour

pressure data at 25°C, benzene = 12.8 kPa, toluene = 3.85 kPa)

[4 Marks]

(A) The vapour will contain a higher percentage of benzene

(B) The vapour will contain a higher percentage of toluene

(C) The vapour will contain equal amounts of benzene and toluene

(D) Not enough information is given to make a prediction

**Question 61.**

At 100°C the vapour pressure of a solution of 6.5 g of a solute in 100 g water is 732 mm. If Kb = 0.52, the boiling point of this solution will be

[4 Marks]

(A) 102°C

(B) 100°C

(C) 101°C

(D) 103°C

**Question 62.**

The pressure of $H_2$ required to make the potential of $H_2$-electrode zero in pure water at 298 K is:

[4 Marks]

(A) $10^{-4}$ atm

(B) $10^{-14}$ atm

(C) $10^{-10}$ atm

(D) $10^{-12}$ atm

**Question 63.**

The rate of a first-order reaction is 0.04 mol $l^{-1}$ $s^{-1}$ at 10 seconds and 0.03 mol $l^{-1}$ $s^{-1}$ at 20 seconds after initiation of the reaction. The half-life period of the reaction is

[4 Marks]

(A) 34.1 s

(B) 24.1 s

(C) 54.1 s

(D) 44.1 s

**Question 64.**

The addition of a catalyst during a chemical reaction alters which of the following quantities?

[4 Marks]

(A) Entropy

(B) Internal energy

(C) Activation energy

(D) Enthalpy

**Question 65.**

Which one of the following characteristics is associated with adsorption?

[4 Marks]

(A) $\Delta G$ and $\Delta H$ are negative but $\Delta S$ is positive

(B) $\Delta G$ and $\Delta S$ are negative but $\Delta H$ is positive

(C) $\Delta G$, $\Delta H$ and $\Delta S$ all are negative

(D) $\Delta G$ is negative but $\Delta H$ and $\Delta S$ are positive

**Question 66.**

Fog is colloidal solution of

[4 Marks]

(A) Gas in liquid

(B) Liquid in gas

(C) Gas in gas

(D) Solid in gas

**Question 67.**

Which is the correct statement for the given acids?

[4 Marks]

(A) Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid

(B) Phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid

(C) Both are diprotic acids

(D) Both are triprotic acids

**Question 68.**

The product obtained as a result of a reaction of nitrogen with $CaC_2$ is

[4 Marks]

(A) $CaCN_2$

(B) CaCN

(C) $CaCN_3$

(D) $Ca_2CN$

**Question 69.**

Among the following, the correct order of acidity is

[4 Marks]

(A) $HClO_2 < HClO < HClO_3 < HClO_4$

(B) $HClO_4 < HClO_2 < HClO < HClO_3$

(C) $HClO_3 < HClO_4 < HClO_2 < HClO$

(D) $HClO < HClO_2 < HClO_3 < HClO_4$

**Question 70.**

Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?

[4 Marks]

(A) $F_2 > Cl_2 > Br_2 > I_2$

(B) $Br_2 > I_2 > F_2 > Cl_2$

(C) $I_2 > Br_2 > Cl_2 > F_2$

(D) $Cl_2 > Br_2 > F_2 > I_2$

**Question 71.**

Match the compounds given in column I with the hybridisation and shape given in column II and mark the correct option.

[4 Marks]

| Column–I | Column–II |
|---|---|
| 1. $XeF_6$ | (i) Distorted octahedral |
| 2. $XeO_3$ | (ii) Square planar |
| 3. $XeOF_4$ | (iii) Pyramidal |
| 4. $XeF_4$ | (iv) Square pyramidal |

(A) 1 (i), 2 (ii), 3 (iv), 4 (iii)

(B) 1 (i), 2 (iii), 3 (iv), 4 (ii)

(C) 1 (i), 2 (iii), 3 (iv), 4 (ii)

(D) 1 (iv), 2 (iii), 3 (ii), 4 (i)

**Question 72.**

Which one of the following statements is correct when $SO_2$ is passed through acidified $K_2Cr_2O_7$ solution?

