



PYRAMID

IIT-JEE | MEDICAL | FOUNDATION

NEET TEST PAPER

Time : 3 Hrs.

Max. Marks : 720

Important Instructions :

1. The test is of 3 hours duration and Test Booklet contains 200 questions. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.
2. Use Black Ball point Pen only for writing particulars on this page/markings responses.
3. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
4. On completion of the test, the candidate must handover the Answer Sheet to the Invigilator before leaving the Room / Hall. The candidates are allowed to take away this Test Booklet with them.
5. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
7. Each candidate must show on demand his/her Admission Card to the Invigilator.
8. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.
9. Use of Electronic/Manual Calculator is prohibited.
10. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of this examination.
11. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.

Name of Student : _____

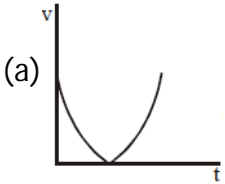
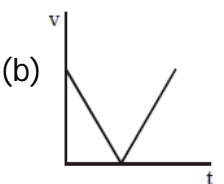
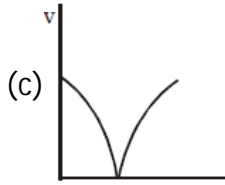
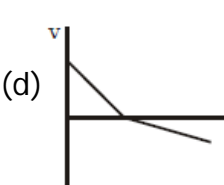
“ We are what we repeatedly do. Excellence, therefore, is not an act but a habit .”

Aristotle - Greek philosopher (384 BC - 322 BC)

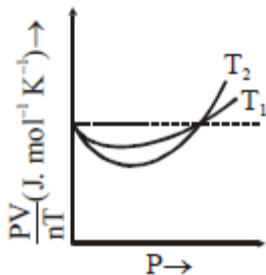
PHYSICS

SECTION - A

This section contains 35 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D); out of which only one is correct :

- Which of the following quantities has the dimensional formula $[ML^2T^{-2}K^{-1}]$:
 - Boltzmann's constant
 - Heat capacity
 - Entropy
 - All of these
- Air is blown through a hole on a closed pipe containing liquid. Then the pressure will :
 - Increase on sides
 - Increase downwards
 - Increase in all directions
 - Never increases
- The velocity time (v-t) graph for a body thrown vertically upward (which eventually comes down considering constant air friction acting on it is best shown by :
 - 
 - 
 - 
 - 
- A particle of mass 1 kg located at the position $3\hat{i}$ m has a velocity $(\hat{i} + \hat{j} + \hat{k})$ m/s. Its angular momentum about origin in $kg\ m^2s^{-1}$ is :
 - Zero
 - 3
 - $3\sqrt{2}$
 - 3
- Two match sticks are placed side by side on surface of water. A third match stick is placed between the two touching the water film. If a drop of light oil is dropped on this spot then both the match stick will
 - get separated quickly
 - come closer
 - all will remain as such
 - nothing can be predicted
- When a man starts to walk on rough horizontal surface, then nature and direction of force of friction on shoes due to ground :
 - Static, forward
 - Static, backward
 - Dynamic, forward
 - Dynamic, backward

7. A body of mass 10 kg is kept on a horizontal floor. Coefficient of friction between body and floor is 0.5. If $g = 10 \text{ ms}^{-2}$, then force of friction acting on the body is :
- (a) 50 N (b) 25 N
(c) Zero (d) 10 N
8. The figure below shows the plot of $\frac{PV}{nT}$ versus P for oxygen gas at two different temperatures



Read the following statements concerning the above curves:-

(i) The dotted line corresponds to the 'ideal' gas behaviour.

(ii) $T_1 > T_2$

(iii) The value of $\frac{PV}{nT}$ at the point where

the curves meet on the y-axis is the same for all gases. Which of the above statements is true?

- (a) (i) only
(b) (i) and (ii) only
(c) all of these
(d) None of the above

9. Engine of car of mass m supplies a constant power P . Starting from rest at an instant of time, then :

(a) Velocity $\propto t^{\frac{3}{2}}$

(b) Velocity $\propto t^{\frac{1}{2}}$

(c) Displacement $\propto t^{\frac{3}{2}}$

(d) Both (2) & (3)

10. A wave travelling along positive x-axis is given by : $y = A \sin(\omega t - kx)$. If it is reflected from rigid boundary such that 80% amplitude is reflected, then equation of reflected wave is :-

(a) $y = A \sin(\omega t + kx)$

(b) $y = -0.8 A \sin(\omega t + kx)$

(c) $y = 0.8 A \sin ky \cos \omega t$

(d) $y = A \cos ky \sin \omega t$

11. The amount of work required for increasing the length of a given wire by 1 cm in Erg (A-Area, l-Length in CGS System) will be :

(a) $YA/2l$

(b) $Yl/2A$

(c) $Yl^2/2A$

(d) none of these

12. In a tug of war, a 1 kg mass is hanged from the middle of the rope. What force should each side exert to make the rope horizontal again? Take $g = 10 \text{ ms}^{-2}$.

(a) 10 N

(b) 20 N

(c) 40 N

(d) infinity

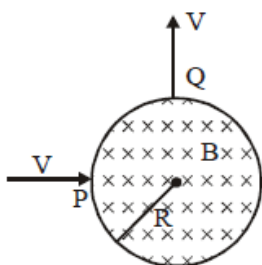
13. A pendulum consisting of a small sphere of mass M suspended by an inextensible and mass less string of length l is made to swing in a vertical plane. If the breaking strength of the string is $2Mg$, then the maximum angular amplitude of the displacement from the vertical can be:

- (a) 0° (b) 30°
 (c) 60° (d) 90°

14. Sand drops vertically at the rate of 2kg/sec onto a conveyor belt moving horizontally with a velocity of 0.2 m/sec . Then the extra force required to keep the belt moving is :

- (a) 0.4 N (b) 0.08 N
 (c) 0.04 N (d) 0.2 N

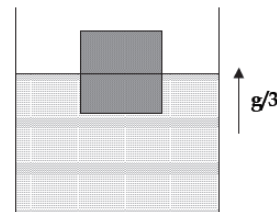
15. A particle of charge q and mass m enters normally (at point P) in a region of magnetic field speed v . It comes out normally from Q after time T as shown in fig. The magnetic field B is present only in the region of radius R and is uniform. Initial and final velocities are along radial direction and they are perpendicular to each other. For this to happen which of the following expression is correct :-



(a) $B = \frac{mv}{qR}$ (b) $T = \frac{\pi R}{2v}$

(c) $T = \frac{\pi m}{2qB}$ (d) All of these

16. A cubical block is floating in a liquid with half of its volume immersed in the liquid. When the whole system accelerates upwards with a net acceleration of $g/3$. The fraction of volume immersed in the liquid will be :-

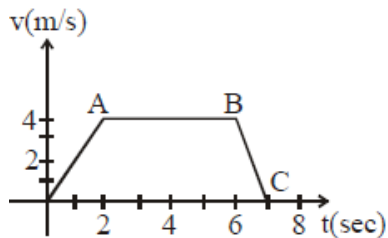


(a) $\frac{1}{2}$ (b) $\frac{3}{8}$

(c) $\frac{2}{3}$ (d) $\frac{3}{4}$

17. A lift having mass 100 kg moves from rest in upward direction. Using the $v - t$ graph find tension T_1 , T_2 and T_3 in rope from zero to 2s , $2\text{ to }6\text{s}$ and $6\text{ to }7\text{s}$ respectively. Then

$T_1 : T_2 : T_3$ is :-



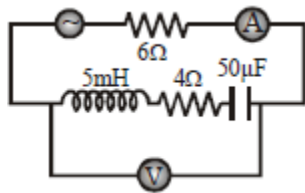
(a) $3 : 5 : 6$ (b) $4 : 2 : 1$

(c) $6 : 5 : 3$ (d) $1 : 1 : 1$

18. A point moves along a circle with speed $v = at$, where a is radius of circular path then the total acceleration of the point at a time when it has traced $\frac{1}{8}$ th of circumference is :-

- (a) $\frac{v}{8a}$ (b) $2a\sqrt{4+\pi^2}$
 (c) a (d) $\frac{a}{2}\sqrt{4+\pi^2}$

19. In the circuit shown in the figure, the ac source gives a voltage $V = 20\cos(2000t)$. Neglecting source resistance, the voltmeter and ammeter reading will be –



- (a) 0V, 0.47 A (b) 1.68V, 0.47 A
 (c) 0V, 1.4 A (d) 5.6V, 1.4 A

20. Five very long, thin straight wires are bound together to form a small cable. Currents carried by the wires are $I_1 = 20A$, $I_2 = -6A$, $I_3 = 12A$, $I_4 = -7A$, $I_5 = 18A$. The magnetic induction at a distance of 10 cm from the cable is

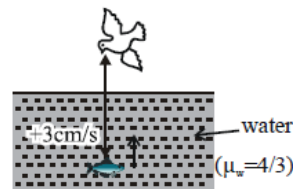
- (a) $34 \mu T$ (b) 74mT
 (c) 34mT (d) $74 \mu T$

21. A large parallel plate capacitor, where plates have an area of $1 m^2$ and are separated from each other by 1 mm, is

being charged at a rate of $25 V/s$. If the dielectric constant between the plates has the dielectric constant 10, then the displacement current at this instant is :-

- (a) $1.1\mu A$ (b) $2.2\mu A$
 (c) $11\mu A$ (d) $22\mu A$

22.



