

SAMPLE QUESTION PAPER

for (NEET-UG)

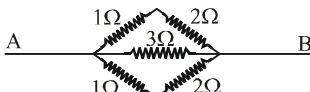
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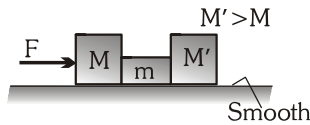
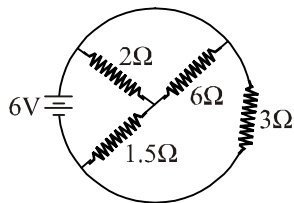
IMPORTANT INSTRUCTIONS :

1. **There are 180 questions in this paper. Each question carries 4 marks for correct response.**
2. For Each incorrect response, (-1) of the total marks allotted to the question would be deducted from the total score. No deduction from the total score, however, will be made if no response is indicated for the item in the answer sheet.
3. **ATTEMPT ALL THE QUESTIONS. Only one alternative is correct.**

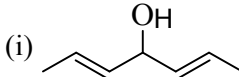
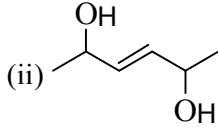
PHYSICS

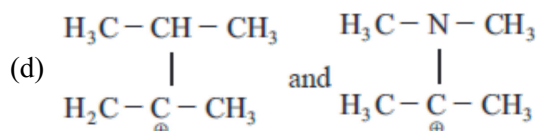
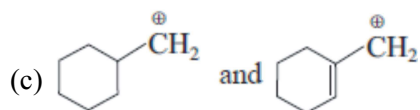
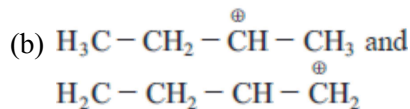
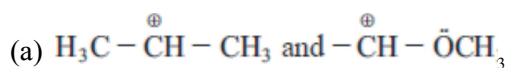
1. There are two charges +1 microcoulomb and 5 microcoulomb. The ratio of the forces acting on them will be;
 - (a) 1 : 5
 - (b) 1 : 1
 - (c) 5 : 1
 - (d) 1 : 25
2. Electric intensity at point varies as r^{-3} for;
 - (a) a point charge.
 - (b) an electric dipole.
 - (c) a plane infinite sheet of charge.
 - (d) a line charge of infinite length.
3. An electric cell does 5 joule of work in carrying 10 coulomb of charge around a closed circuit. The electromotive force of the cell is;
 - (a) 2 volt
 - (b) (1/2) volt
 - (c) 4 volt
 - (d) 1 volt
4. A point charge 'q' is located at the centre of a cube of side L. The electric flux emerging from the cube is;
 - (a) q/ϵ_0
 - (b) $q/(6L^2\epsilon_0)$
 - (c) $6(q/\epsilon_0)L^2$
 - (d) zero
5. When air in a capacitor is replaced by a medium of dielectric constant K, the capacity;
 - (a) decreases K times
 - (b) increases K times
 - (c) increases K^2 times
 - (d) remains constant
6. A capacitor of 10 μ F has a p.d. of 40 volts across it. If it is discharged in 0.2 sec, the average current during discharge is;
 - (a) 2 mA
 - (b) 4 mA
 - (c) 1 mA
 - (d) 0.5 mA
7. The effective resistance between A and B is;
 
 - (a) 9 Ω
 - (b) 1 Ω
 - (c) 6 Ω
 - (d) 3 Ω
8. When a small element of conductor carrying a current 'i' is placed in magnetic field of induction B at an angle θ w.r.t. \vec{B} . Then the force F, that it experiences, is;
 - (a) zero
 - (b) Bi
 - (c) $Bi/\sin\theta$
 - (d) $Bi/\cos\theta$
9. The magnetic field due to a magnetic dipole of magnetic moment M at a point on the axis of the dipole and at a distance 'd' from it is given by;
 - (a) M/d^3
 - (b) M/d^2
 - (c) $2M/d^3$
 - (d) $2M/d^2$
10. The magnetic flux linked with a coil is changed from 1 weber to 0.1 weber in 0.1 sec. The induced e.m.f. is;
 - (a) 9V
 - (b) 10V
 - (c) 0.009V
 - (d) (1/9)V
11. An alternating current of frequency 'f' is flowing in a circuit containing a resistance R and a choke L in series. The impedance of the circuit is equal to;
 - (a) R
 - (b) $R + 2\pi/L$
 - (c) $\sqrt{R^2 + 4\pi^2 f^2 L^2}$
 - (d) $R / 2\pi fL$
12. Force F is given by Stoke's equation $F = 6\pi\eta r v$ then dimensions of viscosity η are;
 - (a) $[ML^{-1} T^{-1}]$
 - (b) $[MLT^{-1}]$
 - (c) $[M^{-1} L^{-1} T^{-1}]$
 - (d) $[ML^2 T^{-2}]$