[4 Marks]

(A) The solution turns blue

(B) The solution is decolourized

(C) $SO_2$ is reduced

(D) Green $Cr_2(SO_4)_3$ is formed

**Question 73.**

When copper is heated with conc. $HNO_3$ it produces

[4 Marks]

(A) $Cu(NO_3)_2$ and $N_2O$

(B) $Cu(NO_3)_2$ and NO

(C) $Cu(NO_3)_2$, NO and $NO_2$

(D) $Cu(NO_3)_2$ and $NO_2$

**Question 74.**

The electronic configurations of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are

[4 Marks]

(A) $[Xe]4f^7 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$

(B) $[Xe]4f^7 5d^1 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$

(C) $[Xe]4f^6 5d^1 6s^2$, $[Xe]4f^5 5d^1 6s^2$ and $[Xe]4f^8 5d^1 6s^2$

(D) $[Xe]4f^7 6s^2$, $[Xe]4f^8 6s^2$ and $[Xe]4f^8 5d^1 6s^2$

**Question 75.**

Which of the following has longest C–O bond length? (Free C–O bond length in CO is 1.128 Å)

[4 Marks]

(A) $[Mn(CO)_6]^+$

(B) $[Fe(CO)_4]^{2-}$

(C) $[Co(CO)_4]^-$

(D) $[Ni(CO)_4]$

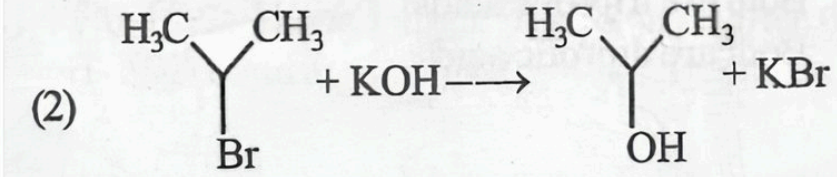
**Question 76.**

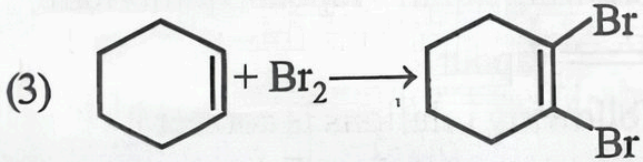
For the following reactions :

Which of the following statements is correct?

[4 Marks]

(1) $CH_3CH_2CH_2Br + KOH \rightarrow CH_3CH{=}CH_2 + KBr + H_2O$

(2) 


(3) 


(A) (1) and (2) are elimination reactions and (3) is addition reaction

(B) (1) is elimination, (2) is substitution and (3) is addition reaction

(C) (1) is substitution, (2) and (3) are addition reactions

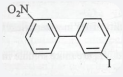
(D) (1) is elimination, (2) and (3) are substitution reactions

**Question 77.**

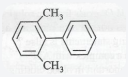
Which of the following biphenyls is optically active?

[4 Marks]

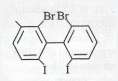
(A) a



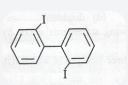
(B) d



(C) b



(D) c



**Question 78.**

Which of the following reagents would distinguish cis-cyclopentane-1,2-diol from the trans-isomer?

[4 Marks]

(A) Acetone

(B) Ozone

(C) $MnO_2$

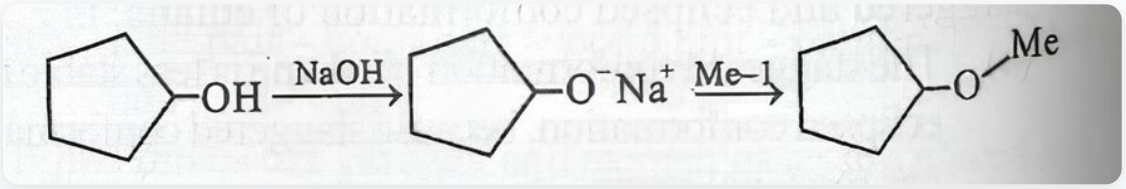
(D) Aluminium isopropoxide

**Question 79.**

The reaction

Can be classified as:-

[4 Marks]




(A) Dehydration reaction

(B) Williamson alcohol synthesis reaction

(C) Williamson ether synthesis reaction

(D) Alcohol formation reaction

**Question 80.**

The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha-carbon, is:

[4 Marks]

(A) A carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol.

(B) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibration.

(C) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol tautomerism.

(D) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as enolization.