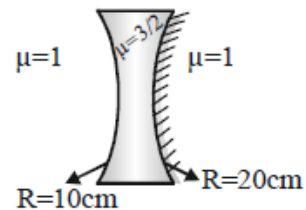
In given diagram apparent velocity of bird (coming toward fish) seen by fish is 19 cm/s. Find the actual velocity of bird :-

- (a) 16 cm/s (b) 14 cm/s
 (c) 12 cm/s (d) 21 cm/s

23. If the momentum of an electron is changed by Δp , then the de-Broglie wavelength associated with it changes by 0.50%. The initial momentum of the electron will be :-

- (a) $\frac{\Delta p}{200}$ (b) $\frac{\Delta p}{199}$
 (c) $201 \Delta p$ (d) $400 \Delta p$

24. Find the power of given system :-

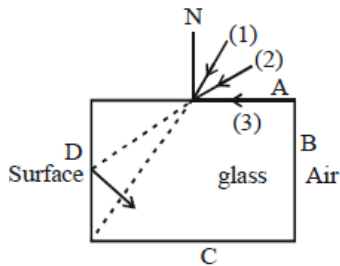


- (a) -10 D (b) -15 D
 (c) -20 D (d) -25 D

25. Photoelectric emission is observed from a metallic surface for frequencies ν_1 and ν_2 of the incident light rays ($\nu_1 > \nu_2$). If the maximum values of kinetic energy of the photoelectrons emitted in the two cases are in the ratio of 1 : k, then the threshold frequency of the metallic surface is :-

- (a) $\frac{\nu_1 - \nu_2}{k - 1}$ (b) $\frac{k\nu_1 - \nu_2}{k - 1}$
 (c) $\frac{k\nu_2 - \nu_1}{k - 1}$ (d) $\frac{\nu_2 - \nu_1}{1}$

26. Which of following ray have maximum probability for TIR at surface D :-

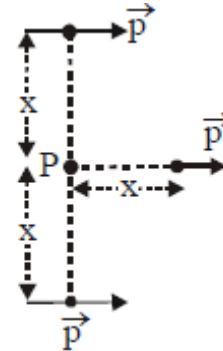


- (a) 1 (b) 2
 (c) 3 (d) All (1), (2), (3)

27. A radioactive isotope X with a half-life of 1.37×10^9 year decays to Y which is stable. A sample of rock from the moon was found to contain both the elements X and Y which were in the ratio of 1 : 7. The age of the rock is :-

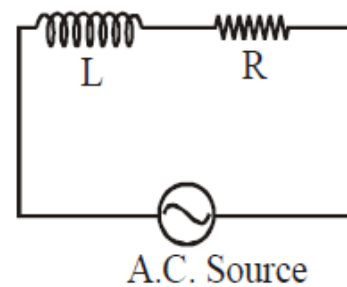
- (a) 1.96×10^8 years (b) 3.85×10^9 years
 (c) 4.11×10^9 years (d) 9.59×10^9 years

28. Three identical dipoles are arranged as shown below. What will be the net electric field at P :-



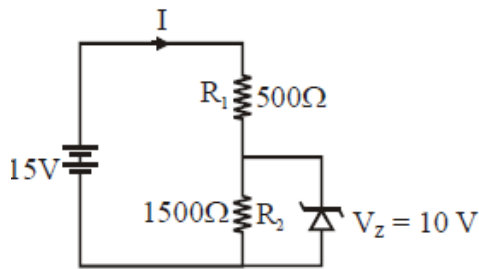
- (a) $\frac{kp}{x^3}$ (b) $\frac{2kp}{x^3}$
 (c) Zero (d) $\frac{\sqrt{2}kp}{x^3}$

29. In a simple L-R circuit with A.C. source the potential difference at any instant across inductor and resistance are V_L and V_R respectively and V_{AC} source has potential difference V_{AC} at the same instant. Then :

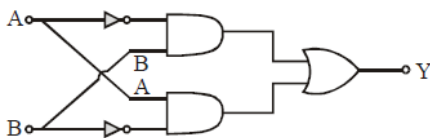


- (a) $V_L^2 + V_R^2 = V_{AC}^2$ (b) $V_L + V_R = V_{AC}$
 (c) $V_L^2 - V_R^2 = V_{AC}^2$ (d) $V_L^3 + V_R^3 = V_{AC}^3$

30. In the given circuit the current through the Zener diode is :-



- (a) 10 mA (b) 6.67 mA
 (c) 5 mA (d) 3.33 mA
31. Equipotential surfaces associated with an electric field which is increasing in magnitude along the x-direction are :-
- (a) Planes parallel to yz-plane
 (b) Planes parallel to xy-plane
 (c) Planes parallel to xz-plane
 (d) Coaxial cylinders of increasing radii around the x-axis
32. The truth table for the following logic circuit is :-



- (a)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

 (b)

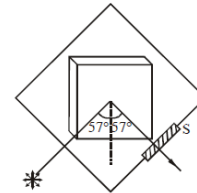
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1
- (c)

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

 (d)

A	B	Y
0	0	1
0	1	1
1	0	0
1	1	1

33. Figure represents a glass plate placed vertically on a horizontal table with a beam of unpolarised light falling on its surface at the polarised angle of 57° with the normal. The electric vector in the reflected light on screen S will vibrate with respect to the plane of incidence in a :-



- (a) vertical plane (b) horizontal plane
 (c) plane making an angle of 45° with the vertical
 (d) plane making an angle of 57° with the horizontal
34. A transistor is operated in common-emitter configuration at $V_{CC} = 2V$ such that a change in the base current from $100\mu A$ to $200\mu A$ produces a change in the collector current from 5 mA to 10 mA. The current gain is :-
- (a) 100 (b) 150
 (c) 50 (d) 75
35. An emf of 15 volt is applied in a circuit containing 5 henry inductance and 10 ohm resistance. The ratio of the current at time $t = \infty$ and $t = 1$ second is:-
- (a) $\frac{e^{1/2}}{e^{1/2} - 1}$ (b) $\frac{e^2}{e^2 - 1}$
 (c) $1 - e^{-1}$ (d) e^{-1}

SECTION - B

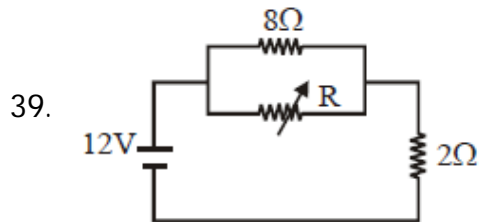
This section contains 15 multiple choice questions. Solve any 10 from the following :

36. A 5 watt source emits monochromatic light of wavelength 5000\AA . When placed 0.5 m away, it liberates photoelectrons from a photosensitive metallic surface. When the source is moved to a distance of 1.0m, the number of photo electrons liberated will
- (a) be reduced by a factor of 2
 (b) be reduced by a factor of 4
 (c) be reduced by a factor of 8
 (d) be reduced by a factor of 16
37. The relative magnetic permeability of a substance 'A' is slightly greater than unity while that of a substance 'B' is slightly less than unity. Then :
- (a) A – Ferromagnetic, B – Paramagnetic
 (b) A – Diamagnetic, B – Paramagnetic
 (c) A – Paramagnetic, B – Diamagnetic
 (d) A and B both ferromagnetic
38. A ray of light is incident on a convex mirror along a vector $3\hat{i} + 4\hat{j} + 12\hat{k}$. The normal to the convex mirror on incidence point is along $3\hat{i} + 4\hat{j}$. The unit vector along the reflected ray is :-
- (a) $\frac{1}{13}(-3\hat{i} + 4\hat{j} - 12\hat{k})$

(b) $\frac{1}{13}(-3\hat{i} - 4\hat{j} + 12\hat{k})$

(c) $\frac{1}{13}(3\hat{i} + 4\hat{j} + 12\hat{k})$

(d) None of these



The value of the resistance R in figure is adjusted such that power dissipated in the 2Ω resistor is maximum. Under this condition :-

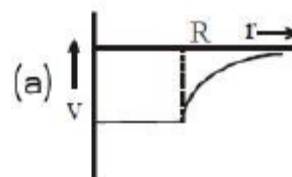
(a) $R = 2\Omega$

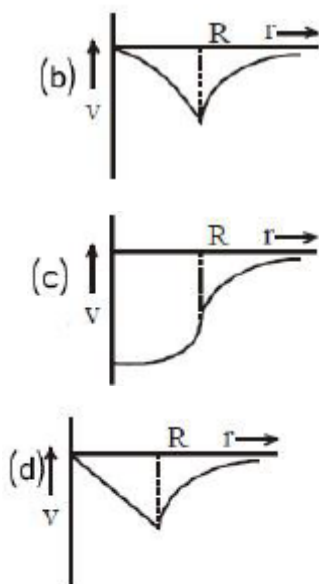
(b) $R = 8\Omega$

(c) power dissipated in the 2Ω resistor is 72W.

