NEET-UG EXAMINATION PAPER-2019

(Solved)

Time allowed : 3 hours | Maximum Marks : 720

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.

The unit of thermal conductivity is :

[4 Marks]

(A) J m^{-1} K^{-1}

(B) W m K^{-1}

(C) J m K^{-1}

(D) W m^{-1} K^{-1}

Question 2.

In an experiment, the percentage of error occurred in the measurement of physical quantities A, B, C and D are 1%, 2%, 3% and 4% respectively. Then the maximum percentage of error in the

measurement X, where $X= A^2B^{1/2}/ C^{1/3}D^3$ will be:

[4 Marks]

(A) 16%

(B) -10%

(C) 10%

(D) (3/13)%

Question 3.

The speed of a swimmer in still water is 20 m/s. The speed of river water is 10 m/s and is flowing due east. If he is standing on the south bank and wishes to cross the river along the shortest path, the angle at which he should make his strokes w.r.t. north is given by:

[4 Marks]

(A) 30° west

(B) 60° west

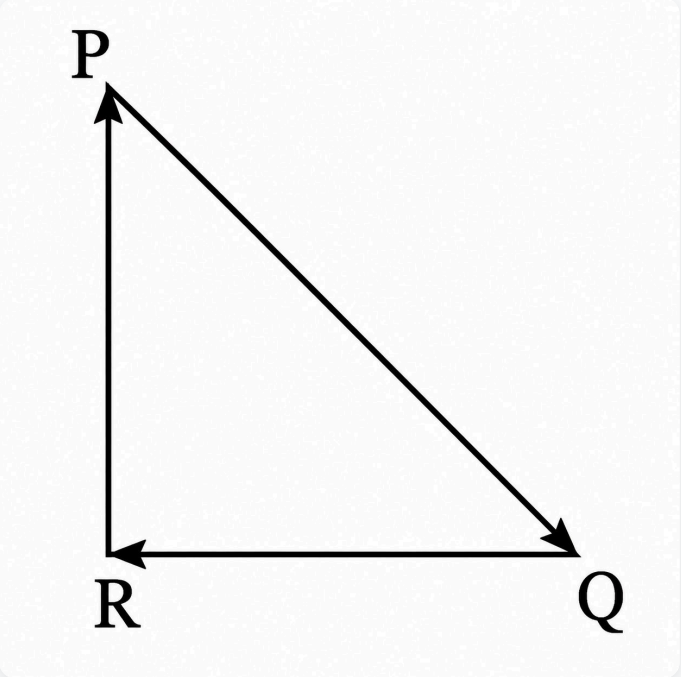
(C) 0°

(D) 45° west

Question 4.

A particle moving with velocity v is acted by three forces shown by the vector triangle PQR. The velocity of the particle will:

[4 Marks]



(A) increase

(B) remain constant

(C) decrease

(D) change according to the smallest force

Question 5.

A block of mass 10 kg is in contact against the inner wall of a hollow cylindrical drum of radius 1 m. The coefficient of friction between the block and the inner wall of the cylinder is 0.1. The minimum angular velocity needed for the cylinder to keep the block stationary when the cylinder is vertical and rotating about its axis, will be ($g = 10\ m/s^2$):

[4 Marks]

(A) $10/\pi^2$ rad/s

(B) $\sqrt{10}$ rad/s

(C) 10 rad/s

(D) 10π rad/s

Question 6.

A force $F = 20 + 10y$ acts on a particle in y-direction where F is in newton and y in meter. Work done by this force to move the particle from $y = 0$ to $y = 1$ m is:

[4 Marks]

(A) 5 J

(B) 25 J

(C) 30 J

(D) 20 J

Question 7.

Body A of mass 4m moving with speed u collides with another body B of mass 2m, at rest. The collision is head on and elastic in nature. After the collision the fraction of energy lost by the colliding body A is:

[4 Marks]

(A) 1/9

(B) 8/9

(C) 4/9

(D) 5/9

Question 8.

Two particles A and B are moving in uniform circular motion in concentric circles of radii rA and rB with speed vA and vB respectively. Their time period of rotation is the same. The ratio of angular speed of A to that of B will be: (a) rA : rB (b) vA : vB (c) rB : rA (d) 1 : 1

[4 Marks]

(A) 1 : 1

(B) r_B : r_A

(C) r_A : r_B

(D) v_A : v_B

Question 9.

A solid cylinder of mass 2 kg and radius 4 cm is rotating about its axis at the rate of 3 rpm. The torque required to stop after 2 revolutions is:

[4 Marks]

(A) 2×10^{-6} Nm

(B) 2×10^{-3} Nm

(C) 2×10^{6} Nm

(D) 12×10^{-4} Nm

Question 10.

A disc of radius 2 m and mass 100 kg rolls on a horizontal floor. Its centre of mass has speed of 20 cm/s. How much work is needed to stop it?

[4 Marks]

(A) 2 J

(B) 30 kJ

(C) 3 J

(D) 1 J

Question 11.

The work done to raise a mass m from the surface of the earth to a height h, which is equal to the radius of the earth, is:

[4 Marks]

(A) 2mgR

(B) mgR

(C) 3/2 mgR

(D) 1/2 mgR

Question 12.

When a block of mass M is suspended by a long wire of length L, the length of the wire becomes (L + l). The elastic potential energy stored in the extended wire is:

[4 Marks]

(A) Mgl

(B) 1/2 MgL

(C) MgL

(D) 1/2 Mgl

Question 13.

A small hole of area of cross-section 2 mm^2 is present near the bottom of a fully filled open tank of height 2 m. Taking g = 10 m/s^2, the rate of flow of water through the open hole would be:

[4 Marks]

(A) 12.6×10^{-6} m^3/s

(B) 6.4×10^{-6} m^3/s

(C) 8.9×10^{-6} m^3/s

(D) 2.23×10^{-6} m^3/s

Question 14.

A soap bubble, having radius of 1 mm, is blown from a detergent solution having a surface tension of 2.5×10^{-2} N/m. The pressure inside the bubble equals at a point Z_0 below the free surface of water in a container. Taking g = 10 m/s^2, density of water = 10^3 kg/m^3, the value of Z_0 in cm is:

[4 Marks]

(A) 0.5 cm

(B) 10 cm

(C) 1 cm

(D) 100 cm

Question 15.

A copper rod of 88 cm and an aluminium rod of same length have their increase in length independent of increase in temperature. The length of aluminium rod is: ($\alpha_Cu = 1.7 \times 10^{-5}$ K^{-1} and $\alpha_Al = 2.2 \times 10^{-5}$ K^{-1})

[4 Marks]

(A) 68 cm

(B) 88 cm

(C) 113.9 cm

(D) 6.8 cm

Question 16.

A sample of 0.1 g of water at 100°C and normal pressure (1.013×10^5 Nm^{-2}) requires 54 cal of heat energy to convert it into steam at 100°C. If the volume of the steam produced is 167.1 cc, the change in internal energy of the sample, is:

[4 Marks]

(A) 42.2 J

(B) 84.5 J

(C) 208.7 J

(D) 104.3 J

Question 17.

In which of the following processes, heat is neither absorbed nor released by a system?

[4 Marks]

(A) isobaric

(B) isochoric

(C) isothermal

(D) adiabatic

Question 18.

Increase in temperature of a gas filled in a container would lead to:

[4 Marks]

(A) increase in its mass

(B) increase in its kinetic energy

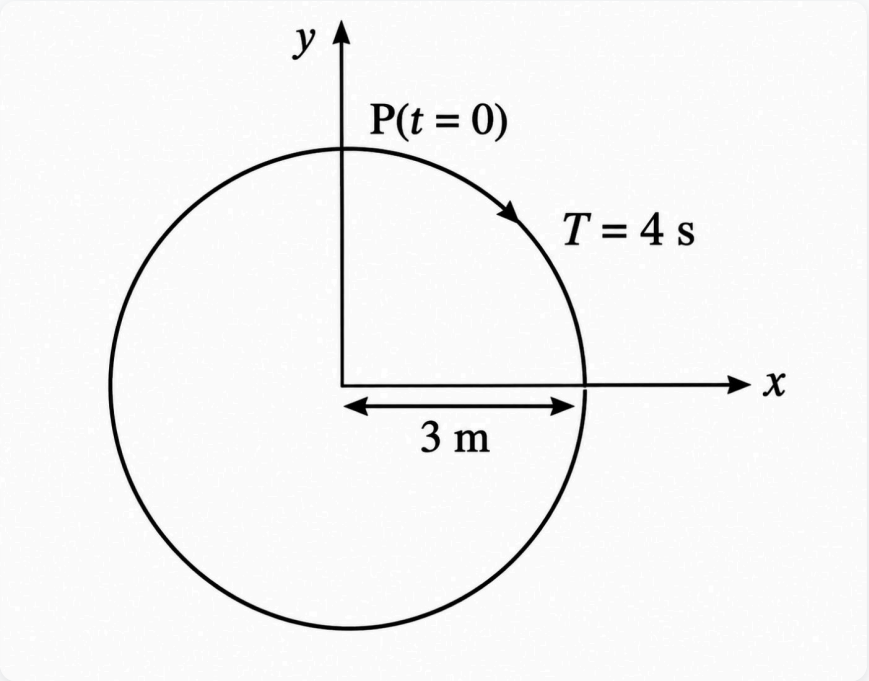
(C) decrease in its pressure

(D) decrease in intermolecular distance

Question 19.