**Question 81.**

The product formed by the reaction of an aldehyde with a primary amine is

[4 Marks]

(A) Aromatic acid

(B) Ketone

(C) Carboxylic acid

(D) Schiff base

**Question 82.**

The correct statement regarding the basicity of arylamines is

[4 Marks]

(A) Arylamines are generally less basic than alkylamines because the nitrogen lone-pair electrons are delocalized by interaction with the aromatic ring π electron system.

(B) Arylamines are generally more basic than alkylamines because of aryl group.

(C) Arylamines are generally more basic than alkylamines because the nitrogen lone-pair electrons are not delocalized by interaction with the aromatic ring π electron system.

(D) Arylamines are generally more basic than alkylamines, because the nitrogen atom in arylamines is sp-hybridized.

**Question 83.**

Which one given below is a non-reducing sugar?

[4 Marks]

(A) Sucrose

(B) Glucose

(C) Lactose

(D) Maltose

**Question 84.**

In a protein molecule various amino acids are linked together by

[4 Marks]

(A) dative bond

(B) β-glycosidic bond

(C) α-glycosidic bond

(D) peptide bond

**Question 85.**

The correct statement regarding RNA and DNA, respectively is

[4 Marks]

(A) The sugar component in RNA is arabinose.

(B) The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose.

(C) The sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose.

(D) The sugar component in RNA is arabinose and the sugar component in DNA is 2'-deoxyribose.

**Question 86.**

Natural rubber has

[4 Marks]

(A) all cis-configuration

(B) all trans-configuration

(C) random cis- and trans-configuration

(D) alternate cis- and trans-configuration

**Question 87.**

Which of the following is an analgesic?

[4 Marks]

(A) Novalgin

(B) Penicillin

(C) Streptomycin

(D) Chloromycetin

**Question 88.**

Match items of Column I with the items of Column II and assign the correct code:

[4 Marks]

| Column–I | Column–II |
|---|---|
| (a) Cyanide process | (i) Ultrapure Ge |
| (b) Froth floatation process | (ii) Dressing of ZnS |
| (c) Electrolytic reduction | (iii) Extraction of Al |
| (d) Zone refining | (iv) Extraction of Au |
| | (v) Purification of Ni |

(A) a-(iii), b-(iv), c-(v), d -(i)

(B) a-(i), b-(ii), c-(iii), d -(iv)

(C) a-(iv), b-(ii), c-(iii), d -(i)

(D) a-(ii), b-(iii), c-(i), d -(iv)

**Question 89.**

Lithium has a bcc structure. Its density is 530 kg $m^{-3}$ and its atomic mass is 6.94 g $mol^{-1}$. Calculate the edge length of a unit cell of Lithium metal. ($N_a$ = 6.02 × $10^{23}$ $mol^{-1}$)

[4 Marks]

(A) 154 pm

(B) 352 pm

(C) 527 pm

(D) 264 pm

**Question 90.**

The ionic radii of $A^+$ and $B^-$ ions are 0.98 × $10^{-10}$ m and 1.81 × $10^{-10}$ m. The coordination number of each ion in AB is

[4 Marks]

(A) 6

(B) 4

(C) 2

(D) 8

**Question 91.**

It is much easier for a small animal to run uphill than for a large animal, because

[4 Marks]

(A) smaller animals have a higher metabolic rate.

(B) the efficiency of muscles in large animals is less than in the small animals.

(C) it is easier to carry a small body weight.

(D) small animals have a lower $O_2$ requirement.

**Question 92.**

Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature?

[4 Marks]

(A) When written by hand, the names are to be underlined

(B) The names are written in Latin and are italicised

(C) The first word in a biological name represents the genus name, and the second is a specific epithet

(D) Biological names can be written in any language

**Question 93.**

Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom

[4 Marks]

(A) Monera

(B) Protista

(C) Fungi

(D) Animalia

**Question 94.**

One of the major components of cell wall of most fungi is

[4 Marks]

(A) Chitin

(B) Cellulose

(C) Peptidoglycan

(D) Hemicellulose

**Question 95.**

Which one of the following statements is wrong?

[4 Marks]

(A) Cyanobacteria are also called blue-green algae

(B) Golden algae are also called desmids

(C) Eubacteria are also called false bacteria

(D) Phycomycetes are also called algal fungi

**Question 96.**

Which of the following statements is wrong for viroids?