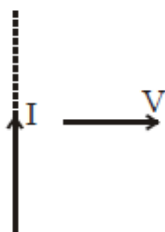
(d) power dissipated in the 2Ω resistor is 8 W.

40. The dependence of potential with distance r from the centre of a negatively charged non-conducting solid sphere is given by the following curve:





41. A conducting wire is moving towards right in a magnetic field B . The direction of induced current in the wire is shown in the figure. The direction of magnetic field will be :-



- (a) In the plane of paper pointing towards right
 (b) In the plane of paper pointing towards left
 (c) Perpendicular to the plane of paper and inwards
 (d) Perpendicular to the plane of paper and outwards

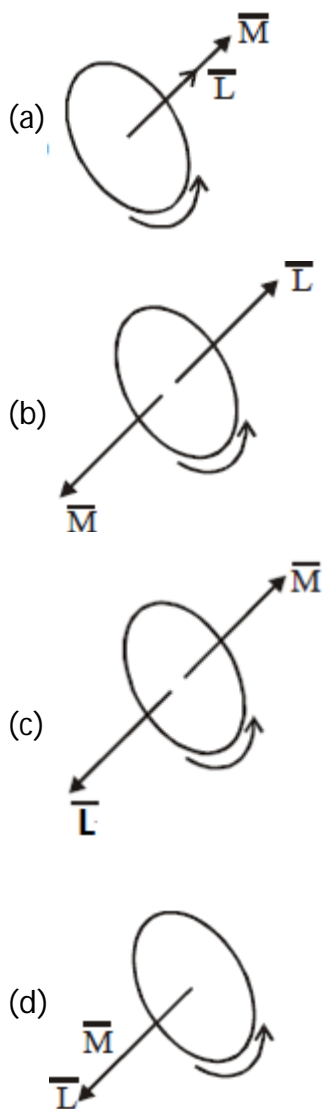
42. An electron (mass = 9.1×10^{-31} kg and charge = 1.6×10^{-19} C) is sent in an electric field of intensity 1×10^6 V/m. How long would it take for the electron, starting from rest, to attain one-tenth the velocity of light.

- (a) 1.7×10^{-12} sec (b) 1.7×10^{-6} sec
 (c) 1.7×10^{-8} sec (d) 1.7×10^{-10} sec

43. If an orbital electron of the hydrogen atom jumps from the ground state to a higher energy state, its orbital speed reduces to half its initial value. If the radius of the electron orbit in the ground state is r , then the radius of the new orbit would be :

- (a) $2r$ (b) $4r$
 (c) $8r$ (d) $16r$

44. A negatively charged particle is revolving in a circle of radius r out of the following which one fig. represents the correct direction of \vec{L} and \vec{M} (L is angular momentum of particle and M is magnetic moment of the particle):-



45. At a place the value of horizontal component of the earth's magnetic field H is 3×10^{-5} (from S to N) Weber/ m^2 . A metallic rod AB of length 2m placed in East-West direction, having the end A towards east, falls vertically downward with a constant velocity of 50 m/s. Which end of the rod becomes positively charged and what is the value of induced potential difference between the two ends

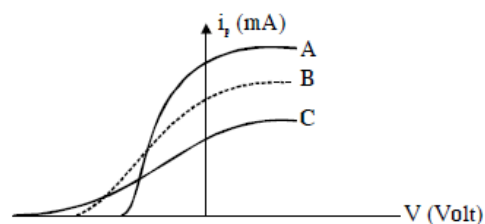
(a) End A, 3×10^{-3} millivolt

(b) End A, 3 millivolt

(c) End B, 3×10^{-3} millivolt

(d) End B, 3 millivolt

46. A light of same frequency incident on three metals A, B and C and obtain graph is :



(a) $\phi_A > \phi_B > \phi_C$

(b) $\phi_A < \phi_B < \phi_C$

(c) $\phi_B > \phi_C > \phi_A$

(d) $\phi_A = \phi_B = \phi_C$

47. The Earth is assumed to be a sphere of radius R . A platform is arranged at a height R from the surface of the Earth. The escape velocity of a body from this platform is fv , where v is its escape velocity from the surface of the Earth then the value of f is :-

(a) $\sqrt{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{1}{3}$ (d) $\frac{1}{2}$

48. A block of wood floats in water with $\frac{4}{5}$ th

of its volume submerged, but it just floats in a liquid. What is the density of block.

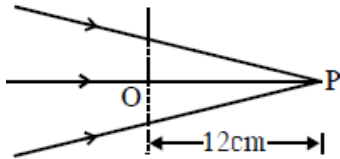
(a) $750 \frac{kg}{m^3}$

(b) $800 \frac{kg}{m^3}$

(c) $1000 \frac{kg}{m^3}$

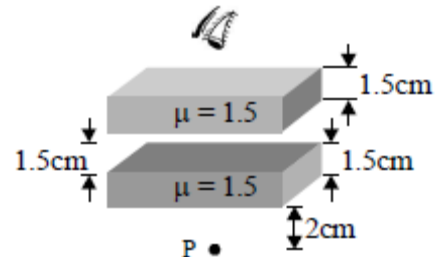
(d) $1250 \frac{kg}{m^3}$

49. Figure given below shows a beam of light converging at point P. When a concave lens of focal length 16 cm is introduced in the path of the beam at a place O shown by dotted line such that OP becomes the axis of the lens, the beam converges at a distance x from the lens. The value x will be equal to :-



- (a) 12 cm (b) 24 cm
(c) 36 cm (d) 48 cm

50. The image of point P when viewed from top of the slabs will be :-



- (a) 2.0 cm above P
(b) 1.5 cm above P
(c) 2.0 cm below P
(d) 1 cm above P

CHEMISTRY

SECTION - A

This section contains 35 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D); out of which only one is correct :

51. 1.0 g of magnesium is burnt with 0.56 g of oxygen in a closed vessel. Which reactant is left in excess and how much? (At. weight of Mg = 24, O = 16)
- (a) Mg, 0.16 g (b) O₂, 0.16 g
(c) Mg, 0.44 g (d) O₂, 0.28 g
52. The radius of hydrogen atom in the ground state is 0.53 Å. The radius of Li²⁺ ion (at. no. = 3) in a similar state is
- (a) 0.17 Å (b) 0.53 Å
(c) 0.265 Å (d) 1.06 Å
53. The electron was shown experimentally to have wave properties by
- (a) de-Broglie
(b) N Bohr
(c) Davisson and Germer
(d) Schrodinger
54. Which one of the following molecules contain no π bond?
- (a) CO₂ (b) H₂O
(c) SO₂ (d) NO₂
55. Which of the following is not isostructural with SiCl₄?
- (a) SCl₄ (b) SO₄²⁻
(c) PO₄³⁻ (d) NH₄⁺
56. A solution of urea (mol. mass 56 g mol⁻¹) boils at 100.18°C at the atmospheric pressure. If k_f and k_b for water are 1.86 and 0.512 K kg mol⁻¹ respectively, the above solution will freeze at
- (a) -6.54°C (b) 6.54°C
(c) 0.654°C (d) -0.654°C
57. 1 M and 2.5 L NaOH solution is mixed with another 0.5 M and 3 L NaOH solution. Then, find out the molarity of resultant solution.
- (a) 0.80 M (b) 1.0 M
(c) 0.73 M (d) 0.50 M
58. In Duma's method of estimation of nitrogen 0.35 g of an organic compound gave 55 mL of nitrogen collected at 300 K temperature and 715 mm pressure. The percentage composition of nitrogen in the compound would be (Aqueous tension at 300 K = 15 mm)
- (a) 16.45 (b) 17.45
(c) 14.45 (d) 15.45
59. For a reversible reaction, if the concentrations of the reactants are doubled, the equilibrium constant will be
- (a) one-fourth (b) halved
(c) doubled (d) the same