The radius of circle, the period of revolution, initial position and sense of revolution are indicated in the fig. y-projection of the radius vector of rotating particle P is:

[4 Marks]



(A) y(t) = 3 sin (3π/2) cos πt, where y in m

(B) y(t) = −3 cos 2πt, where y in m

(C) y(t) = 3 cos (πt/2), where y in m

(D) y(t) = 4 sin (πt/2), where y in m

Question 20.

Average velocity of a particle executing SHM in one complete oscillation is:

[4 Marks]

(A) Zero

(B) $A\omega^2/2$

(C) $A\omega$

(D) $A\omega/2$

Question 21.

The displacement of a particle executing simple harmonic motion is given by

$y = A_0 + A \sin \omega t + B \cos \omega t$.

Then the amplitude of its oscillation is given by:

[4 Marks]

(A) $A_0 + \sqrt{(A^2 + B^2)}$

(B) A + B

(C) $\sqrt{(A_0^2 + (A + B)^2)}$

(D) $\sqrt{(A^2 + B^2)}$

Question 22.

Two point charges A and B, having charges +Q and −Q respectively, are placed at certain distance apart and force acting between them is F. If 25% charge of A is transferred to B, the force between the charges becomes:

[4 Marks]

(A) 9F/16

(B) F

(C) 4F/3

(D) 16F/9

Question 23.

Two parallel infinite line charges with linear charge densities +λ C/m and −λ C/m are placed at a distance of 2R in free space. What is the electric field midway between the two line charges?

[4 Marks]

(A) $2\lambda/\pi\varepsilon_0 R$ N/C

(B) $\lambda/\pi\varepsilon_0 R$ N/C

(C) zero

(D) $\lambda/2\pi\varepsilon_0 R$ N/C

Question 24.

A hollow metal sphere of radius R is uniformly charged. The electric field due to the sphere at a distance r from the centre:

[4 Marks]

(A) zero as r increases for r < R, decreases as r increases for r > R

(B) increases as r increases for r < R and for r > R

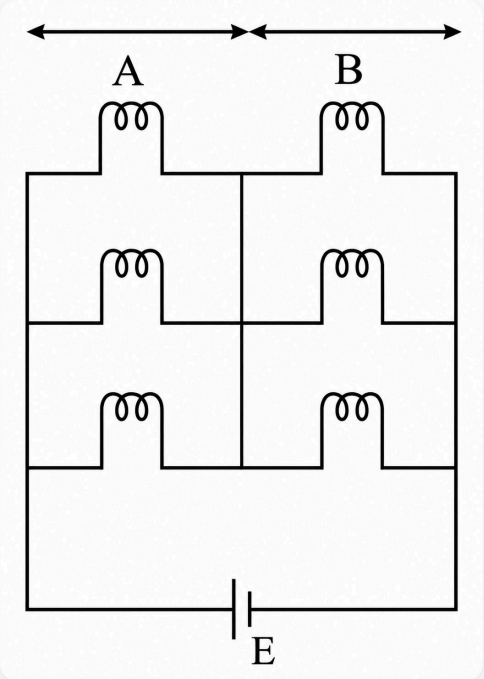
(C) zero as r increases for r < R, increases as r increases for r > R

(D) decreases as r increases for r < R and for r > R

Question 25.

Six similar bulbs are connected as shown in the figure connected to a DC source of emf E, and zero internal resistance. The ratio of power consumption by the bulbs when (i) all are glowing and (ii) in the situation when two from section A and one from section B are glowing, will be:

[4 Marks]



(A) 9 : 4

(B) 2 : 1

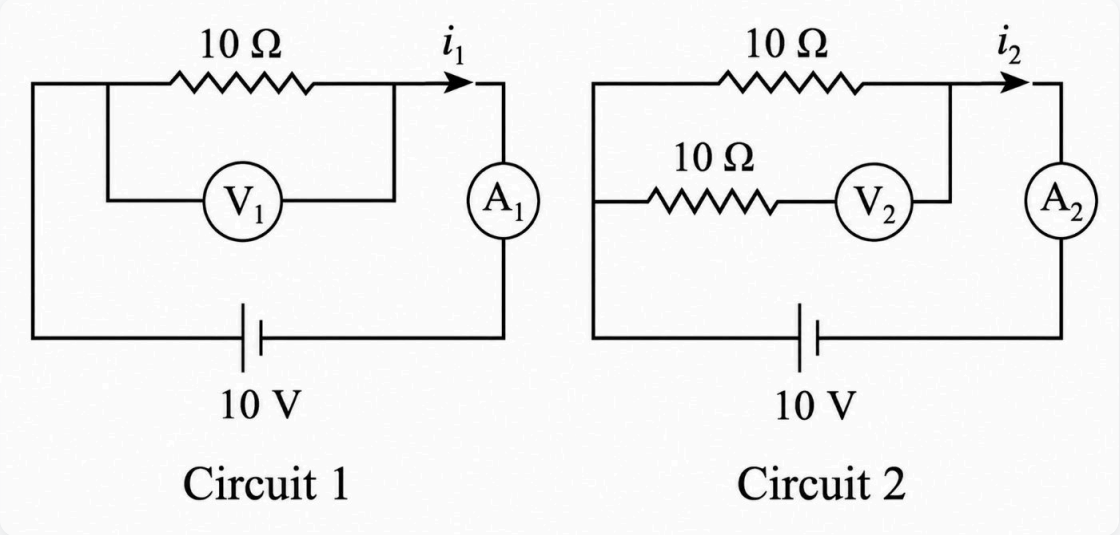
(C) 1 : 2

(D) 4 : 9

Question 26.

In the circuits shown below, the readings of the voltmeters and the ammeters will be :

[4 Marks]



(A) $V_2 > V_1$ and $i_1 > i_2$

(B) $V_1 = V_2$ and $i_1 = i_2$

(C) $V_2 > V_1$ and $i_1 = i_2$

(D) $V_1 = V_2$ and $i_1 > i_2$

Question 27.

Ionized hydrogen nucleus and α-particles with same momentum enter perpendicular to a constant magnetic field, B. The ratio of their radii of their paths r_H : r_α will be:

[4 Marks]

(A) 1 : 4

(B) 1 : 2

(C) 4 : 1

(D) 2 : 1

Question 28.

At a point A on the earth's surface the angle of dip, δ = +25°. At a point B on the earth's surface the angle of dip, δ = −25°. We can interpret that:

[4 Marks]

(A) A is located in the northern hemisphere and B is located in the southern hemisphere.

(B) A and B are both located in the southern hemisphere.

(C) A is located in the southern hemisphere and B is located in the northern hemisphere.

(D) A and B are both located in the northern hemisphere.

Question 29.

A 800 turn coil of effective area 0.05 m^2 is kept perpendicular to magnetic field 5×10^{-5} T. When the plane of the coil is rotated by 90° around any of its coplanar axis in 0.1 s, the induced potential will be:

[4 Marks]

(A) 2 V

(B) 0.2 V

(C) 0.02 V

(D) 2×10^{-3} V

Question 30. In which of the following devices, the eddy current effect is not used?

[4 Marks]

(A) magnetic braking in train

(B) electromagnet

(C) induction furnace

(D) electric heater

Question 31.

Which colour of the light has the longest wavelength?

[4 Marks]

(A) blue

(B) red

(C) green

(D) violet

Question 32.

In total Internal reflection when the angle of incidence is equal to the critical angle for the pair of media in contact, what will be angle of refraction?

[4 Marks]

(A) 90°

(B) equal to angle of incidence

(C) 180°

(D) 0°

Question 33.

Two similar thin equi-convex lenses, of focal length f each, are kept coaxially in contact with each other such that the focal length of the combination is F_1. When the space between two lenses is filled with glycerin (which has the same refractive index (=1.5) as that of glass) then the equivalent focal length is F_2. The ratio $F_1 : F_2$ will be:

[4 Marks]

(A) 1 : 2

(B) 3 : 4

(C) 2 : 3

(D) 2 : 1

Question 34.

Pick the wrong answer in the context with rainbow.