[4 Marks]

(A) They lack a protein coat

(B) They are smaller than viruses

(C) They cause infections

(D) Their RNA is of high molecular weight

**Question 97.**

In bryophytes and pteridophytes, transport of male gametes requires

[4 Marks]

(A) Wind

(B) Insects

(C) Water

(D) Birds

**Question 98.**

Select the correct statement:

[4 Marks]

(A) Gymnosperms are both homosporous and heterosporous

(B) Salvinia, Ginkgo and Pinus all are gymnosperms

(C) The leaves of gymnosperms are not well adapted to extremes of climate

(D) Sequoia is one of the tallest trees

**Question 99.**

Which of the following features is not present in the Phylum – Arthropoda?

[4 Marks]

(A) Chitinous exoskeleton

(B) Metameric segmentation

(C) Parapodia

(D) Jointed appendages

**Question 100.**

Which of the following characteristic features always holds true for the corresponding group of animals?

[4 Marks]

(A) Cartilaginous — Chondrichthyes

(B) Viviparous — Mammalia

(C) Possess a mouth with an upper and a lower jaw — Chordata

(D) 3- chambered heart divided venticle - Reptilia with one incompletely

**Question 101.**

Which one of the following characteristics is not shared by birds and mammals?

[4 Marks]

(A) Ossified endoskeleton

(B) Breathing using lungs

(C) Viviparity

(D) Warm blooded nature

**Question 102.**

Stems modified into flat green organs performing the functions of leaves are known as

[4 Marks]

(A) Scales

(B) Cladodes

(C) Phyllodes

(D) Phylloclades

**Question 103.**

The standard petal of a papilionaceous corolla is also called

[4 Marks]

(A) Vexillum

(B) Pappus

(C) Carina

(D) Corona

**Question 104.**

Proximal end of the filament of stamen is attached to the

[4 Marks]

(A) Anther

(B) Connective

(C) Placenta

(D) Thalamus or petal

**Question 105.**

The coconut water from tender coconut represents

[4 Marks]

(A) free nuclear proembryo

(B) free nuclear endosperm

(C) fleshy mesocarp

(D) endocarp

**Question 106.**

Cotyledon of maize grain is called

[4 Marks]

(A) coleoptile

(B) scutellum

(C) coleorhiza

(D) plumule

**Question 107.**

Tricarpellary syncarpous gynoecium is found in flowers of

[4 Marks]

(A) Liliaceae

(B) Solanaceae

(C) Fabaceae

(D) Poaceae

**Question 108.**

Which type of tissue correctly matches with its location?

[4 Marks]

(A) Tissue-Smooth muscle, Location- Wall of intestine

(B) Tissue-Areolar tissue, Location -Tendons

(C) Tissue- Cuboidal epithelium, Location -Lining of stomach

(D) Tissue-Transitional epithelium, Location -Tip nose

**Question 109.**

Which of the following features is not present in *Periplaneta americana*?

[4 Marks]

(A) Indeterminate and radial cleavage during embryonic development

(B) Schizocoelom as body cavity

(C) Exoskeleton composed of N-acetylglucos-amine

(D) Metamerically segmented body

**Question 110.**

Mitochondria and chloroplast are (A) semi-autonomous organelles (B) formed by division of pre-existing organelles and they contain DNA but lack protein synthesizing machinery

Which one of the following options is correct?

[4 Marks]

(A) (A) is true but (B) is false

(B) Both (A) and (B) are false

(C) (B) is true but (A) is false

(D) Both (A) and (B) are correct

**Question 111.**

Microtubules are the constituents of

[4 Marks]

(A) Centrioles, Spindle fibres and Chromatin

(B) Centrosome, Nucleosome and Centrioles

(C) Spindle fibres, Centrioles and Cilia

(D) Cilia, Flagella and Peroxisomes

**Question 112.**

Which one of the following cell organelles is enclosed by a single membrane?

[4 Marks]

(A) Lysosomes

(B) Nuclei

(C) Chloroplasts

(D) Mitochondria

**Question 113.**

The two polypeptides of human insulin are linked together by

[4 Marks]

(A) phosphodiester bond

(B) hydrogen bonds

(C) covalent bond

(D) disulphide bridges

**Question 114.**

The amino acid Tryptophan is the precursor for the synthesis of

[4 Marks]

(A) Melatonin and Serotonin

(B) Thyroxine and Triiodothyronine

(C) Cortisol and Cortisone

(D) Estrogen and Progesterone

**Question 115.**

Which one of the following statements is wrong?