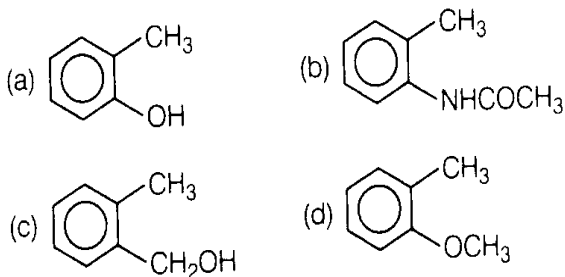
60. Which has highest pH?
 (a) CH_3COOK (b) Na_2CO_3
 (c) NH_4Cl (d) NaNO_3
61. The solubility of a saturated solution of calcium fluoride is 2×10^{-4} mol/L. Its solubility product is
 (a) 12×10^{-2} (b) 14×10^{-4}
 (c) 22×10^{-11} (d) 32×10^{-12}
62. In which of the following reactions, standard reaction entropy changes $[\Delta S^\circ]$ is positive and standard Gibbs energy change $[\Delta G^\circ]$ decreases sharply with increasing temperature?
 (a) $\text{C}(\text{graphite}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{CO}(\text{g})$
 (b) $\text{CO}(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$
 (c) $\text{Mg}(\text{s}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{MgO}(\text{s})$
 (d) $\frac{1}{2}\text{C}(\text{graphite}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \frac{1}{2}\text{CO}_2(\text{g})$
63. A reaction occurs spontaneously if
 (a) $T\Delta S < \Delta H$ and both ΔH and ΔS are +ve
 (b) $T\Delta S > \Delta H$ and both ΔH and ΔS are +ve
 (c) $T\Delta S = \Delta H$ and both ΔH and ΔS are +ve
 (d) $T\Delta S > \Delta H$ and ΔH is +ve and ΔS are -ve
64. In a reaction, $\text{A} + \text{B} \rightarrow \text{Product}$, rate is doubled when the concentration of B is doubled and rate increases by a factor of 8 when the concentrations of both the reactions (A and B) are doubled. Rate law for the reaction can be written as
 (a) rate = $k[\text{A}][\text{B}]^2$
 (b) rate = $k[\text{A}]^2[\text{B}]^2$
 (c) rate = $k[\text{A}][\text{B}]$
 (d) rate = $k[\text{A}]^2[\text{B}]$
65. If the E°_{Cell} for a given reaction has negative value then which of the following gives the correct relationships for the values of ΔG° and K_{eq} ?
 (a) $\Delta G^\circ < 0, K_{\text{eq}} > 1$
 (b) $\Delta G^\circ < 0, K_{\text{eq}} < 1$
 (c) $\Delta G^\circ > 0, K_{\text{eq}} < 1$
 (d) $\Delta G^\circ > 0, K_{\text{eq}} > 1$
66. Kohlrausch's law states that at
 (a) infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte whatever be the nature of the other ion of the electrolyte
 (b) infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte depending on the nature of the other ion of the electrolyte
 (c) infinite dilution, each ion makes definite contribution to conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte
 (d) infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte

67. During dialysis
- only solvent molecules can diffuse
 - solvent molecules, ions and colloidal particles can diffuse
 - all kinds of particles can diffuse through the semipermeable membrane
 - solvent molecules and ions can diffuse
68. Which of the following pairs of metal is purified by van-Arkel method?
- Zr and Ti
 - Ag and Au
 - Ni and Fe
 - Ga and In
69. Identify the correct order of the size of the following.
- $\text{Ca}^{2+} < \text{K}^+ < \text{Ar} < \text{S}^{2-} < \text{Cl}^-$
 - $\text{Ca}^{2+} < \text{K}^+ < \text{Ar} < \text{Cl}^- < \text{S}^{2-}$
 - $\text{Ar} < \text{Ca}^{2+} < \text{K}^+ < \text{Cl}^- < \text{S}^{2-}$
 - $\text{Ca}^{2+} < \text{Ar} < \text{K}^+ < \text{Cl}^- < \text{S}^{2-}$
70. Which of the following oxides is not expected to react with sodium hydroxide?
- B_2O_3
 - CaO
 - SiO_2
 - BeO
71. The sequence of ionic mobility in aqueous solution is
- $\text{K}^+ > \text{Na}^+ > \text{Rb}^+ > \text{Cs}^+$
 - $\text{Cs}^+ > \text{Rb}^+ > \text{K}^+ > \text{Na}^+$
 - $\text{Rb}^+ > \text{K}^+ > \text{Cs}^+ > \text{Na}^+$
 - $\text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$
72. Identify the incorrect statement among the following
- There is a decrease in the radii of the atoms or ions as one proceeds from La or Lu
 - Lanthanide contraction is the accumulation of successive shrinkages
 - As a result of lanthanide contraction, the properties of 4d series of the transition elements have no similarities with the 5d series of elements
 - Shielding power of 4f electrons is quite weak
73. The aqueous solution containing which one of the following ions will be colourless?
(At no. Sc = 21, Fe = 26, Ti = 22, Mn = 25)
- Sc^{3+}
 - Fe^{2+}
 - Ti^{3+}
 - Mn^{2+}
74. $[\text{Co}(\text{NH}_3)_4(\text{NO}_2)_2] \text{Cl}$ exhibits
- linkage isomerism, geometrical isomerism and optical isomerism
 - linkage isomerism, ionization isomerism and optical isomerism
 - linkage isomerism, ionization isomerism and geometrical isomerism
 - ionization isomerism, geometrical isomerism and optical isomerism
75. Coordination number of Ni in $[\text{Ni}(\text{C}_2\text{O}_4)_3]^{4-}$
- 3
 - 6
 - 4
 - 2
76. Among the following compound one that is most reactive towards electrophilic nitration is
- benzoic acid
 - nitrobenzene
 - toluene
 - benzene

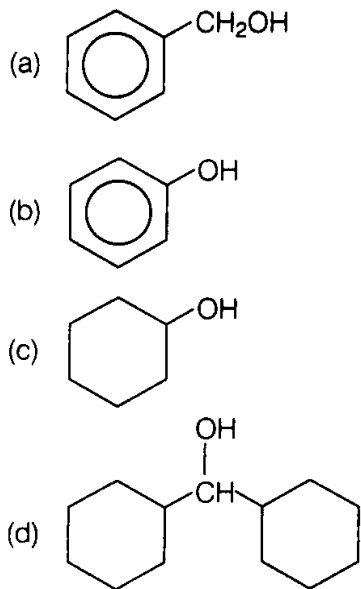
77. The correct order of increasing bond length of C-H, C-O, C-C and C=C is

- (a) $C-C < C=C < C-O < C-H$
 (b) $C-O < C-H < C-C < C=C$
 (c) $C-H < C-O < C-C < C=C$
 (d) $C-H < C=C < C-O < C-C$

78. Which one of the following is most reactive towards electrophilic reagent?



79. Which one of the following compounds has the most acidic nature?



80. Which of the following compounds will exhibit cis-trans (geometrical) isomerism?

- (a) 2-butene (b) Butanol
 (c) 2-butyne (d) 2-butanol

81. Which one of the following has the shortest carbon-carbon bond length?

- (a) Benzene (b) Ethene
 (c) Ethyne (d) Ethane

82. Which is the most suitable reagent among the following to distinguish compound (III) from rest of the compounds?

- I. $CH_3-C\equiv C-CH_3$
 II. $CH_3-CH_2-CH_2-CH_3$
 III. $CH_3-CH_2-C\equiv CH$
 IV. $CH_3-CH=CH_2$

- (a) Br_2/CCl_4 (b) Br_2/CH_3COOH
 (c) Alk. $KMnO_4$ (d) Ammoniacal $AgNO_3$

83. What is formed when a primary alcohol undergoes catalytic dehydrogenation?

- (a) Aldehyde (b) Ketone
 (c) Alkene (d) Acid

84. Which one of the following on oxidation gives a ketone?

- (a) Primary alcohol
 (b) Secondary alcohol
 (c) Tertiary alcohol
 (d) All of these

85. Chlorobenzene reacts with Mg in dry ether to give a compound (A) which further reacts with ethanol to yield

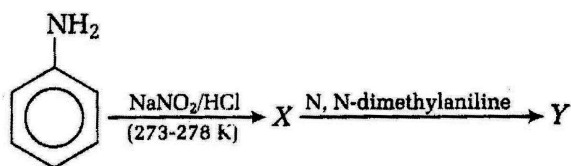
- (a) phenol (b) benzene
 (c) ethyl benzene (d) phenyl ether

SECTION - B

This section contains 15 multiple choice questions. Solve any 10 from the following :