[4 Marks]

(A) An observer can see a rainbow when his front is towards the sun.

(B) Rainbow is a combined effect of dispersion, refraction and reflection of sunlight.

(C) When the light rays undergo two internal reflections in a water drop, a secondary rainbow is formed.

(D) The order of colours is reversed in the secondary rainbow.

Question 35.

In a double slit experiment, when light of wavelength 400 nm was used, the angular width of the first minima formed on a screen placed in a way, was found to be 0.2°. What will be the angular width of the first minima, if the entire experimental apparatus is immersed in water? (μ_water = 4/3)

[4 Marks]

(A) 0.1°

(B) 0.050°

(C) 0.266°

(D) 0.15°

Question 36.

An electron is accelerated through a potential difference of 10,000 V. Its de Broglie wavelength is (nearly): ($m = 9 \times 10^{-31}$ kg)

[4 Marks]

(A) 12.2×10^{-14} m

(B) 12.2×10^{-12} m

(C) 12.2×10^{-13} m

(D) 12.2 nm

Question 37.

The total energy of an electron in an atom in an orbit is −3.4 eV. Its kinetic and potential energies are, respectively:

[4 Marks]

(A) −3.4 eV, −6.8 eV

(B) −3.4 eV, −3.4 eV

(C) 3.4 eV, −6.8 eV

(D) 3.4 eV, 3.4 eV

Question 38.

α-particle consists of:

[4 Marks]

(A) 2 electrons, 2 protons and 2 neutrons

(B) 2 protons and 2 neutrons only

(C) 2 protons only

(D) 2 electrons and 4 protons only

Question 39.

For a p-type semiconductor, which of the following statements is true?

[4 Marks]

(A) Holes are the majority carriers and pentavalent atoms are the dopants.

(B) Electrons are the majority carriers and pentavalent atoms are the dopants.

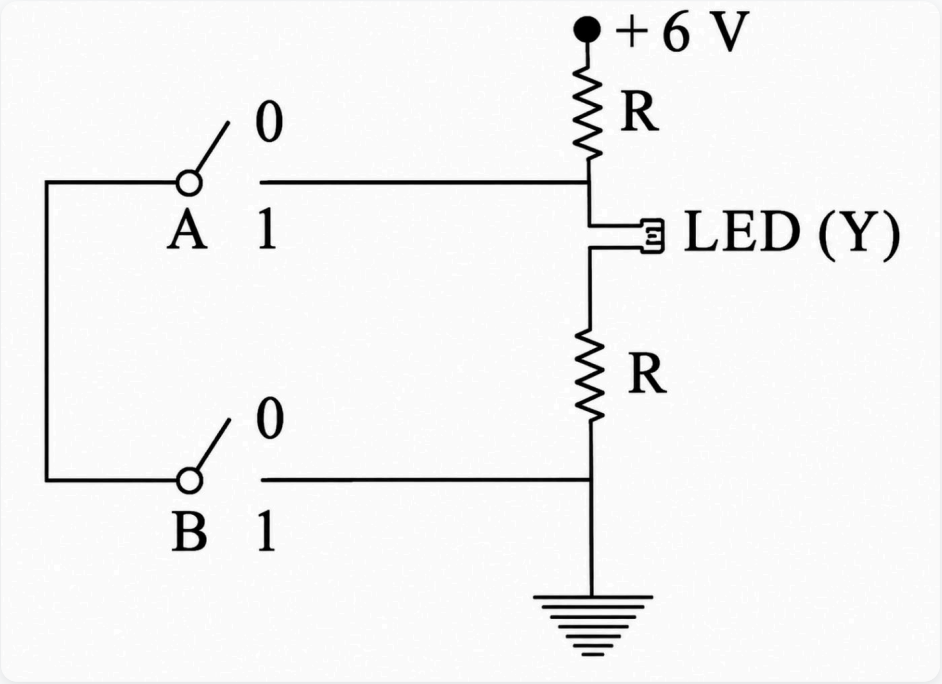
(C) Holes are the majority carriers and trivalent atoms are the dopants.

(D) Electrons are the majority carriers and trivalent atoms are the dopants.

Question 40.

The correct Boolean operation represented by the circuit diagram drawn is:

[4 Marks]



(A) AND

(B) NAND

(C) OR

(D) NOR

Question 41.

A body weighs 200 N on the surface of the earth. How much will it weigh half way down to the centre of the earth?

[4 Marks]

(A) 150 N

(B) 250 N

(C) 200 N

(D) 100 N

Question 42.

Which of the following acts as a circuit protection device?

[4 Marks]

(A) Conductor

(B) Fuse

(C) Switch

(D) Inductor

Question 43.

A parallel plate capacitor of capacitance 20 μF is being charged by a voltage source whose potential is changing at the rate of 3 V/s. The conduction current through the connecting wires and the displacement current through the plates of the capacitor, would be, respectively:

[4 Marks]

(A) zero, zero

(B) zero, 60 μA

(C) 60 μA, 60 μA

(D) 60 μA, zero

Question 44.

When an object is shot from the bottom of a long smooth inclined plane kept at an angle 60° with horizontal, it can travel a distance x_1 along the plane. But when the inclination is decreased to 30° and

the same object is shot with the same velocity, it can travel x_2 distance. Then $x_1 : x_2$ will be:

[4 Marks]

(A) 1 : √3

(B) √2 : 1

(C) 1 : √2

(D) 1 : 2√3

Question 45.

The number of moles of hydrogen molecule required to produce 20 moles of ammonia under Haber's process is:

[4 Marks]

(A) 10

(B) 20

(C) 30

(D) 40

Question 46.

Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region?

[4 Marks]

(A) Brackett series

(B) Paschen series

(C) Lyman series

(D) Balmer series

Question 47.

4d, 5p, 5f and 6p orbitals are arranged in the order of decreasing energy. The correct option is:

[4 Marks]

(A) 5f > 6p > 4d > 5p

(B) 5f > 5p > 4d > 6p

(C) 6p > 5f > 4d > 5p

(D) 5f > 6p > 5p > 4d

Question 48.

For the second period elements the correct increasing order of first ionisation enthalpy is:

[4 Marks]

(A) Li < B < Be < C < O < N < F < Ne

(B) Li < Be < B < C < N < O < F < Ne

(C) Li < Be < B < C < O < N < F < Ne

(D) Li < B < Be < C < N < O < F < Ne

Question 49.

The manganate and permanganate ions are tetrahedral, due to:

[4 Marks]

(A) The π-bonding involves overlap of d-orbital of oxygen with d-orbitals of manganese

(B) The π-bonding involves overlap of p-orbital of oxygen with p-orbitals of manganese

(C) There is no π-bonding

(D) The π-bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese

Question 50.

Which of the following diatomic molecular species has only π-bonds according to Molecular Orbital Theory?

[4 Marks]

(A) C_2

(B) N_2

(C) Be_2

(D) O_2

Question 51.

A gas at 350 K and 15 bar has molar volume 20 percent smaller than ideal gas under the same conditions. The correct option about the gas and its compressibility factor (Z) is:

[4 Marks]

(A) $Z > 1$ and attractive forces are dominant

(B) $Z > 1$ and repulsive forces are dominant

(C) $Z < 1$ and attractive forces are dominant

(D) $Z < 1$ and repulsive forces are dominant

Question 52.

Under isothermal condition, a gas at 300 K expands from 0.1 L to 0.25 L against a constant external pressure of 2 bar. The work done by the gas is [Given that 1 L bar = 100 J]

[4 Marks]

(A) 5 kJ

(B) 25 J

(C) 30 J

(D) −30 J

Question 53.

In which case change in entropy is negative?

[4 Marks]

(A) $2H(g) \rightarrow H_2(g)$

(B) Sublimation of solid to gas

(C) Expansion of a gas at constant temperature

(D) Evaporation of water

Question 54.

Conjugate base of Bronsted acid H_2O and HF are:

[4 Marks]

(A) H_3O^+ and H_2F^+, respectively

(B) OH^- and F^-, respectively

(C) OH^- and H_2F^+, respectively

(D) H_3O^+ and F^-

Question 55.

If pH of a saturated solution of $Ca(OH)_2$ is 9. The solubility product (K_{sp}) of $Ca(OH)_2$ is:

[4 Marks]

(A) 0.25×10^{-10}

(B) 0.125×10^{-15}

(C) 0.5×10^{-10}

(D) 0.5×10^{-15}

Question 56.

Which of the following reactions is disproportionation reaction?
Select the correct option from the following:

[4 Marks]

(a) $2Cu^+ \rightarrow Cu^{2+} + Cu$

(b) $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$

(c) $2KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + MnO_2 + O_2$

(d) $2MnO_4^- + 3Mn^{2+} + 2H_2O \xrightarrow{\Delta} 5MnO_2 + 4H^+$

(A) (a) and (d) only

(B) (a), (c) and (d)

(C) (a), (b) and (c)

(D) (a) and (b) only

Question 57.