[4 Marks]

(A) Sucrose is a disaccharide.

(B) Uracil is a pyrimidine.

(C) Cellulose is a polysaccharide.

(D) Glycine is a sulphur containing amino acid.

**Question 116.**

Spindle fibres attach on to

[4 Marks]

(A) Telomere of the chromosome

(B) Kinetochore of the chromosome

(C) Kinetosome of the chromosome

(D) Centromere of the chromosome

**Question 117.**

Which of the following is not a characteristic feature during mitosis in somatic cells?

[4 Marks]

(A) Spindle fibres

(B) Chromosome movement

(C) Disappearance of nucleolus

(D) Synapsis

**Question 118.**

In meiosis crossing over is initiated at

[4 Marks]

(A) Pachytene

(B) Zygotene

(C) Leptotene

(D) Diplotene

**Question 119.**

Water vapour comes out from the plant leaf through the stomatal opening. Through the same stomatal opening carbon dioxide diffuses into the plant during photosynthesis. Reason out the above statements using one of following options

[4 Marks]

(A) Both processes cannot happen simultaneously.

(B) Both processes can happen together because the diffusion coefficient of water and $CO_2$ is different.

(C) The above processes happen only during night time.

(D) One process occurs during day time, and the other at night.

**Question 120.**

In which of the following, all three are macronutrients?

[4 Marks]

(A) Boron, zinc, manganese

(B) Molybdenum, magnesium, manganese

(C) Iron, copper, molybdenum

(D) Nitrogen, calcium, phosphorus

**Question 121.**

In a chloroplast the highest number of protons are found in

[4 Marks]

(A) lumen of thylakoids

(B) stroma

(C) antennae complex

(D) inter membrane space

**Question 122.**

Water soluble pigments found in plant cell vacuoles are

[4 Marks]

(A) Anthocyanins

(B) Carotenoids

(C) Chlorophylls

(D) Xanthophylls

**Question 123.**

Emerson’s enhancement effect and Red drop have been instrumental in the discovery of

[4 Marks]

(A) oxidative phosphorylation

(B) two photosystems operating simultaneously

(C) photophosphorylation and non-cyclic electron transport

(D) photophosphorylation and cyclic electron transport

**Question 124.**

A plant in your garden avoids photorespiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilisation.

In which of the following physiological groups would you assign this plant?

[4 Marks]

(A) CAM

(B) Nitrogen fixer

(C) $C_4$

(D) $C_3$

**Question 125.**

The *Avena* curvature is used for bioassay of

[4 Marks]

(A) ABA

(B) $GA_3$

(C) IAA

(D) Ethylene

**Question 126.**

Which of the following guards the opening of hepatopancreatic duct into the duodenum?

[4 Marks]

(A) Sphincter of Oddi

(B) Ileoceacal valve

(C) Pyloric sphincter

(D) Semilunar valve

**Question 127.**

In the stomach, gastric acid is secreted by the

[4 Marks]

(A) acid cells

(B) peptic cells

(C) parietal cells

(D) gastrin secreting cells

**Question 128.**

Name the chronic respiratory disorder caused mainly by cigarette smoking

[4 Marks]

(A) asthma

(B) respiratory acidosis

(C) emphysema

(D) respiratory alkalosis

**Question 129.**

Reduction in pH of blood will

[4 Marks]

(A) reduce the blood supply to the brain.

(B) reduce the rate of heart beat.

(C) decrease the affinity of haemoglobin with oxygen.

(D) release bicarbonate ions by the liver.

**Question 130.**

Blood pressure in the pulmonary artery is

[4 Marks]

(A) less than that in the venae cavae.

(B) more than that in the carotid.

(C) more than that in the pulmonary vein.

(D) same as that in the aorta.

**Question 131.**

In mammals, which blood vessel would normally carry largest amount of urea?