86. When phenol is treated with excess of bromine water, it gives
- (a) m-bromophenol
 - (b) o-and p-bromophenol
 - (c) 2, 4-dibromophenol
 - (d) 2, 4, 6, tribromophenol
87. HBr reacts fastest with
- (a) 2-methyl propan – 1 –ol
 - (b) 2-methyl propan – 2 -ol
 - (c) propan – 2 – ol
 - (d) propan- 1 – ol
88. Reduction of aldehydes and ketones into hydrocarbons using zinc amalgam and conc. HCl is called
- (a) Clemmensen reduction
 - (b) Cope reduction
 - (c) Dow reduction
 - (d) Wolff- Kishner reduction
89. A carbonyl compound reacts with hydrogen cyanide to form cyanohydrin which on hydrolysis forms a racemic mixture of α hydroxyl acid. The carbonyl compound is
- (a) acetaldehyde (b) acetone
 - (c) diethyl ketone (d) formaldehyde
90. Which one of the following can be oxidized to the corresponding carbonyl compound?
- (a) 2-hydroxy propane
 - (b) Ortho-nitro phenol
 - (c) Phenol
 - (d) 2-methyl 2- hydroxyl propane
91. Reduction by LiAlH_4 of hydrolysed product of an ester gives
- (a) two acids
 - (b) two aldehydes
 - (c) one molecule of alcohol and another of carboxylic acid
 - (d) two alcohols
92. An ester (A) with molecular formula $\text{C}_9\text{H}_{10}\text{O}_2$ was treated with excess of CH_3MgBr and the complex so formed was treated with H_2SO_4 to give an olefin (B). Ozonolysis of (B) gave a ketone with molecular formula $\text{C}_8\text{H}_8\text{O}$ which shows positive iodoform test. The structure of (A) is
- (a) $\text{C}_6\text{H}_5\text{COOC}_2\text{H}_5$
 - (b) $\text{C}_6\text{H}_5\text{COOC}_6\text{H}_5$
 - (c) $\text{H}_3\text{CCOOC}_6\text{H}_5$
 - (d) p- $\text{H}_3\text{COC}_6\text{H}_4\text{COCH}_3$
93. Acetamide is treated with the following reagents separately. Which one of these would yield methyl amine?
- (a) NaOH, Br_2 (b) Sodalime
 - (c) Hot conc. H_2SO_4 (d) PCl_5

94. Aniline in a set of the following reactions yielded a coloured product Y.



The structure of Y would be

- (a)
- (b)
- (c)
- (d)
95. Which of the following structures represents neoprene polymer?
- (a) $\left(\text{CH}_2 - \underset{\text{Cl}}{\text{C}} = \text{CH} - \text{CH}_2 \right)_n$
- (b) $\left(\text{CH}_2 - \underset{\text{CN}}{\text{CH}} \right)_n$
- (c) $\left(\text{CH}_2 - \underset{\text{Cl}}{\text{CH}} \right)_n$
- (d) $\left(\text{CH} - \text{CH}_2 \right)_n$
 $\quad \quad \quad |$
 $\quad \quad \quad \text{C}_6\text{H}_5$
96. The pH of an aqueous solution of $\text{Ba}(\text{OH})_2$ is 10. If the K_{sp} of $\text{Ba}(\text{OH})_2$ is 1×10^{-9} , then the concentration, of Ba^{2+} ions in the solution in mol L^{-1} is

- (a) 1×10^{-2} (b) 1×10^{-4}
 (c) 1×10^{-1} (d) 1×10^{-5}

97. Cyclohexanol is dehydrated to cyclohexene on heating with conc. H_2SO_4 . If the yield of this reaction is 75% how much cyclohexene will be obtained from 100 g of cyclohexanol?
- (a) 61.5 g (b) 75.0 g
 (c) 20.0 g (d) 41.0 g
98. An oxide of a metal (M) contains 40% by mass of oxygen. Metal (M) has atomic mass of 24. The empirical formula of the oxide is
- (a) M_2O (b) MO
 (c) M_2O_3 (d) M_3O_4
99. What would happen when a solution of potassium chromate is treated with an excess of dilute nitric acid?
- (a) Cr^{3+} and $\text{Cr}_2\text{O}_7^{2-}$ are formed
 (b) $\text{Cr}_2\text{O}_7^{2-}$ and H_2O are formed
 (c) CrO_4^{2-} is reduced to +3 state of Cr
 (d) CrO_4^{2-} is oxidized to +7 state of Cr
100. In a sample of pure compound, Na = 0.0887 mole, O = 0.132 mole, C = 2.65×10^{22} atoms. The empirical formula of the compound is?
- (a) Na_2CO_3 (b) $\text{Na}_3\text{O}_2\text{C}_5$
 (c) $\text{Na}_{0.0887}\text{O}_{0.132}\text{C}_{2.65 \times 10^{22}}$ (d) NaCO

BIOLOGY

BOTANY

SECTION - A

This section contains 35 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D); out of which only one is correct :

101. Select the correct option for Bulliform cells or motor cells?
- (a) Increase the rate of photosynthesis
 - (b) Xerophytic adaptation
 - (c) Mechanical support
 - (d) Help in vegetative propagation
102. Which one of the following options gives the correct categorisation of six plants according to the type of Aestivation (a, b, c). they gives out

	Valvate (a)	Twisted (b)	Imbricate (c)
(a)	Mustard China rose	Cotton Onion	Cassia Gulmohur
(b)	Cassia Mustard	Gulmohur Onion	Chinarose Cotton
(c)	Mustard China rose	Cotton, Cassia	Onion Gulmohur
(d)	Mustard, Onion	Cotton Chinarose	Cassia, Gulmohur

103. Each molecule of $FADH_2$ result in production of how many ATP molecule during aerobic respiration ?
- (a) 2
 - (b) 3
 - (c) 6
 - (d) 4
104. If sap wood is remove from stem then which of following function is mostly affected?
- (a) secondary growth
 - (b) support
 - (c) gaseous exchange
 - (d) conduction
105. Read the following statements. Find out how many statements are correct :-
- (A) The main area of various types of activities of a cell is cytoplasm
 - (B) Lysosome is called suicidal bags of cell
 - (C) Cell wall is dead and permeable
 - (D) Cell membrane is selectively impermiabile
- (a) 4
 - (b) 3
 - (c) 2
 - (d) 1
106. End product of fermentation are :-
- (a) C_2H_5OH & O_2
 - (b) C_2H_5OH & CO_2
 - (c) CO_2 & O_2
 - (d) CO_2 & pyruvate

107. In *Pinus*, male strobilus bears a large number of :
- (a) Anthers
(b) Stamens
(c) Microsporophylls
(d) Megasporophylls
108. Which of the following micronutrients is required for pollen germination and carbohydrate translocation ?
- (a) Boron (b) Molybdenum
(c) Zinc (d) Copper
109. Which of the following plant growth regulators promotes internode elongation just prior to flowering in beet ?
- (a) Cytokinin (b) Auxin
(c) Ethylene (d) Gibberellin
110. Arrange the following events of life cycle of Bryophyte in correct sequence :-
- I. Germination of spore
II. Gametes formation
III. Formation of Gametophyte
IV. Fertilization
V. Embryo formation
- (a) I, III, IV, V, II (b) II, IV, I, V, III
(c) III, II, IV, V, I (d) V, I, II, III, IV
111. Read the following pair :-
- (A) Diatoms-Chief producer in Ocean
(B) Dinoflagellates-Diploid body
(C) Slime mould-Spores have true wall
(D) Euglenoids-Cellulosic cell wall
(E) Protozoans-Unicellular eukaryotes
- choose the correct pair

- (a) A, B, C (b) C, D, E
(c) A, C, E (d) A, B, E

112. *Solanum tuberosum*, *Solanum melongena* and *Solanum nigrum* represent :-

- (a) They all are species of different genus
(b) *Solanum* is name of species while *tuberosum*, *melongena* and *nigrum* represent variety
(c) They all are member of same species
(d) They all are species of same genus

113. Which of the following is incorrectly matched in the given table?

	Crop	Variety	Insect pests
(a)	Rapeseed Mustard	Pus Gaurav	Aphid
(b)	Flat bean	Pusa sem-2 & 3	Jassid, Aphids and Fruit borer
(c)	Okra	Pusasawani	Shoot and fruit borer
(d)	Maize	Pusa snowball K-1	Leaf beetle

114. If a polygenic trait is controlled by two gene pairs than what will be the probability of individuals in F_2 generation showing exact resemblance to F_1 generation :-

- (a) $\frac{2}{16}$ (b) $\frac{4}{16}$
(c) $\frac{6}{16}$ (d) $\frac{1}{16}$

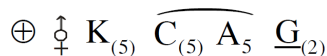
115. Which one of the following is used as vector for cloning genes into several dicot plants :-

- (a) *Agrobacterium tumifaciens*
- (b) Baculovirus
- (c) *Propionibacterium sharmanii*
- (d) *Glomus 128*.