This method used to remove temporary hardness of water:

[4 Marks]

(A) Calgon's method

(B) Clark's method

(C) Ion-exchange method

(D) Synthetic resins method

Question 58.

Which of the following is an amphoteric hydroxide?

[4 Marks]

(A) $Sr(OH)_2$

(B) $Ca(OH)_2$

(C) $Mg(OH)_2$

(D) $Be(OH)_2$

Question 59.

Enzymes that utilize ATP in phosphate transfer require an alkaline earth metal (M) as the cofactor. M is:

[4 Marks]

(A) Be

(B) Mg

(C) Sr

(D) Ca

Question 60.

Which of the following is incorrect statement?

[4 Marks]

(A) $SiCl_4$ is easily hydrolysed

(B) PbF_4 is covalent in nature

(C) GeX_4 (X = F, Cl, Br, I) is more stable than GeX_2

(D) SnF_4 is ionic in nature

Question 61.

Which of the following species is not stable?

[4 Marks]

(A) $[Sn(OH)_6]^{2-}$

(B) $[SiCl_6]^{2-}$

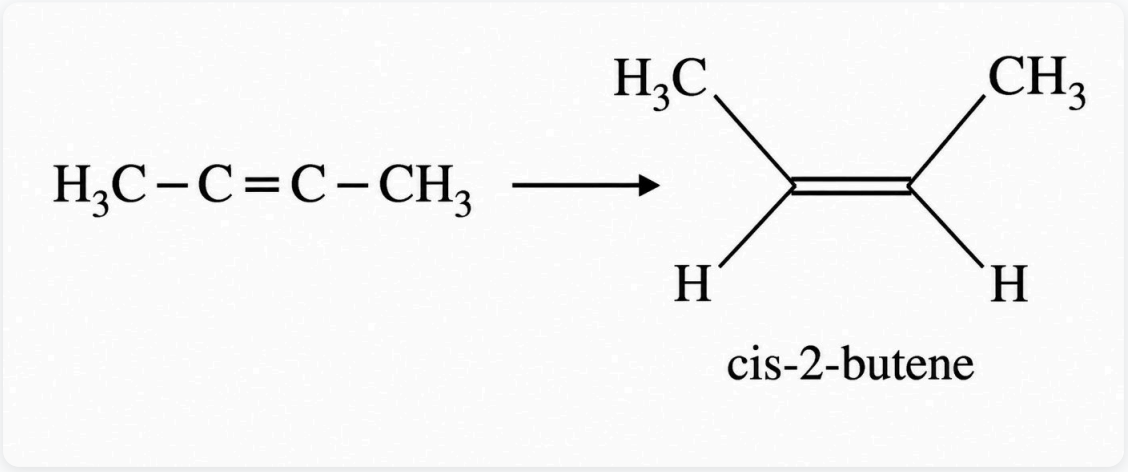
(C) $[GeCl_6]^{2-}$

(D) $[SiF_6]^{2-}$

Question 62.

The most suitable reagent for the following conversion, is:

[4 Marks]



(A) Zn/HCl

(B) Hg^{2+}/H^+, H_2O

(C) Na/liquid NH_3

(D) H_2, Pd/C, quinoline

Question 63.

Among the following, the one that is not a greenhouse gas is:

[4 Marks]

(A) methane

(B) nitrous oxide

(C) ozone

(D) sulphur dioxide

Question 64.

A compound is formed by cation C and anion A. The anions form hexagonal close packed (hcp) lattice and the cations occupy 75% of octahedral voids. The formula of the compound is:

[4 Marks]

(A) C_4A_3

(B) C_3A_2

(C) C_4A_3

(D) C_3A_4

Question 65.

The mixture which shows positive deviation from Raoult's law is:

[4 Marks]

(A) Benzene + Toluene

(B) Acetone + Chloroform

(C) Chloroethane + Bromoethane

(D) Ethanol + Acetone

Question 66.

The mixture that forms maximum boiling azeotrope is:

[4 Marks]

(A) Heptane + Octane

(B) Water + Nitric acid

(C) Acetone + Carbon disulphide

(D) Ethanol + Water

Question 67.

For a cell involving one electron E°_cell = 0.59 V at 298 K, the equilibrium constant for the cell reaction is:
[Given that 2.303RT/F = 0.059 V at T = 298 K]

[4 Marks]

(A) 1.0×10^{2}

(B) 1.0×10^{5}

(C) 1.0×10^{30}

(D) 1.0×10^{10}

Question 68.

For the cell reaction
$2Fe^{3+}(aq) + 2I^{-}(aq) \rightarrow 2Fe^{2+}(aq) + I_2(aq)$
0.24 V at 298 K. The standard Gibbs energy (ΔG°) of the reaction is:
[Given that Faraday constant F = 96500 C mol^{-1}]

[4 Marks]

(A) −23.16 kJ mol^{-1}

(B) −46.32 kJ mol^{-1}

(C) 46.32 kJ mol^{-1}

(D) 23.16 kJ mol^{-1}

Question 69.

If the rate constant for a first order reaction is k, the time (t) required for completion of 99% of the reaction is given by:

[4 Marks]

(A) t = 4.606/k

(B) t = 0.693/k

(C) t = 2.303/k

(D) t = 6.909/k

Question 70.

For the chemical reaction
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
the correct option is:

[4 Marks]

(A) $-d[N_2]/dt = 2\ d[NH_3]/dt$

(B) $-1/3\ d[H_2]/dt = -1/2\ d[NH_3]/dt$

(C) $-d[N_2]/dt = 1/2\ d[NH_3]/dt$

(D) $-3\ d[H_2]/dt = 2d[NH_3]/dt$

Question 71.

Which mixture of the solutions will lead to the formation of negatively charged colloidal $[AgI]I^-$ sol?

[4 Marks]

(A) 50 mL of 0.1 M $AgNO_3$ + 50 mL of 0.1 M KI

(B) 50 mL of 2 M $AgNO_3$ + 50 mL of 1.5 M KI

(C) 50 mL of 1 M $AgNO_3$ + 50 mL of 2 M KI

(D) 50 mL of 1 M $AgNO_3$ + 50 mL of 1.5 M KI

Question 72.

Which one is malachite from the following?

[4 Marks]

(A) $CuCO_3.Cu(OH)_2$

(B) Fe_3O_4

(C) $Cu(OH)_2$

(D) $CuFeS_2$

Question 73.

Which is the correct thermal stability order for H_2E (E = O, S, Se, Te and Po)?

[4 Marks]

(A) $H_2O < H_2S < H_2Se < H_2Te < H_2Po$

(B) $H_2S < H_2O < H_2Se < H_2Te < H_2Po$

(C) $H_2Po < H_2Te < H_2Se < H_2S < H_2O$

(D) $H_2Se < H_2Te < H_2Po < H_2O < H_2S$

Question 74.

Match the following:

[4 Marks]

Match the following:

(A)	Pure nitrogen	(i)	Chlorine
(B)	Haber process	(ii)	Sulphuric acid
(C)	Contact process	(iii)	Ammonia
(D)	Deacon's process	(iv)	Sodium azide or Barium azide

Which of the following is the **correct** option ?

	(A)	(B)	(C)	(D)
(a)	(i)	(ii)	(iii)	(iv)
(b)	(ii)	(iv)	(i)	(iii)
(c)	(iii)	(iv)	(ii)	(i)
(d)	(iv)	(iii)	(ii)	(i)

(A) d

(B) c

(C) a

(D) b

Question 75.

Identify the incorrect statement related to PCl_5 from the following:

[4 Marks]

(A) Axial P–Cl bonds are longer than equatorial P–Cl bonds

(B) PCl_5 molecule is non-reactive

(C) Two axial P–Cl bonds make an angle of 180° with each other

(D) Three equatorial P–Cl bonds make an angle of 120° with each other

Question 76.

What is the correct electronic configuration of the central atom in $[Fe(CN)_6]^{3-}$ based on crystal field theory?

[4 Marks]

(A) e^3 _g $t^3{}_2$_g

(B) e^4 _g $t^2{}_2$ _g

(C) $t^4{}_2$_g e^2 _g

(D) $t^6{}_2$_ge^0_ g

Question 77.

The correct order of the basic strength of methyl substituted amines in aqueous solution is:

[4 Marks]

(A) $(CH_3)_3N > CH_3NH_2 > (CH_3)_2NH$

(B) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$

(C) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2$

(D) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N$

Question 78.

The non-essential amino acid among the following is:

[4 Marks]

(A) valine

(B) leucine

(C) alanine

(D) lysine

Question 79.