[4 Marks]

(A) Hepatic Vein

(B) Dorsal Aorta

(C) Hepatic Portal Vein

(D) Renal Vein

**Question 132.**

Lack of relaxation between successive stimuli in sustained muscle contraction is known as

[4 Marks]

(A) Fatigue

(B) Tetanus

(C) Tonus

(D) Spasm

**Question 133.**

Photosensitive compound in human eye is made up of

[4 Marks]

(A) Guanosine and Retinol

(B) Opsin and Retinal

(C) Transducin and Retinene

(D) Opsin and Retinol

**Question 134.**

Which of the following pairs of hormones are not antagonistic (having opposite effects) to each other?

[4 Marks]

(A) Parathormone – Calcitonin

(B) Insulin – Glucagon

(C) Aldosterone – Atrial Natriuretic Factor

(D) Relaxin – Inhibin

**Question 135.**

Changes in GnRH pulse frequency in females is controlled by circulating levels of

[4 Marks]

(A) estrogen and inhibin

(B) estrogen and progesterone

(C) progesterone only

(D) progesterone and inhibin

**Question 136.**

Identify the correct statement on ‘inhibin’

[4 Marks]

(A) Inhibits the secretion of LH, FSH and Prolactin.

(B) Is produced by granulose cells in ovary and inhibits the secretion of FSH.

(C) Is produced by granulose cells in ovary and inhibits the secretion of LH.

(D) Is produced by nurse cells in testes and inhibits the secretion of LH.

**Question 137.**

Seed formation without fertilization in flowering plants involves the process of:

[4 Marks]

(A) Sporulation

(B) Budding

(C) Somatic hybridisation

(D) Apomixis

**Question 138.**

Which one of the following statements is not true?

[4 Marks]

(A) Stored pollen in liquid nitrogen can be used in the crop breeding programmes

(B) Exine of pollen grains is made up of sporopollenin

(C) Pollen grains of many species cause severe allergies

(D) Tapetum helps in the dehiscence of anther

**Question 139.**

Which of the following statements is not correct?

[4 Marks]

(A) Some reptiles have also been reported as pollinators in some plant species.

(B) Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil.

(C) Insects that consume pollen or nectar without bringing about pollination are called pollen/nectar robbers.

(D) Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style.

**Question 140.**

Fertilization in humans is practically feasible only if

[4 Marks]

(A) the sperms are transported into cervix within 48 hrs of release of ovum in uterus

(B) the ovum and sperms are transported simultaneously to ampullary-isthmic junction of the cervix

(C) the sperms are transported into vagina just after the release of ovum in fallopian tube

(D) the ovum and sperms are transported simultaneously to ampullary-isthmic junction of the fallopian tube

**Question 141.**

Select the incorrect statement:

[4 Marks]

(A) LH triggers secretion of androgens from the Leydig cells

(B) LH triggers ovulation in ovary

(C) LH and FSH decrease gradually during the follicular phase

(D) FSH stimulates the sertoli cells which help in spermiogenesis

**Question 142.**

In context of Amniocentesis, which of the following statement is incorrect?

[4 Marks]

(A) It can be used for detection of Cleft palate

(B) It can be used for detection of Down syndrome

(C) It is used for prenatal sex determination

(D) It is usually done when a woman is between 14–16 weeks pregnant.

**Question 143.**

Which of the following approaches does not give the defined action of contraceptive?

[4 Marks]

(A) Hormonal contraceptives — Prevent/retard entry of sperms, prevent ovulation and fertilization

(B) Vasectomy — Prevents spermatogenesis

(C) Barrier methods — prevent fertilization

(D) Intra uterine devices — Increase phagocytosis of sperms, suppress sperm motility and fertilizing capacity of sperms

**Question 144.**

A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the $F_1$ plants were selfed the resulting genotypes were in the ratio of

[4 Marks]

(A) 3 : 1 :: Tall : Dwarf

(B) 3 : 1 :: Dwarf : Tall

(C) 1 : 2 : 1 :: Tall homozygous : Tall heterozygous : Dwarf

(D) 1 : 2 : 1 :: Tall heterozygous : Tall homozygous : Dwarf

**Question 145.**

In a testcross involving F, dihybrid flies, more parental type offspring were produced than the recombinant type offspring.

This indicates

[4 Marks]

(A) the two genes are linked and present on the same chromosome.

(B) chromosomes failed to separate during meiosis.

(C) the two genes are located on two different chromosomes.

(D) both of the characters are controlled by more than one gene.

**Question 146.**

A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in

[4 Marks]

(A) Polyteny

(B) Somaclonal variation

(C) Polyploidy

(D) Aneuploidy

**Question 147.**

Which of the following most appropriately describes haemophilia?