116. *Anabaena* and *Azospirillum* :-

- (a) Biofertilizers which are used by farmers regularly in their fields to replenish soil nutrients
- (b) Biocontrol agents which are used by farmers regularly in their field to control pest
- (c) Antibiotic producing microbes to treat deadly disease such as diphtheria, plague, and whooping cough
- (d) Microbes which are used for commercial Production of ethanol

117.



These floral formula is related with :-

- (a) Malvaceae family
- (b) Solanaceae family
- (c) Cruciferae family
- (d) Papilionaceae family

118. Which of the following statements are correct?

- (a) Pollen grains are rich in nutrients.
- (b) In some cereals like rice and wheat pollen grain lose viability within 30 minutes of their release

- (c) In some members of rosaceae, leguminosae and solanaceae, pollen grains maintain viability for months
- (d) All of the above

119. Which one statement is incorrect regarding plant cell ?

- (a) Leucoplasts are bound by two membranes and lack pigments
- (b) The secretions of cell are packed in golgibody
- (c) Mitochondria help in photophosphorilation
- (d) In 70 s ribosomes 'S' indirectly is measure of density and size

120. Given below are figures of flowering plants. Choose the correct option :-



Figure-A



Figure-B



Figure-C

Options

- (a) A strong hallucinogenic drug LSD is obtained from figure C
- (b) The flower tops, leaves and the resins of figure B are used in various combinations to produce marijuana, hashish and ganja.
- (c) Opioids are obtained from Figure C
- (d) Cocaine commonly called crack or coke is usually snorted is usually obtained from figure A

121. In a moss plant number of chromosome in its leaf is 30, what will be the number of chromosomes in the neck canal cell, spores and capsule cell of sporophyte respectively:-

- (a) 60, 30, 60 (b) 30, 60, 30
 (c) 30, 30, 60 (d) 60, 60, 30

122.

	Characteristics	C ₃ plant	C ₄ plant
(A)	Primary CO ₂ acceptor	(i)	(ii)
(B)	Number of carbons in the primary CO ₂ acceptor	(iii)	3
(C)	RuBisCO in mesophyll cells	Yes	(iv)

Choose the correct combination for (i) to (iv):-

- (a) (i) –PEP, (ii)–OAA, (iii)–3, (iv)–Yes
 (b) (i)–PGA, (ii)–RuBP, (iii)–5, (iv)–No
 (c) (i)–RuBP, (ii)–OAA, (iii)–4, (iv)–Yes
 (d) (i)–RuBP, (ii)–PEP, (iii)–5, (iv)–No

123. If a pollen of a flower falls on the stigma of another flower belonging to the same plant it is.

- (a) Functionally self pollination
 (b) Genetically & functionally cross pollination
 (c) Genetically self pollination & functionally cross pollination

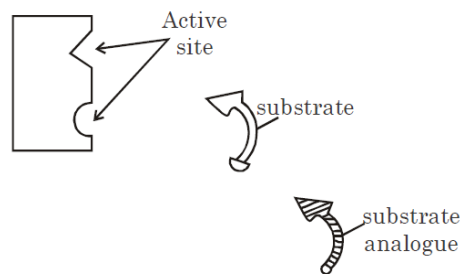
(d) Genetically cross pollination & functionally self pollination.

124. Match the Column & select the correct option:-

Column-I		Column-II	
(A)	Disintegration of nuclear membrane	(i)	Anaphase
(B)	Re-appearance of nucleolus	(ii)	Prophase
(C)	Division of centromere	(iii)	Telophase
(D)	Replication of DNA	(iv)	S-Phase

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

125.



Above diagram is the indicative diagram of a type of inhibition. Choose the correct match :

	Type of Inhibition	Substrate	Substrate analogue
(a)	Non-Competitive reversible	Malonate	Succinate
(b)	Competitive	Succinate dehydrogenase	Malonate
(c)	Competitive	Succinate	Malonate
(d)	Non-Competitive irreversible	Succinate dehydrogenase	Succinate

126. What is not true for genetic code :-

- (a) It is unambiguous
- (b) A codon in mRNA is read in a non contiguous fashion
- (c) It is nearly universal
- (d) It is degenerate

127. During a microbial study, a spore was observed as thick walled, highly resistant and surrounded by different wall layers. This can withstand both high and low temperature and they remain unharmed during pasteurisation. The spore must be :-

- (a) Exospore
- (b) Endospore
- (c) Auxospore
- (d) Statospore

128. Which of the following taxonomic categories contains organisms least similar to one another?

- (a) Class
- (b) Genus
- (c) Family
- (d) Species

129. Which of the following phenomenon is not universal in occurrence in plants ?

- (a) Metabolism
- (b) Guttation
- (c) Respiration
- (d) Growth

130. Choose the correct sequence of steps of plant tissue culture ?

- (a) Sterilization → Hardening → Selection of explant → Inoculation → Regeneration → Plantlet transfer
- (b) Selection of explant → Inoculation → Regeneration → Sterilization → Hardening → Plantlet transfer
- (c) Plantlet transfer → Sterilization → Selection of explant → Inoculation → Regeneration → Hardening
- (d) Selection of explant → Sterilization → Inoculation → Regeneration → Hardening → Plantlet transfer

131. Which statements is correct (with respect to phloem transport)?

- (a) occurs from high TP to low TP
- (b) occurs from low TP to high TP
- (c) This is simple physical process independent on biological system
- (d) Phloem sap contains H₂O and sucrose only

132. Read and following statements carefully and select the correct option :-

(1) Source of the restriction enzyme Hind III is *E.coli*

(2) In biolistic method of gene transfer, microparticles made up of gold or tungsten are coated with foreign DNA.

(3) Micro-injection method for injecting recombinant DNA is used for animal cell.

(4) Primers are chemically synthesized Oligonucleotides that are complementary to the regions of DNA in PCR.

How many of the above statements are correct?

- (a) Four (b) Three
(c) Two (d) One

133. The cross section of a plant material shows the following anatomical features under microscope :-

(A) Collenchymatous hypodermis as a homogenous layer

(B) Sclerenchymatous pericycle in patches located just above phloem bundles

(C) Vascular bundles are arranged in a ring

(D) Radially placed parenchymatous cells between vascular bundles

Identify this section

- (a) *Cucurbita* stem
(b) *Helianthus* stem
(c) *Zea mays* stem
(d) *Saccharum* stem

134. Ground tissue includes

- (a) all tissues except epidermis and vascular bundles
(b) epidermis and cortex
(c) all tissues internal to endodermis
(d) all tissues external to endodermis

135. Well developed pith is found in

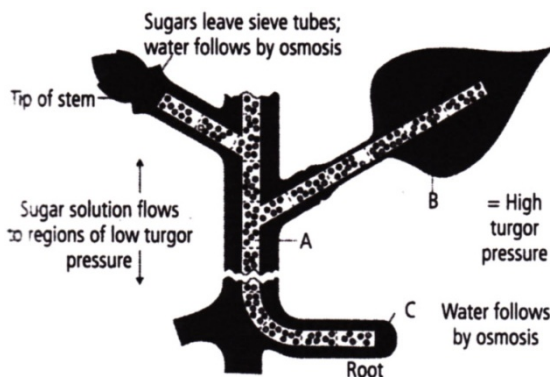
- (a) monocot root and monocot stem
(b) monocot stem and dicot root
(c) monocot root and dicot stem
(d) dicot root and dicot stem

SECTION – B

This section contains 15 multiple choice questions. Solve any 10 from the following :

136. Secondary growth usually does not occur in
- stems and roots of dicots
 - stems and roots of gymnosperms
 - stems and roots of monocots
 - both (b) and (c)
137. Stomata of CAM plants
- open during the night and close during the day
 - never open
 - are always open
 - open during the day and close at night
138. Which one of the following is not a micronutrient?
- Molybdenum
 - Magnesium
 - Zinc
 - Boron
139. Passive absorption of minerals depend on
- temperature
 - temperature and metabolic inhibitor
 - metabolic inhibitor
 - humidity
140. In glycolysis, during oxidation electrons are removed by
- ATP
 - glyceraldehyde-3-phosphate
 - NAD⁺
 - molecular oxygen
141. Refer to the given figure representing mechanism of translocation and select the

option which correctly identifies A, B and C

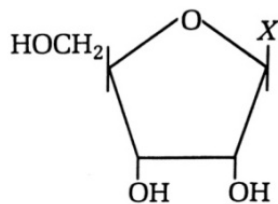


- A-Phloem; B-Sugars enter sieve tube; C-Sugars leave sieve tube
 - A-Xylem; B-Sugars enter sieve tube; C-Sugars leave sieve tube
 - A-Xylem; B-Sugars leave sieve tube; C-Sugars enter sieve tube
 - A-Phloem; B-Sugars leave sieve tube; C-Sugars enter sieve tube
142. As compared to a C_3 -plant, how many additional molecules of ATP are needed for net production of one molecule of hexose sugar by C_4 -plants
- 2
 - 6
 - 12
 - zero
143. Which one of the following is wrong in relation to photorespiration?
- It is a characteristic of C_3 -plants
 - It occurs in chloroplasts
 - It occurs in day time only
 - It is a characteristic of C_4 -plants