The biodegradable polymer is:

[4 Marks]

(A) nylon-6,6

(B) nylon-6

(C) Buna-S

(D) nylon 2–nylon 6

Question 80.

Among the following, the narrow spectrum antibiotic is:

[4 Marks]

(A) penicillin G

(B) amoxycillin

(C) ampicillin

(D) chloramphenicol

Question 81.

For an ideal solution, the correct option is:

[4 Marks]

(A) $\Delta_{mix} V \neq 0$ at constant T and P

(B) $\Delta_{mix} S = 0$ at constant T and P

(C) $\Delta_{mix} H = 0$ at constant T and P

(D) $\Delta_{mix} G = 0$ at constant T and P

Question 82.

Which will make basic buffer?

[4 Marks]

(A) 100 mL of 0.1 M HCl + 100 mL of 0.1 M NaOH

(B) 100 mL of 0.1 M CH_3COOH + 100 mL of 0.1 M NaOH

(C) 100 mL of 0.1 M HCl + 200 mL of 0.1 M NH_4OH

(D) 50 mL of 0.1 M NaOH + 25 mL of 0.1 M CH_3COOH

Question 83.

The number of sigma (σ) and pi (π) bonds in pent-2-en-4-yne is:

[4 Marks]

(A) 10σ bonds and 3π-bonds

(B) 13σ bonds and no π-bond

(C) 11σ bonds and 2π bonds

(D) 8σ bonds and 5π bonds

Question 84.

Match the Xenon compounds in Column-I with its structure in Column-II and assign the correct code:

[4 Marks]

Column-I		Column-II	
(A)	XeF_4	(i)	Pyramidal
(B)	XeF_6	(ii)	Square planar
(C)	$XeOF_4$	(iii)	Distorted octahedral
(D)	XeO_3	(iv)	Square pyramidal

Codes

	(A)	(B)	(C)	(D)
(a)	(ii)	(iii)	(iv)	(i)
(b)	(ii)	(iii)	(i)	(iv)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(i)	(ii)	(iii)	(iv)

(A) d

(B) a

(C) b

(D) c

Question 85.

Select the correctly written scientific name of Mango which was first described by Carolus Linnaeus:

[4 Marks]

(A) Mangifera Indica

(B) Mangifera indica

(C) Mangifera indica Linn.

(D) Mangifera indica Car. Linn.

Question 86.

The contrasting characteristics generally in a pair used for identification of animals in Taxonomic Key are referred to as:

[4 Marks]

(A) Alternate

(B) Lead

(C) Couplet

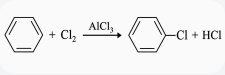
(D) Doublet

Question 87.

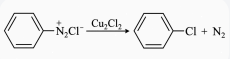
Among the following, the reaction that proceeds through an electrophilic substitution, is:

[4 Marks]

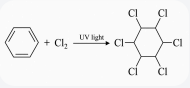
(A) b



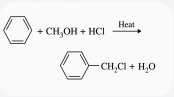
(B) a



(C) c



(D) d

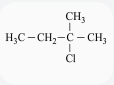


Question 88.

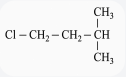
An alkene “A” on reaction with O_3 and Zn–H_2O gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene “A” gives the major product. The structure of product “B” is:

[4 Marks]

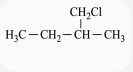
(A) c



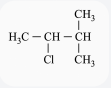
(B) a



(C) b



(D) d



Question 89.

One scientist cultured Cladophora in a suspension of Azotobacter and illuminated the culture by splitting light through a prism. He observed that bacteria accumulated mainly in the region of:

[4 Marks]

(A) Blue and red light

(B) Violet and green light

(C) Indigo and green light

(D) Orange and yellow light

Question 90.

The organisms in column I with habitats in column II.

Select the correct answer from the options given below:

[4 Marks]

Column-I	Column-II
(A) Halophiles	(i) Hot springs
(B) Thermoacidophiles	(ii) Aquatic environment
(C) Methanogens	(iii) Guts of ruminants
(D) Cyanobacteria	(iv) Salty areas

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

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

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

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

Question 91.

Which of the following statements is incorrect?

[4 Marks]

(A) Morels and truffles are edible delicacies.

(B) Claviceps is a source of many alkaloids and LSD.

(C) Yeasts have filamentous bodies with long thread-like hyphae.

(D) Conidia are produced exogenously and ascospores endogenously.

Question 92.

Which of the following statements is incorrect?

[4 Marks]

(A) Prions consist of abnormally folded proteins.

(B) Viruses are obligate parasites.

(C) Infective constituent in viruses is the protein coat.

(D) Viroids lack a protein coat.

Question 93.

Mad cow disease in cattle is caused by an organism which has:

[4 Marks]

(A) Free DNA without protein coat

(B) Inert crystalline structure

(C) Abnormally folded protein

(D) Free RNA without protein coat

Question 94.

Pinus seed cannot germinate and establish without fungal association. This is because:

[4 Marks]

(A) it has very hard seed coat.

(B) its embryo is immature.

(C) it has obligate association with mycorrhizae.

(D) its seeds contain inhibitors that prevent germination.

Question 95.

Phloem in gymnosperms lacks:

[4 Marks]

(A) Both sieve tubes and companion cells

(B) Sieve tubes only

(C) Albuminous cells and sieve cells

(D) Companion cells only

Question 96.

Which of the following animals are true coelomates with bilateral symmetry?

[4 Marks]

(A) Platyhelminthes

(B) Aschelminthes

(C) Adult echinoderms

(D) Annelids

Question 97.

Consider following features:
(a) Organ system level of organisation
(b) Bilateral symmetry
(c) True coelomates with segmentation of body
Select the correct option of animal groups which possess all the above characteristics.

[4 Marks]

(A) Annelida, Arthropoda and Chordata

(B) Annelida, Arthropoda and Mollusca

(C) Arthropoda, Mollusca and Chordata

(D) Annelida, Mollusca and Chordata

Question 98.

Match the following organisms with their respective chracteristics:

[4 Marks]

(A)	*Pila*	(i)	Flame cells
(B)	*Bombyx*	(ii)	Comb plates
(C)	*Pleurobrachia*	(iii)	Radula
(D)	*Taenia*	(iv)	Malpighian tubules

Select the correct option from the following:

	(A)	(B)	(C)	(D)
(a)	(iii)	(ii)	(i)	(iv)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(ii)	(iv)	(iii)	(i)
(d)	(iii)	(ii)	(iv)	(i)

(A) d

(B) c

(C) a

(D) b

Question 99.

Regeneration of damaged growing grass following grazing is largely due to:

[4 Marks]

(A) Secondary meristem

(B) Lateral meristem

(C) Apical meristem

(D) Intercalary meristem

Question 100.

Xylem translocates:

[4 Marks]

(A) Water, mineral salts, some organic nitrogen and hormones

(B) Water, mineral salts and some organic nitrogen only

(C) Water and mineral salts only

(D) Water only

Question 101.

Which of the statements given below is not true about formation of annual rings in trees?

[4 Marks]

(A) Annual ring is a combination of spring wood and autumn wood produced in a year.

(B) Differential activity of cambium causes light and dark bands of tissue – early and late wood to form respectively.

(C) Annual rings are not prominent in trees of temperate region.

(D) Activity of cambium depends upon variation in climate.

Question 102.

Match the following cell structure with its characteristic feature :

[4 Marks]

Column-I		Column-II
(A) Tight junctions	(i)	Cement neighbouring cells together to form sheet.
(B) Adhering junctions	(ii)	Transmit information through chemical to another cells.
(C) Gap junctions	(iii)	Establish a barrier to prevent leakage of fluid across epithelial cells.
(D) Synaptic junctions	(iv)	Cytoplasmic channels to facilitate communication between adjacent cells.

Select correct option from the following :

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

(A) c

(B) d

(C) b

(D) a

Question 103.

Which of the following statements is INCORRECT?

[4 Marks]

(A) Female cockroach possesses sixteen ovarioles in the ovaries.

(B) Cockroaches exhibit mosaic vision with less sensitivity and more resolution.

(C) A mushroom-shaped gland is present in the 6th–7th abdominal segments of male cockroach.

(D) A pair of spermatheca is present in the 6th segment of female cockroach.

Question 104.

Which of the following nucleic acid is present in an organism having 70S ribosomes only?

[4 Marks]

(A) Double stranded circular DNA with histone proteins.

(B) Single stranded DNA with protein coat.

(C) Double stranded circular naked DNA.

(D) Double stranded DNA enclosed in nuclear membrane.

Question 105.

Which of the following cell organelles is present in the highest number in secretory cells?

[4 Marks]

(A) Lysosome

(B) Mitochondria

(C) Endoplasmic reticulum

(D) Golgi complex

Question 106.