[4 Marks]

(A) Chromosomal disorder

(B) X-linked recessive gene disorder

(C) Dominant gene disorder

(D) Recessive gene disorder

**Question 148.**

Pick out the correct statements:

(1) Haemophilia is a sex-linked recessive disease

(2) Down’s syndrome is due to aneuploidy

(3) Phenylketonuria is an autosomal recessive gene disorder

(4) Sickle cell anaemia is a X-linked recessive gene disorder

[4 Marks]

(A) (1) and (4) are correct

(B) (2) and (4) are correct

(C) (1), (3) and (4) are correct

(D) (1), (2) and (3) are correct

**Question 149.**

A complex of ribosomes attached to a single strand of RNA is known as

[4 Marks]

(A) Polysome

(B) Polymer

(C) Polypeptide

(D) Okazaki fragment

**Question 150.**

Which one of the following is the starter codon?

[4 Marks]

(A) AUG

(B) UGA

(C) UAA

(D) UAG

**Question 151.**

Which of the following is required as inducer(s) for the expression of Lac operon?

[4 Marks]

(A) Lactose and galactose

(B) Lactose

(C) Glucose

(D) Galactose

**Question 152.**

Which of the following is not required for any of the techniques of DNA fingerprinting available at present ?

[4 Marks]

(A) Zinc finger analysis

(B) Polymerase chain reaction

(C) Restriction enzymes

(D) DNA-DNA hybridization

**Question 153.**

Which of the following structures is homologus to the wing of a bird?

[4 Marks]

(A) Flipper of Whale

(B) Hind limb of Rabbit

(C) Dorsal fin of a Shark

(D) Wing of a Moth

**Question 154.**

Following are the two statements regarding the origin of life

(A) The earliest organisms that appeared on the earth were non-green and presumably anaerobes.

(B) The first autotrophic organisms were the chemoautotrophs that never released oxygen.

Of the above statements which one of the following options is correct?

[4 Marks]

(A) (B) is correct but (A) is false.

(B) (A) is correct but (B) is false.

(C) Both (A) and (B) are correct.

(D) Both (A) and (B) are false.

**Question 155.**

Analogous structures are a result of

[4 Marks]

(A) Stabilizing selection

(B) Shared ancestry

(C) Convergent evolution

(D) Divergent evolution

**Question 156.**

In higher vertebrates, the immune system can distinguish self-cells and non-self. If this property is lost due to genetic abnormality and it attacks self-cells, then it leads to

[4 Marks]

(A) auto-immune disease

(B) active immunity

(C) graft rejection

(D) allergic response

**Question 157.**

Antivenom injection contains preformed antibodies while polio drops that are administered into the body contain

[4 Marks]

(A) Gamma globulin

(B) Attenuated pathogens

(C) Harvested antibodies

(D) Activated pathogens

**Question 158.**

Which of the following statements is not true for cancer cells in relation to mutations?

[4 Marks]

(A) Mutations inactivate the cell control.

(B) Mutations inhibit production of telomerase.

(C) Mutations destroy telomerase inhibitor.

(D) Mutations in proto-oncogenes accelerate the cell cycle.

**Question 159.**

A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called

[4 Marks]

(A) Strip farming

(B) Shifting agriculture

(C) Contour farming

(D) Ley farming

**Question 160.**

Which part of the tobacco plant is infected by *Meloidogyne incognita*?

[4 Marks]

(A) Flower

(B) Leaf

(C) Stem

(D) Root

**Question 161.**

Which of the following is wrongly matched in the given table?

[4 Marks]

(A) Microbe-Trichoderma polysporum; Product- Cyclosporin A; Application- immuno-suppressive drug

(B) Microbe-Monascus purpureus; Product- Statins; Application- lowering of blood cholesterol

(C) Microbe-Streptococcus; Product- Streptokinase; Application- removal of clot from blood vessel

(D) Microbe-Clostridium butylicum; Product-Lipase; Application- removal of oil stains

**Question 162.**

The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the

[4 Marks]

(A) Thermoacidophiles

(B) Halophiles

(C) Eubacteria

(D) Methanogens

**Question 163.**

Which of the following is not a feature of the plasmids?