144. The substrate for photorespiration is

- (a) ribulosebis-phosphate
- (b) glycolate
- (c) serine
- (d) glycine

145. Given below is the diagrammatic representation of one of the categories of small molecular weight organic compounds in the living tissues. Identify the category shown and the one blank component X in it



Category	Component
(a) Cholesterol	- Guanine
(b) Amino acid	- NH ₂
(c) Nucleotide	- Adenine
(d) Nucleoside	- Uracil

146. During gamete formation, the enzyme recombinase participates during

- (a) metaphase-I (b) anaphase-II
- (c) prophase-I (d) prophase-II

147. In the somatic cell cycle

- (a) in G₁-phase DNA content is double the amount of DNA present in the original cell
- (b) DNA replication takes place in S-phase
- (c) a short interphase is followed by a long mitotic phase
- (d) G₂-phase follows mitotic phase

148. In fungi stored food material is

- (a) glycogen (b) starch
- (c) sucrose (d) glucose

149. During translation initiation in prokaryotes, a GTP molecule is needed in

- (a) association of 30S, mRNA with formyl met tRNA
- (b) association of 50S subunit of ribosome with initiation complex
- (c) formation of formyl met tRNA
- (d) binding of 30S subunit of ribosome with mRNA

150. Point mutation involves

- (a) insertion
- (b) change in single base pair
- (c) duplication
- (d) deletion

ZOOLOGY

SECTION - A

This section contains 35 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D); out of which only one is correct :

151. Which endocrine organ secretion acts on postganglionic neuron of sympathetic nervous system?

- (a) Thyroid
- (b) Thymus
- (c) Islets of Langerhans
- (d) Adrenal medulla

152. Cancer may be more prevalent in elderly because of a decrease in immune function due to decrease output from the _____ gland.

- (a) Pineal
- (b) Thyroid
- (c) Thymus
- (d) Adrenal cortex

153. Centromere is required for :-

- (a) Replication of DNA
- (b) Chromosome segregation
- (c) Poleward movement of chromosome
- (d) Cytoplasmic cleavage

154. Which points are not correct about angiotensin-II?

- (A) Decreases the glomerular blood pressure
- (B) Activates the adrenal cortex to release aldosterone
- (C) Powerful vasoconstrictor
- (D) Decreases the GFR
- (E) Activates the J.G. cells to release renin

- (a) A, B, C
- (b) A, D, E
- (c) C, D, E
- (d) B, C, E

155. Some statements are given below about *Wuchereria*:-

- (I) Triploblastic with the presence of an excretory pore
- (II) The presence of a muscular pharynx
- (III) Males longer than females
- (IV) Cellular level of organisation

Choose the correct answer from the option is given below :-

- (a) I and II
- (b) Only II
- (c) I and IV
- (d) II, III and IV

156. Find out the correct match between column-I and II.

Column - I		Column - II	
A	PTH	i.	Milk synthesis
B	Oxytocin	ii.	Hypernatraemia
C	Calcitonin	iii.	Hypocalcaemia
D	Aldosterone	iv.	Blood pressure regulation
E	ADH	v.	Hypercalcaemia
		vi.	Milk ejection
		vii.	H ₂ O loss prevention

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

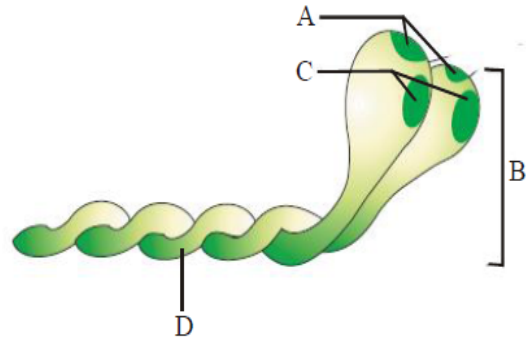
157. Which of the following is correct w.r.t differences between rod cells and cone cells of our retina:-

		Rod cell	Cone cells
A	Distribution	More concentrated in centre of retina	Evenly distribute all over retina
B	Visual acuity	High	Low
C	Visual pigment	Iodopsin	Rhodopsin
D	Over all function	Vision in poor light	Color vision in bright light

158. During muscular contraction which of the following event does not occur ?

- (a) H-zone disappears
 - (b) I-band reduces
 - (c) A-band widens
 - (d) Z-lines come closer
- (a) a, b and c (b) a, c and d
- (c) c and d (d) c only

159. Find out A, B, C, D :-



- (a) A–Head, B–LMM, C–GTP binding site, D–HMM
- (b) A–Head, B–Cross arm, C–Ca⁺² binding site, D–LMM
- (c) A–Actin binding site, B–Cross arm, C–ATP binding site, D–LMM
- (d) A–Myosin binding site, B–Cross arm, C–ATP binding site, D–LMM

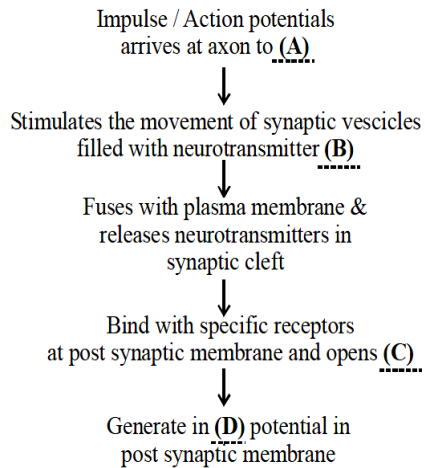
160. How many pairs of homologous chromosome will be found in metaphase in a haploid cell having a total of 50 chromosomes :-

- (a) 100
- (b) 25
- (c) 50
- (d) Zero

161. Mark correct respiratory equation :-

- (a) IRV = TV + ERV
- (b) EC = TLC – RV
- (c) FRC = TLC – IC
- (d) RV = TLC – (IRV + ERV)

162. Identify the following steps likely to place as (A), (B), (C) & (D) in process of synaptic transmission:-



	A	B	C	D
(a)	Axon Terminle	Acetyl choline	K ⁺ chan nel	Inhibitory
(b)	Axon Terminale	GABA	Cl ⁻ cha nnel	Inhibitory
(c)	Ranvier's node	GABA	Cl ⁻ cha nnel	Inhibitory
(d)	Axon hillock	Acetyl choline	Na ⁺ channel	Excitator y

163. Each of the two _____ secreted by anterior pituitary is chemically identical in both sexes but produces very different, though homologous effect?

- (a) Corticotropins (b) thyrotropins
(c) somatotropins (d) gonadotropins

164. Single heart circuit occurs in :-

- (a) Fishes (b) Frog
(c) Reptiles (d) Man

165. Tube-within-tube body plan is found in :-

- (a) *Ascaris* (b) *Faciola*
(c) *Hydra* (d) *Euspongia*

166. A slide under microscope shows following features :

- (i) Unicellularity
(ii) Well defined nucleus
(iii) Biflagellate – one flagellum lying longitudinally and the other transversely
What would you identify it as ?

- (a) Protozoan (b) Bacterium
(c) Euglenoid (d) Dinoflagellate

167. Cell that are found only in phylum porifera :-

- (a) Choanocyte (b) Lasso cell
(c) Chondrocyte (d) Solenocyte

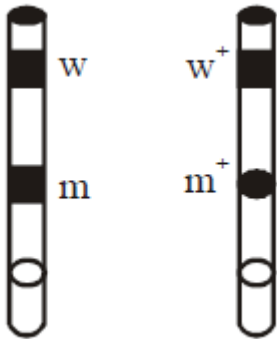
168. Birds and mammals share one of the following characteristics as a common feature.

- (a) Pigmented skin
(b) Pneumatic bone
(c) Viviparity
(d) Warm blooded body

169. Enzymes that catalyse removal of groups from substrates by mechanisms other than hydrolysis are classified under which of the following classes ?