Match the column I with column II

Choose the right match from options given below:

[4 Marks]

	Column I		Column II
(A)	Golgi apparatus	(i)	Synthesis of protein
(B)	Lysosomes	(ii)	Trap waste and excretory products
(C)	Vacuoles	(iii)	Formation of glycoproteins and glycolipids
(D)	Ribosomes	(iv)	Digesting biomolecules

Choose the right match from options given below:

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

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

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

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

Question 107.

Concanavalin A is:

[4 Marks]

(A) an essential oil

(B) an alkaloid

(C) a lectin

(D) a pigment

Question 108.

Purines found both in DNA and RNA are:

[4 Marks]

(A) Cytosine and thymine

(B) Adenine and guanine

(C) Guanine and cytosine

(D) Adenine and thymine

Question 109.

Which of the following glucose transporters is insulin-dependent?

[4 Marks]

(A) GLUT II

(B) GLUT I

(C) GLUT III

(D) GLUT IV

Question 110.

Consider the following statements:
(A) Coenzyme or metal ion that is tightly bound to enzyme protein is called prosthetic group.
(B) A complete catalytic active enzyme with its bound prosthetic group is called apoenzyme.
Select the correct option.

[4 Marks]

(A) Both (A) and (B) are true.

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

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

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

Question 111.

Cells in G_0 phase:

[4 Marks]

(A) exit the cell cycle

(B) enter the cell cycle

(C) suspend the cell cycle

(D) terminate the cell cycle

Question 112.

The correct sequence of phases of cell cycle is:

[4 Marks]

(A) M → G_1 → G_2 → S

(B) G_1 → G_2 → S → M

(C) S → G_1 → G_2 → M

(D) G_1 → S → G_2 → M

Question 113.

Which of the following is not a feature of active transport of solutes in plants?

[4 Marks]

(A) Occurs through membranes

(B) Non-selective

(C) Requires ATP

(D) Occurs against concentration gradient

Question 114.

What will be the direction of flow of water when a plant cell is placed in a hypotonic solution?

[4 Marks]

(A) Water will flow into the cell.

(B) Water will flow out of the cell.

(C) Water will flow in both directions.

(D) No flow of water in any direction.

Question 115.

The main difference between active and passive transport across cell membrane is:

[4 Marks]

(A) Active transport occurs more rapidly than passive transport.

(B) Passive transport requires a concentration gradient across a biological membrane whereas active transport requires energy to move solutes.

(C) Passive transport is non-selective whereas active transport is selective.

(D) Passive transport is confined to anionic carrier proteins whereas active transport is confined to cationic channel proteins.

Question 116.

What is the direction of movement of sugars in phloem?

[4 Marks]

(A) Non-multidirectional

(B) Upward

(C) Bi-directional

(D) Downward

Question 117.

Grass leaves curl inwards during very dry weather. Select the most appropriate reason from the following:

[4 Marks]

(A) Shrinkage of air spaces in spongy mesophyll

(B) Tyloses in vessels

(C) Closure of stomata

(D) Flaccidity of bulliform cells

Question 118.

Which of the following bacteria reduce nitrate in soil into nitrogen?

[4 Marks]

(A) Nitrobacter

(B) Nitrosomonas

(C) Nitrococcus

(D) Thiobacillus

Question 119.

Thiobacillus is a group of bacteria helpful in carrying out:

[4 Marks]

(A) Nitrogen fixation

(B) Chemoautotrophic fixation

(C) Nitrification

(D) Denitrification

Question 120.

In Hatch and Slack pathway, the primary CO_2 acceptor is:

[4 Marks]

(A) Oxaloacetic acid

(B) Phosphoglyceric acid

(C) Rubisco

(D) Phosphoenol pyruvate

Question 121.

Conversion of glucose to glucose-6-phosphate, the first irreversible reaction of glycolysis, is catalysed by:

[4 Marks]

(A) Enolase

(B) Hexokinase

(C) Aldolase

(D) Phosphofructokinase

Question 122.

Where is the respiratory electron transport system (ETS) located in plants?

[4 Marks]

(A) Outer mitochondrial membrane

(B) Inner mitochondrial membrane

(C) Mitochondrial matrix

(D) Intermembrane space

Question 123.

Respiratory Quotient (RQ) value of tripalmitin is:

[4 Marks]

(A) 0.9

(B) 0.07

(C) 0.7

(D) 0.09

Question 124.

Removal of shoot tips is a very useful technique to boost the production of tea leaves. This is because:

[4 Marks]

(A) Auxins prevent leaf drop at early stages.

(B) Gibberellins prevent bolting and are inactivated.

(C) Gibberellins delay senescence of leaves.

(D) Effect of auxins is removed and growth of lateral buds is enhanced.

Question 125.

In order to increase the yield of sugarcane crop, which of the following plant growth regulators should be sprayed?

[4 Marks]

(A) Auxins

(B) Gibberellins

(C) Cytokinins

(D) Ethylene

Question 126.

It takes very long time for pineapple plants to produce flowers. Which combination of hormones can be applied artificially to induce flowering in pineapple plants throughout the year to increase yield?

[4 Marks]

(A) Gibberellin and Abscisic acid

(B) Cytokinin and Abscisic acid

(C) Gibberellin and Cytokinin

(D) Auxin and Ethylene

Question 127.

What is the site of perception of photoperiod necessary for induction of flowering in plants?

[4 Marks]

(A) Leaves

(B) Shoot apex

(C) Pulvinus

(D) Lateral buds

Question 128.

Match the items given in Column-I with Column- II and choose the correct option.

[4 Marks]

Column-I	Column-II
(A) Rennin	(i) Vitamin B_{12}
(B) Enterokinase	(ii) Facilitated transport
(C) Oxyntic cells	(iii) Milk proteins
(D) Fructose	(iv) Trypsinogen

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

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

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

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

Question 129.

Identify the cells whose secretion protects the lining of gastrointestinal tract from digestive enzymes.

[4 Marks]

(A) Chief cells

(B) Goblet cells

(C) Oxyntic cells

(D) Duodenal cells

Question 130.

Match the following structures with their respective location in organs:

[4 Marks]

(A)	Crypts of Lieberkuhn	(i)	Pancreas
(B)	Glisson's capsule	(ii)	Duodenum
(C)	Islets of Langerhans	(iii)	Small intestine
(D)	Brunner's glands	(iv)	Liver

Select the **correct** option from the following:

	(A)	**(B)**	**(C)**	**(D)**
(a)	(iii)	(i)	(ii)	(iv)
(b)	(ii)	(iv)	(i)	(iii)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(iii)	(ii)	(i)	(iv)

(A) d

(B) c

(C) b

(D) a

Question 131.

Tidal volume and Expiratory reserve volume of an athlete is 500 mL and 1000 mL respectively. What will be his Expiratory capacity if the residual volume is 1200 mL?

[4 Marks]

(A) 2700 mL

(B) 2200 mL

(C) 1500 mL

(D) 1700 mL

Question 132.

Due to increasing air-borne allergens and pollutants, many people in urban areas are suffering from respiratory disorder causing wheezing due to:

[4 Marks]

(A) reduction in the secretion of surfactants by pneumocytes.

(B) proliferation of fibrous tissues and damage of alveolar walls.

(C) inflammation of bronchi and bronchioles.

(D) benign growth on mucous lining of nasal cavity.

Question 133.

All the components of the nodal tissue are autoexcitable. Why does the SA node act as the normal pacemaker?

[4 Marks]

(A) Only SA node can convey the action potential to the other components.

(B) SA node is the only component to generate the threshold potential.

(C) SA node has the lowest rate of depolarisation.

(D) SA node has the highest rate of depolarisation.

Question 134.

A specialised nodal tissue embedded in the lower corner of the right atrium, close to Atrio-ventricular septum, delays the spreading of impulses to heart apex for about 0.1 sec. This delay allows:

[4 Marks]

(A) blood to enter aorta.

(B) the atria to empty completely.

(C) blood to enter pulmonary arteries.

(D) the ventricles to empty completely.

Question 135.

Match the Column-I with Column-II

[4 Marks]

	Column-I		Column-II
(A)	P-wave	(i)	Depolarisation of ventricles
(B)	QRS complex	(ii)	Repolarisation of ventricles
(C)	T - wave	(iii)	Coronary ischemia
(D)	Reduction in the size of T-wave	(iv)	Depolarisation of atria
		(v)	Repolarisation of atria

Select the **correct** option.

	(A)	(B)	(C)	(D)
(a)	(iv)	(i)	(ii)	(iii)
(b)	(iv)	(i)	(ii)	(v)
(c)	(ii)	(i)	(v)	(iii)
(d)	(ii)	(iii)	(v)	(iv)

(A) d

(B) c

(C) a

(D) b

Question 136.