[4 Marks]

(A) Independent replication

(B) Circular structure

(C) Transferable

(D) Single-stranded

**Question 164.**

The taq polymerase enzyme is obtained from

[4 Marks]

(A) Pseudomonas putida

(B) Thermus aquaticus

(C) Bacillus subtilis

(D) Thiobacillus ferroxidans

**Question 165.**

Which of the following is a restriction endonuclease?

[4 Marks]

(A) DNase I

(B) Hind II

(C) Protease

(D) RNase

**Question 166.**

Which part of the tobacco plant is infected by *Meloidogyne incognita*?

[4 Marks]

(A) Stem

(B) Root

(C) Flower

(D) Leaf

**Question 167.**

Gause's principle of competitive exclusion states that:

[4 Marks]

(A) larger organisms exclude smaller ones through competition.

(B) no two species can occupy the same niche indefinitely for the same limiting resources.

(C) competition for the same resources excludes species having different food preferences.

(D) more abundant species will exclude the less abundant species through competition.

**Question 168.**

When does the growth rate of a population following the logistic model equal zero? The logistic model is given as $dN/dt=rN(1-N/K)$

[4 Marks]

(A) when N/K equals zero.

(B) when death rate is greater than birth rate.

(C) when N nears the carrying capacity of the habitat.

(D) when N/K is exactly one.

**Question 169.**

The term ecosystem was coined by

[4 Marks]

(A) E. Haeckel

(B) E. Warming

(C) E.P. Odum

(D) A.G. Tansley

**Question 170.**

Which of the following is a characteristic feature of cropland ecosystem?

[4 Marks]

(A) Least genetic diversity

(B) Absence of soil organisms

(C) Absence of weeds

(D) Ecological succession

**Question 171.**

Which of the following would appear as the pioneer organisms on bare rocks?

[4 Marks]

(A) Liverworts

(B) Lichens

(C) Mosses

(D) Green algae

**Question 172.**

Which of the following is the most important cause of animals and plants being driven to extinction?

[4 Marks]

(A) Over-exploitation

(B) Alien species invasion

(C) Habitat loss and fragmentation

(D) Co-extinctions

**Question 173.**

Which is the National Aquatic Animal of India?

[4 Marks]

(A) Sea-horse

(B) Blue whale

(C) River dolphin

(D) Gangetic shark

**Question 174.**

A river with an inflow of domestic sewage rich in organic waste may result in

[4 Marks]

(A) increased population of aquatic food web organisms.

(B) dying of the river very soon due to algal bloom.

(C) an increased production of fish due to biodegradable nutrients.

(D) death of fish due to lack of oxygen.

**Question 175.**

Joint Forest Management Concept was introduced in India during

[4 Marks]

(A) 1960s

(B) 1970s

(C) 1990s

(D) 1980s

**Question 176.**

Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancers

[4 Marks]

(A) Ammonia

(B) Methane

(C) Ozone

(D) Nitrous oxide

**Question 177.**

Which of the following is not a stem modification?

[4 Marks]

(A) Tendrils of cucumber

(B) Pitcher of Nepenthes

(C) Thorns of citrus

(D) Flattened structure of Opuntia

**Question 178.**

A typical fat molecule is made up of:

[4 Marks]

(A) One glycerol and three fatty acid molecules.

(B) One glycerol and one fatty acid molecules

(C) Three glycerol and three fatty acid molecules

(D) Three glycerol molecules and one fatty acid molecule

**Question 179.**

Asthma may be attributed to

[4 Marks]

(A) allergic reaction of the mast cells in the lungs

(B) inflammation of the trachea

(C) accumulation of fluid in the lungs

(D) bacterial infection of the lungs

**Question 180.**

Match the terms in Column-I with their description in Column-II and choose the correct option.

[4 Marks]

| Column-I | Column-II |
|---|---|
| (A) Dominance | (i) Many genes govern a single character |
| (B) Codominance | (ii) In a heterozygous organism, only one allele expresses itself |
| (C) Pleiotropy | (iii) In a heterozygous organism, both alleles express themselves fully |
| (D) Polygenic inheritance | (iv) A single gene influences many characters |

(A) A - (ii) B-(iii) C-(iv) D(i)

(B) A - (iv) B-(iii) C-(i) D(ii)

(C) A - (iv) B-(i) C-(ii) D(iii)

(D) A - (ii) B-(i) C-(iv) D(iii)