13. The numerical ratio of displacement to distance is;
 (a) always less than one.
 (b) always equal to one.
 (c) always more than one.
 (d) equal to or less than one.
14. A bird is flying towards north with a velocity 40 km/hr and a train is moving with velocity 40 km/hr towards east. What is the velocity of the bird noted by a man in the train ?
 (a) $40\sqrt{2}$ km/hr north-east.
 (b) $40\sqrt{2}$ km/hr south-east.
 (c) $40\sqrt{2}$ km/hr north-west.
 (d) $40\sqrt{2}$ km/hr south-west.
15. A particle makes 'n' rev/sec on a circular path of radius 'r'. Its centripetal acceleration is;
 (a) $4\pi n^2 r$ (b) $4\pi^2 n^2 / r$
 (c) $4\pi^2 n^2 r$ (d) $4\pi^2 n^2 r^2$
16. A stone is just released from the window of a train moving along a horizontal straight track. The stone will hit the ground following a;
 (a) straight line path (vertical)
 (b) parabolic path.
 (c) hyperbolic path.
 (d) circular path.
17. Which of the following has the maximum momentum?
 (a) A 100 kg vehicle moving at 0.02 ms^{-1} .
 (b) A 4 g weight moving at 10000 ms^{-1} .
 (c) A 200 g weight moving with kinetic energy of 10^{-6} J .
 (d) A 20 g weight after falling one kilometre.
18. Moment of inertia of a ring of mass M and radius R about an axis passing through the centre and perpendicular to the plane is;
 (a) $(1/2) MR^2$ (b) MR^2
 (c) $(1/4) MR^2$ (d) $(3/4) MR^2$
19. A body of mass 1 kg is rotated in a horizontal circle of radius 1 m and moves with velocity 2 m/sec. The work done in 10 revolutions is;
 (a) 40 J (b) 20 J
 (c) $4 \times 2\pi(10) \text{ J}$ (d) zero
20. The escape velocity of a particle of mass 'm' varies as;
 (a) m^2 (b) m
 (c) m^0 (d) m^{-1}
21. Refractive index of a material is greatest;
 (a) for red light.
 (b) for green light.
 (c) for violet light.
 (d) the question is irrelevant as refractive index of a material is same for all colours of light.
22. The minimum distance between an object and its real image formed by a convex lens is;
 (a) 2f (b) 4 f
 (c) f (d) zero
23. The focal length of the objective of a microscope is;
 (a) greater than the focal length of eye-piece.
 (b) lesser than the focal length of the eye-piece.
 (c) equal to the focal length of the eye-piece.
 (d) any of (a), (b) and (c).
24. Yellow light emitted by sodium lamp in Young's double slit experiment is replaced by monochromatic blue light of the same intensity;
 (a) fringe width will decrease.
 (b) fringe width will increase.
 (c) fringe width will remain unchanged.
 (d) fringes will become less intense.
25. A diffraction pattern is obtained using red light. Which of the following happens if the red light is replaced by blue light ?
 (a) there is no change.
 (b) diffraction bands become narrow and crowded.
 (c) diffraction bands become broader and farther.
 (d) bands disappear.
26. Plane polarised light is passed through a polaroid. On viewing through the polaroid, we find that when the polaroid is given one complete rotation about the direction of the light, one of the following is observed;
 (a) the intensity of light gradually decreases to zero and remains zero.
 (b) the intensity of light gradually increases to a maximum and remains maximum.
 (c) there is no change in intensity.
 (d) the intensity of light is twice maximum and twice zero.
27. When light falls on a photosensitive surface, electrons are emitted from the surface. The kinetic energy of these electrons does not depend on the;
 (a) wavelength of light.
 (b) thickness of the surface layer.
 (c) type of material used for the surface.
 (d) intensity of light.
28. An electron changes its position from orbit $n = 4$ to $n = 2$ of an atom. Wavelength of the emitted radiation is; (R- Rydberg's constant)
 (a) $16/R$ (b) $16/7R$
 (c) $16/5R$ (d) $16/3R$
29. The X-ray beam coming from an X-ray tube will be;
 (a) monochromatic.
 (b) having all wavelengths smaller than a certain maximum wavelength.
 (c) having all wavelengths larger than a certain minimum wavelength.
 (d) having all wavelengths lying between a minimum and a maximum wavelength.
30. A stable nuclide has, in general;
 (a) odd number of protons and neutrons.
 (b) even number of protons and even number of neutrons.