What would be the heart rate of a person if the cardiac output is 5 L, blood volume in the ventricles at the end of diastole is 100 mL and at the end of ventricular systole is 50 mL?

[4 Marks]

(A) 100 beats per minute

(B) 125 beats per minute

(C) 75 beats per minute

(D) 50 beats per minute

Question 137.

Which of the following factors is responsible for the formation of concentrated urine?

[4 Marks]

(A) Hydrostatic pressure during glomerular filtration.

(B) Low levels of antidiuretic hormone.

(C) Maintaining hyperosmolarity towards inner medullary interstitium in the kidneys.

(D) Secretion of erythropoietin by juxtaglomerular complex.

Question 138.

Use of artificial kidney during haemodialysis may result in:
(A) Nitrogenous waste build-up in the body.
(B) Non-elimination of excess potassium ions.
(C) Reduced absorption of calcium ions from gastrointestinal tract.
(D) Reduced RBC production.
Which of the following options is the most appropriate?

[4 Marks]

(A) (A) and (B) are correct

(B) (B) and (C) are correct

(C) (C) and (D) are correct

(D) (A) and (D) are correct

Question 139.

Select the correct option:

[4 Marks]

(A) Each rib is a flat thin bone and all the ribs are connected dorsally to the thoracic vertebrae and ventrally to the sternum.

(B) There are seven pairs of vertebrosternal, three pairs of vertebrochondral and two pairs of vertebral ribs.

(C) 8th, 9th and 10th pairs of ribs articulate directly with the sternum.

(D) 11th and 12th pairs of ribs are connected to the sternum with the help of hyaline cartilage.

Question 140.

Which of the following muscular disorders is inherited?

[4 Marks]

(A) Tetany

(B) Muscular dystrophy

(C) Myasthenia gravis

(D) Botulism

Question 141.

Which of the following statements is not correct?

[4 Marks]

(A) Action potential in an axon does not move backward because the segment behind is in a refractory phase.

(B) In the knee-jerk reflex, stimulus is the stretching of muscle and response is its contraction.

(C) Rods are very sensitive and contribute to daylight vision.

(D) Depolarisation of hair cells of cochlea results in the opening of the mechanically gated potassium-ion channels.

Question 142.

Match the following hormones with the respective disease:

[4 Marks]

(A) Insulin	(i) Addison's disease
(B) Thyroxine	(ii) Diabetes insipidus
(C) Corticoids	(iii) Acromegaly
(D) Growth hormone	(iv) Goitre
	(v) Diabetes mellitus

Select the correct option.

	(A)	(B)	(C)	(D)
(a)	(v)	(i)	(ii)	(iii)
(b)	(ii)	(iv)	(iii)	(i)
(c)	(v)	(iv)	(i)	(iii)
(d)	(ii)	(iv)	(i)	(iii)

(A) a

(B) b

(C) c

(D) d

Question 143.

In some plants, the female gamete develops into embryo without fertilisation. This phenomenon is known as:

[4 Marks]

(A) Autogamy

(B) Parthenocarpy

(C) Syngamy

(D) Parthenogenesis

Question 144.

What is the fate of the male gametes discharged in the synergid?

[4 Marks]

(A) One fuses with the egg, other(s) fuse(s) with synergid nucleus.

(B) One fuses with the egg and other fuses with central cell nucleus.

(C) All fuse with the egg.

(D) One fuses with the egg, other(s) degenerate(s) in the synergid.

Question 145.

Which one of the following statements regarding post-fertilisation development in flowering plants is incorrect?

[4 Marks]

(A) Ovary develops into fruit.

(B) Zygote develops into embryo.

(C) Ovules develop into embryo sac.

(D) Central cell develops into endosperm.

Question 146.

Persistent nucellus in the seed is known as:

[4 Marks]

(A) Perisperm

(B) Tegmen

(C) Chalaza

(D) Hilum

Question 147.

Extrusion of second polar body from egg nucleus occurs:

[4 Marks]

(A) after fertilisation

(B) after entry of sperm but before fertilisation

(C) simultaneously with first cleavage

(D) before entry of sperm into ovum

Question 148.

Select the correct sequence for transport of sperm cells in male reproductive system:

[4 Marks]

(A) Testis → Epididymis → Vasa efferentia → Vas deferens → Ejaculatory duct → Inguinal canal → Urethra → Urethral meatus

(B) Seminiferous tubules → Vasa efferentia → Epididymis → Inguinal canal → Urethra

(C) Testis → Epididymis → Vasa efferentia → Rete testis → Inguinal canal → Urethra

(D) Seminiferous tubules → Rete testis → Vasa efferentia → Epididymis → Vas deferens → Ejaculatory duct → Urethra → Urethral meatus

Question 149.

Which of the following contraceptive methods do involve
a role of hormone?

[4 Marks]

(A) CuT, Pills, Emergency contraceptives

(B) Pills, Emergency contraceptives, Barrier methods

(C) Barrier method, Lactational amenorrhea, Pills

(D) Lactational amenorrhea, Pills, Emergency contraceptives

Question 150.

Select the hormone-releasing Intra-Uterine Devices.

[4 Marks]

(A) Progestasert, LNG-20

(B) Lippes Loop, Multiload 375

(C) Multiload 375, Progestasert

(D) Vaults, LNG-20

Question 151.

Which of the following sexually transmitted diseases is not completely curable?

[4 Marks]

(A) Genital herpes

(B) Chlamydiasis

(C) Gonorrhoea

(D) Genital warts

Question 152.

In Antirrhinum (Snapdragon), a red flower was crossed with a white flower and in F_1 generation, pink flowers were obtained. When pink flowers were selfed, the F_2 generation showed white, red and pink flowers. Choose the incorrect statement from the following.

[4 Marks]

(A) This experiment does not follow the principle of dominance.

(B) Pink colour in F_1 is due to incomplete dominance.

(C) Ratio of F_2 is ¼ (Red): ½ (Pink): ¼ (White)

(D) Law of Segregation does not apply in this experiment.

Question 153.

What map unit (Centimorgan) is adopted in the construction of genetic maps?

[4 Marks]

(A) A unit of distance between two expressed genes, representing 100% cross over.

(B) A unit of distance between genes on chromosomes, representing 1% cross over.

(C) A unit of distance between genes on chromosomes, representing 50% cross over.

(D) A unit of distance between two expressed genes, representing 10% cross over.

Question 154.

Select the incorrect statement.

[4 Marks]

(A) Male fruit fly is heterogametic.

(B) In male grasshoppers, 50% of sperms have no sex-chromosome.

(C) In domesticated fowls, sex of progeny depends on the type of sperm rather than egg.

(D) Human males have one, of their sex-chromosome much shorter than the other.

Question 155.

Under which of the following conditions will there be no change in the reading frame of following mRNA ?

5′ AACACGGGUGCUAUU 3′

[4 Marks]

(A) Deletion of GGU from 7th, 8th and 9th positions

(B) Insertion of A and G at 4th and 5th positions respectively

(C) Deletion of G from 5th position

(D) Insertion of G at 5th position

Question 156.

Expressed Sequence Tags (ESTs) refers to:

[4 Marks]

(A) DNA polymorphism

(B) Novel DNA sequences

(C) Polypeptide expression

(D) Genes expressed as RNA

Question 157.

Match the following genes of the Lac operon with their respective products:

[4 Marks]

Match the following genes of the Lac operon with their respective products:

(A)	i gene	(i)	β-galactosidase
(B)	z gene	(ii)	Permease
(C)	a gene	(iii)	Repressor
(D)	y gene	(iv)	Transacetylase

Select the **correct** option.

	(A)	**(B)**	**(C)**	**(D)**
(a)	(i)	(iii)	(ii)	(iv)
(b)	(iii)	(i)	(ii)	(iv)
(c)	(iii)	(i)	(iv)	(ii)
(d)	(iii)	(iv)	(i)	(ii)

(A) a

(B) b

(C) c

(D) d

Question 158.

A population of a species invades a new area. Which of the following condition will lead to adaptive radiation?

[4 Marks]

(A) Area with many habitats occupied by a large number of species.

(B) Area with large number of habitats having very low food supply.

(C) Area with a single type of vacant habitat.

(D) Area with many types of vacant habitats.

Question 159.

In Australia, marsupials and placental mammals have evolved to share many similar characteristics. This type of evolution may be referred to as:

[4 Marks]

(A) Convergent evolution

(B) Adaptive radiation

(C) Divergent evolution

(D) Cyclical evolution

Question 160.

In a species, the weight of newborn ranges from 2 to 5kg. 97% of the newborn with an average weight between 3 to 3.3 kg survive whereas 99% of the infants born with
weights from 2 to 2.5 kg or 4.5 to 5 kg die. Which type of selection process is taking place?