- (a) Isomerases (b) Transferases
(c) Lyases (d) Ligases

170. How many type of gametes will be produced in female fruit fly having following arrangement of two genes wm/w^+m^+ on pair of X-chromosome :-



- (a) 4 (b) 2
(c) 1 (d) 0

171. Suppose in *Psittacula* long tail(T) is dominant over short tail (t) and short beak (A) dominant over long beak(a) if f1 generation individual cross with TTaa individual then how many offspring with genotype TTaa will obtained

- (a) 1/4 (b) 2/4
(c) 3/4 (d) Zero

172. 5'GUG UUU ACA GAG AUG3' is a sequence of transcribed mRNA. What will be the corresponding sequence of the coding strand of a gene ?

- (a) 5' GTG TTT ACA GAG ATG 3'
(b) 5' CAC AAA TGT CTC TAC 3'
(c) 3' GTG TTT ACA GAG ATG 5'
(d) 3' CAC AAA TGT CTC TAC 5'

173. Which of the following is correctly matched for the product produced by them ?

- (a) *Trichoderma* = Statin
(b) *Methanobacterium* = Biogas
(c) *Nucleopolyhedrovirus* = Antibiotics
(d) *Saccharomyces* = Swiss cheese

174. Which of the following fish is without operculum?

- (a) *Exocoetus* (b) *Clarias*
(c) *Betta* (d) *Trygon*

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

- (a) Cyclonic Separator
(b) Electrostatic Precipitator
(c) Wet scrubber
(d) Dry scrubber

176. In an area a single banyan tree overshadows 200 parthenium grass. Which of the following is a more meaningful measure of population density ?

- (a) Detritus percent
(b) Standing crop percent
(c) Total number per unit area
(d) Standing state percent

177. Which of the following is limiting factor for productivity in deep lake ecosystems ?

- (a) Nitrogen (b) Sunlight
(c) Carbon (d) Phosphorus

178. Identify the correct statement from the following ?
- (a) Mammals from colder climates generally have longer ears and limbs to minimise heat loss
 - (b) Organisms maintain homeostasis by physiological means alone
 - (c) Success of mammals is largely due to their ability to maintain constant body temperature
 - (d) A majority of animals and nearly all plants can maintain a constant internal environment
179. Which of the following set of organisms are uricotelic :-
- (a) Bony fishes, Aquatic amphibians and Aquatic insects
 - (b) Mammals, many terrestrial amphibians and Marine fishes
 - (c) Reptiles, Birds and Camel
 - (d) Land snails, Insects and Reptiles
180. Read the following statement and choose the incorrect one :-
- (a) The use of drugs like antihistamine, adrenaline and steroids quickly reduce symptoms of allergy
 - (b) The foetus receives some antibodies (IgA) from their mother through placenta during pregnancy
 - (c) AIDS spreads through conscious behaviour pattern
 - (d) Cancer causing gene called as oncogene
181. Which of the following is not true about Cnidarians
- (a) Radial symmetry
 - (b) Diploblastic
 - (c) Tissue level of organisation
 - (d) Deuterostomes
182. Which hormone is used for confirmation of pregnancy :-
- (a) LH
 - (b) Progesterone
 - (c) FSH
 - (d) HCG
183. Which is not an example of evolution by anthropogenic action ?
- (a) Herbicides resistant weeds
 - (b) Antibiotic resistant bacteria
 - (c) Insecticides resistant insects
 - (d) Darwin Finches
184. Goblet cells are found in which of the following tissues ?
- (a) Simple cuboidal
 - (b) Stratified squamous
 - (c) Glandular epithelium
 - (d) Stratified cuboidal
185. Which of the following statement is not correct ?
- (a) In E.C.G end of T-wave represent end of systole
 - (b) Psoriasis and Rheumatoid arthritis both are autoimmune disorder's
 - (c) L.S.D is a cannabinoid and it causes hallucination
 - (d) Morphine is extracted from unripened fruit of *papaversomniferum*

SECTION - B

This section contains 15 multiple choice questions. Solve any 10 from the following

186. All of the following are part of a lac operon except :-
(a) Inducer
(b) Regulatory gene
(c) Co-repressor
(d) Operator gene
187. Which of the following statement is not incorrect ?
(a) According to Watson-Crick model, DNA exists as a double helix, in which two strands of polynucleotides are parallel i.e. run in same direction
(b) All types of pyrimidines are present in DNA, while only one type of pyrimidine is present in RNA
(c) In a nucleic acid a phosphate moiety links the 3'-carbon of one sugar of one nucleotide to the 5' carbon of the sugar of succeeding nucleotide
(d) In a nucleic acid, the bond between the phosphate and hydroxyl group of sugar is aglycosidic bond
188. Which of the following is not true about Cnidarians
(a) Radial symmetry
(b) Diploblastic
(c) Tissue level of organisation
(d) Deuterostomes
189. If you are a cardiologist and you heard 'LUB-DUB' sound during one heart beat in a patient. What is the reason of producing these sounds ?
(a) Due to closure of semilunar valves
(b) Due to closure of atrioventricular valve.
(c) Due to closure of atrioventricular valve followed by semilunar valve
(d) Due to closure of semilunar valve followed by atrioventricular valve.
190. Read the following features :-
(a) The forelimbs are modified into wings
(b) Endoskeleton is fully ossified and the long bones are hollow with air cavities
(c) Respiration is by lungs along with air sacs
(d) Digestive tract has additional chambers i.e. crop & gizzard Out of these which is not suitable features according to flying adaptation in birds ?
Option :-
(a) Only 'c' (b) Only 'd'
(c) Only 'a' (d) Only 'b'

191. Which one of the following conditions correctly describes the manner of determining the sex in the given example ?

- (a) Homozygous sex chromosomes (ZZ) determine female sex in Birds.
- (b) XO type of sex chromosomes determine male sex in grasshopper
- (c) XO condition in humans as found in Turner Syndrome, determines female sex.
- (d) Homozygous sex chromosomes (XX) produce male in *Drosophila*

192. Choose the correct statement :-

- (a) There are working 'Ecosan' toilets in many area of Kerala and Srilanka
- (b) In sanitary land fill, solid waste are dumped in a depression or trench after compaction and covered with dirt everyday
- (c) Black foot disease is caused by Arsenic poisoning
- (d) Green house effect is natural phenomenon

- (a) a, b, c, d
- (b) b, c, d
- (c) c, d
- (d) a, b, c

193. Which is a mismatch in the following option?

- (i) Dodo – Mauritius
 - (ii) Quagga – Russia
 - (iii) Thylacine – Australia
- (a) (ii) & (iii)
 - (b) (i) & (iii)
 - (c) only (ii)
 - (d) (i) & (ii)

194. Match the following :-

Column-I		Column-II	
(A)	Typhoid	(i)	Stool, mucous, blood
(B)	Pneumonia	(ii)	Haemozoin, granules
(C)	Common cold	(iii)	Haemophilus influenzae
(D)	Malaria	(iv)	Salmonella typhi
(E)	Amoebiasis	(v)	Rhino virus

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

195. about chylomicrons?

- I. Chylomicrons are produced in the mucosal epithelial cells of small intestine.
- II. It contains triglycerides, cholesterol and phospholipids.
- III. It is protein coated small vesicles.
- IV. Chylomicrons released from the lacteals enters into the epithelial cells.

- (a) I and IV
- (b) II and III
- (c) I, II, III
- (d) All the above

196. Which is not correctly matched ?

- (a) Modern man - First man who started agriculture
- (b) Neanderthal man - First man who started to buried dead bodies
- (c) Peking man - First man who started use of fire
- (d) Cro-Magnon man - First man who painted walls of caves

197. Read the following statements ?

I. Glomerular filtrate is isotonic to plasma.

II. When the urine passes into collecting tubule, it becomes hypotonic.

III. Filtrate is isotonic in proximal convoluted tubule.

IV. Filtrate becomes more and more hypotonic as it passes through descending limb of Henle's loop.

Correct statements are :-

(a) I and III (b) I, II and III

(c) II and III (d) Only II

198. First form of life arose slowly through

evolutionary forces from non living organic molecules. This is called as :-

(a) Chemical evolution

(b) Biological evolution

(c) Organic evolution

(d) Retrogressive evolution

199. In population showing Verhulst-Pearl

Logistic growth, the deceleration phase

attends when the $\left[\frac{dN}{dt} = rN \left(\frac{K - N}{K} \right) \right]$:-

(a) N is exactly equals to one

(b) r is equal to zero

(c) N is nearly equals to K

(d) $\frac{K - N}{K}$ equal to one

200. Some statements are given for wings of

bat and butterfly :-

(A) They are anatomically similar

(B) They are homologous structure

(C) They are result of divergent evolution

(D) They perform different functions

(E) They are example of adaptive convergence

(F) They indicates common ancestry

How many statements are correct ?

(a) Zero (b) One

(c) Two (d) Three