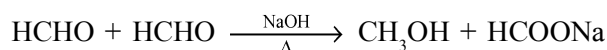
- (c) odd number of protons and even number of neutrons.
 (d) equal numbers of protons and neutrons regardless of whether odd or even.
31. In a semiconductor diode, the barrier potential offers opposition to;
 (a) majority charge carriers in both regions.
 (b) minority charge carriers in both regions.
 (c) free electrons in the n-region.
 (d) holes in the P-region.
32. In a p-n-p transistor with normal bias;
 (a) collector junction has negligible resistance.
 (b) only holes cross the collector junction.
 (c) the collector base junction is reverse biased and emitter base junction is forward biased.
 (d) only majority carriers cross the collector junction.
33. A body executes SHM with an amplitude A. At what displacement from the mean position is the potential energy of the body one-fourth of its total energy ?
 (a) A/4 (b) A/2
 (c) 3A/4 (d) none of these
34. A sound wave in air can be represented as,
 $y = 5 \times 10^{-2} \sin [100t - 50x]$ m
 where 't' is expressed in sec and 'x' in 'm' and 'y' represents displacement. The phase velocity of the wave is;
 (a) 2 m/s (b) 3 m/s
 (c) 5000 m/s (d) 0.5 m/s
35. In an open organ pipe the fundamental note is produced when its length is;
 (a) $\lambda/4$ (b) $\lambda/2$
 (c) $3\lambda/4$ (d) λ
36. A tuning fork of frequency 90 Hz is sounded and moved towards an observer with a velocity equal to one-tenth the velocity of sound, the note heard by the observer will have a frequency;
 (a) 100 Hz (b) 90 Hz
 (c) 80 Hz (d) 900 Hz
37. Boyle's law is applicable in;
 (a) isobaric process (b) isochoric process
 (c) isothermal process (d) adiabatic process
38. In an adiabatic change, between the system and surroundings;
 (a) there is no transfer of heat, hence the temperature remains constant.
 (b) there is transfer of heat in such a way that the temperature remains constant.
 (c) there is no transfer of heat but the temperature may vary.
 (d) there is free transfer of heat as well as variation in the temperature.
39. Two pieces of metal when immersed in a liquid have equal upthrust on them, then;
 (a) both pieces must have equal weights.
 (b) both pieces must have equal densities.
 (c) both pieces must have equal volumes.
 (d) both are floating to the same depth.
40. A cylinder of height 20 m is completely filled with water. The velocity of efflux of water (in ms^{-1}) through a small hole on the side wall of the cylinder near its bottom is;
 (a) 10 (b) 20
 (c) 25.5 (d) 5
41. A satellite of mass M is revolving in a circular orbit of radius 'r' around the earth. Time of revolution of satellite is;
 (a) $T \propto \sqrt{(r^3 / GM^{1/4})}$ (b) $T \propto \sqrt{(r^3 / GM^{2/3})}$
 (c) $T \propto \sqrt{(r^3 / GM)}$ (d) $T \propto \sqrt{(r^5 / GM)}$
42. Four particles, each of mass M and equidistant from each other, move along a circle of radius R under the action of their mutual gravitational attraction. The speed of each particle is;
 (a) $\frac{1}{2} \sqrt{\frac{GM}{R}(1+2\sqrt{2})}$ (b) $\sqrt{\frac{GM}{R}}$
 (c) $\sqrt{2\sqrt{2} \frac{GM}{R}}$ (d) $\sqrt{\frac{GM}{R}(1+2\sqrt{2})}$
43. Measure of two quantities along with the precision of respective measuring instrument is $A = 2.5 \text{ ms}^{-1} \pm 0.5 \text{ ms}^{-1}$, $B = 0.10 \text{ s} \pm 0.01 \text{ s}$. The value of AB will be;
 (a) $(0.25 \pm 0.08) \text{ m}$ (b) $(0.25 \pm 0.5) \text{ m}$
 (c) $(0.25 \pm 0.05) \text{ m}$ (d) $(0.25 \pm 0.135) \text{ m}$
44. A constant force F is applied in a horizontal direction as shown in the **figure**. Contact force between M and 'm' is N and between 'm' and M' is N' then;

 (a) N and N' are equal.
 (b) $N > N'$.
 (c) $N' > N$.
 (d) cannot be determined.
45. The total current supplied to the circuit by the battery is;