[4 Marks]

(A) Cyclical selection

(B) Stabilising selection

(C) Disruptive selection

(D) Directional selection

Question 161.

Which of the following statements is correct about the origin and evolution of men?

[4 Marks]

(A) Homo habilis probably ate meat.

(B) Agriculture came around 50,000 years back.

(C) The Dryopithecus and Ramapithecus primates existing 15 million years ago, walked like men.

(D) Neanderthal men lived in Asia between 1,00,000 and 40,000 years back.

Question 162.

A gene locus has two alleles A, a. If the frequency of dominant allele A is 0.4, then what will be the frequency of homozygous dominant, heterozygous and homozygous recessive individuals in the population ?

[4 Marks]

(A) 0.16 (AA); 0.36 (Aa); 0.48 (aa)

(B) 0.16 (AA); 0.48 (Aa); 0.36 (aa)

(C) 0.16 (AA); 0.24 (Aa); 0.36 (aa)

(D) 0.36 (AA); 0.48 (Aa); 0.16 (aa)

Question 163.

Match the hominids with their correct brain size:

[4 Marks]

(A)	*Homo habilis*	(i)	900 cc
(B)	*Homo neanderthalensis*	(ii)	1350 cc
(C)	*Homo erectus*	(iii)	650 - 800 cc
(D)	*Homo sapiens*	(iv)	1400 cc

Select the **correct** option.

	(A)	**(B)**	**(C)**	**(D)**
(a)	(iii)	(i)	(iv)	(ii)
(b)	(iii)	(ii)	(i)	(iv)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(iv)	(iii)	(i)	(ii)

(A) b

(B) a

(C) c

(D) d

Question 164.

Variations caused by mutation, as proposed by Hugo de Vries, are:

[4 Marks]

(A) small and directionless

(B) random and directionless

(C) random and directional

(D) small and directional

Question 165.

Identify the correct pair representing the causative agent of typhoid fever and the confirmatory test for the disease.

[4 Marks]

(A) Salmonella typhi / Widal test

(B) Salmonella typhi / Anthrone test

(C) Streptococcus pneumoniae / Widal test

(D) Plasmodium vivax / UTI test

Question 166.

Colostrum, the yellowish fluid, secreted by mother during the initial days of lactation is very essential to impart immunity to the newborn infants because it contains:

[4 Marks]

(A) Natural killer cells

(B) Monocytes

(C) Macrophages

(D) Immunoglobulin A

Question 167.

Select the incorrect statement regarding inbreeding.

[4 Marks]

(A) Inbreeding is necessary to evolve a pure line in any animal.

(B) Continued inbreeding reduces fertility and leads to inbreeding depression.

(C) Inbreeding helps in elimination of deleterious alleles from the population.

(D) Inbreeding depression cannot be overcome by out- crossing.

Question 168.

Select the incorrect statement.

[4 Marks]

(A) Inbreeding increases homozygosity.

(B) Inbreeding is essential to evolve purelines in any animal.

(C) Inbreeding selects harmful recessive genes that reduce fertility and productivity.

(D) Inbreeding helps in accumulation of superior genes and elimination of undesirable genes.

Question 169.

Match Column- I with Column- II.

[4 Marks]

Column-I		Column-II	
(A)	Saprophyte	(i)	Symbiotic association of fungi with plant roots
(B)	Parasite	(ii)	Decomposition of dead organic material
(C)	Lichens	(iii)	Living on living plants or animals
(D)	Mycorrhiza	(iv)	Symbiotic association of algae and fungi

Choose the correct answer from the options given below:

	(A)	(B)	(C)	(D)
(a)	(i)	(ii)	(iii)	(iv)
(b)	(iii)	(ii)	(i)	(iv)
(c)	(ii)	(i)	(iii)	(iv)
(d)	(ii)	(iii)	(iv)	(i)

(A) a

(B) b

(C) d

(D) c

Question 170.

Match the Following organisms with the products they produce:

[4 Marks]

(A)	*Lactobacillus*	(i)	Cheese
(B)	*Saccharomyces cerevisiae*	(ii)	Curd
(C)	*Aspergillus niger*	(iii)	Citric acid
(D)	*Acetobacter aceti*	(iv)	Bread
		(v)	Acetic acid

Select the correct option.

	(A)	(B)	(C)	(D)
(a)	(ii)	(iv)	(v)	(iii)
(b)	(i)	(iv)	(iii)	(v)
(c)	(iii)	(iv)	(v)	(i)
(d)	(ii)	(i)	(iii)	(v)

(A) d

(B) c

(C) b

(D) a

Question 171.

Which of the following is a commercial blood cholesterol lowering agent?

[4 Marks]

(A) Cyclosporin A

(B) Lipases

(C) Streptokinase

(D) Statin

Question 172.

Select the correct group of biocontrol agents.

[4 Marks]

(A) Trichoderma, Baculovirus, Bacillus thuringiensis

(B) Nostoc, Azospirillum, Meloidogyne

(C) Oscillatoria, Rhizobium, Trichoderma

(D) Bacillus thuringiensis, Tobacco mosaic virus, Aphids

Question 173.

Which of the following can be used as a biocontrol agent in the treatment of plant disease?

[4 Marks]

(A) Anabaena

(B) Lactobacillus

(C) Chlorella

(D) Trichoderma

Question 174.

Which one of the following equipments is essentially required for growing microbes on a large scale, for industrial production of enzymes?

[4 Marks]

(A) Bioreactor

(B) Industrial oven

(C) Sludge digester

(D) BOD incubator

Question 175.

Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the incorrect statement.

[4 Marks]

(A) The enzyme recognizes a specific palindromic nucleotide sequence in the DNA.

(B) The enzyme cuts DNA molecule at identified position within the DNA.

(C) The enzyme cuts the sugar-phosphate backbone at specific sites on each strand.

(D) The enzyme binds DNA at specific sites and cuts only one of the two strands.

Question 176.

DNA precipitation out of a mixture of biomolecules can be achieved by treatment with:

[4 Marks]

(A) Methanol at room temperature

(B) Chilled chloroform

(C) Chilled ethanol

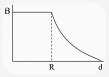
(D) Isopropanol

Question 177.

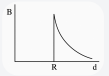
A cylindrical conductor of radius R is carrying a constant current. The plot of the magnitude of the magnetic field, B with the distance, d, from the centre of the conductor, is correctly represented by the figure:

[4 Marks]

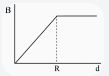
(A)



(B)



(C)



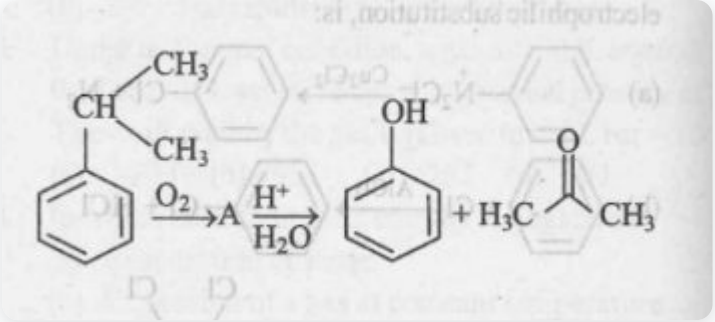
(D)



Question 178.

The structure of intermediate A in the following reaction is:

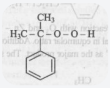
[4 Marks]



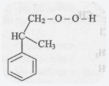
(A) a



(B) b



(C) d



(D) c

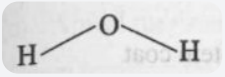


Question 179.

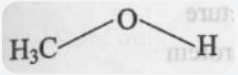
The compound that is most difficult to protonate is:

[4 Marks]

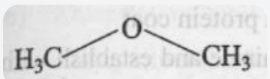
(A) a



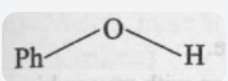
(B) b



(C) c



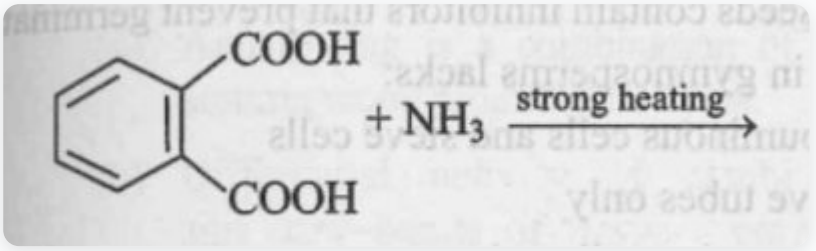
(D) d



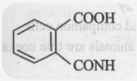
Question 180.

The major product of the following reaction is :

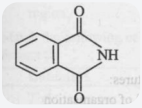
[4 Marks]



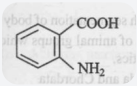
(A) a



(B) b



(C) c



(D) d