 (a) 1 A (b) 2 A
 (c) 4 A (d) 6 A

CHEMISTRY

46. The pair of metal carbonyl complexes that are isoelectronic is :
 (a) $[\text{Co}(\text{CO})_4]^-$ and $\text{Ni}(\text{CO})_4$
 (b) $\text{Ni}(\text{CO})_4$ and $\text{V}(\text{CO})_6$
 (c) $[\text{Cr}(\text{CO})_6]$ and $\text{V}(\text{CO})_6$
 (d) $[\text{Fe}(\text{CO})_4]^-$ and $\text{Cr}(\text{CO})_6$
47. Which one of the following has (have) octahedral geometry ?
 (i) SbCl_6^- (ii) SnCl_6^{2-}
 (iii) XeF_6 (iv) IO_6^{5-}
 (a) (i), (ii) & (iii) (b) (i), (ii) & (iv)
 (c) (ii), (iii) & (iv) (D) All of these
48. In terms of polar character which one of the following orders is correct?
 (a) $\text{NH}_3 < \text{H}_2\text{O} < \text{HF} < \text{H}_2\text{S}$
 (b) $\text{H}_2\text{S} < \text{NH}_3 < \text{H}_2\text{O} < \text{HF}$
 (c) $\text{H}_2\text{O} < \text{NH}_3 < \text{H}_2\text{S} < \text{HF}$
 (d) $\text{HF} < \text{H}_2\text{O} < \text{NH}_3 < \text{H}_2\text{S}$
49. Among the following compounds of Boron, the species which also forms π - bond in addition to σ - bonds is:
 (a) BF_4^- (b) BH_3
 (c) B_2H_6 (D) BF_3
50. Identify the Bronsted acid in the following equation:
 $\text{PO}_4^{3-} + \text{H}_2\text{O}(\text{l}) \rightarrow \text{HPO}_4^{2-}(\text{aq}) + \text{OH}(\text{aq})$
 (a) OH^- (b) PO_4^{3-}
 (c) HPO_4 (d) H_2O
51. The number of grams/weight of NH_4Cl required to be added to 3 liters of 0.01M NH_3 to prepare the buffer of $\text{pH}=9.45$ at temperature 298K (K_b for NH_3 is 1.85×10^{-5})
 (a) 3.53 gm (b) 0.354 gm
 (c) 4.55 gm (d) 0.455 gm
52. For the reaction $2\text{HI}(\text{g}) \rightleftharpoons \text{H}_2(\text{g}) + \text{I}_2(\text{g})$ the degree of dissociation (α) of $\text{HI}(\text{g})$ is related to equilibrium constant K_p by the expression
 (a) $\frac{1+2\sqrt{K_p}}{2}$ (b) $\sqrt{\frac{1+2K_p}{2}}$
 (c) $\sqrt{\frac{2K_p}{1+2K_p}}$ (d) $\frac{2\sqrt{K_p}}{1+2\sqrt{K_p}}$
53. Which of the following is a lyophobic colloid:
 (a) Gelatin (b) Sulphur
 (c) Starch (d) Gum Arabica
54. For car battery which one is correct statement?
 (a) Cathode is Lead dioxide (PbO_2) and anode is Lead (Pb)
 (b) Cathode is Lead dioxide (PbO_2) and anode is Copper (Cu)
 (c) Cathode is Copper (Cu) and anode is Lead dioxide (PbO_2)
 (d) Cathode is Copper (Cu) and anode is Lead (Pb)
55. Considering entropy(s) as a thermodynamic parameter, the criterion for the spontaneity of any process the change in entropy is:
 (a) $(\Delta S_{\text{system}} - \Delta S_{\text{surrounding}}) > 0$
 (b) $\Delta S_{\text{system}} > 0$ only
 (c) $\Delta S_{\text{surrounding}} > 0$ only
 (d) $(\Delta S_{\text{system}} + \Delta S_{\text{surrounding}}) > 0$
56. At low pressure and high temperature, the Vander Waal's equation is finally reduced (simplified) to :
 (a) $PV_m = RT$
 (b) $\left(P + \frac{a}{V_m^2}\right)(V_m - b) = RT$
 (c) $P(V_m - b) = RT$ (d) $\left(P + \frac{a}{V_m^2}\right)V_m = RT$
57. The half life of Th^{232} is 1.4×10^{10} years and that of its daughter element Ra^{238} is 7 years. What amount (most nearly) weight of Ra^{238} will be in equilibrium with 1gm of Th^{232} ?
 (a) 5×10^{-10} gm (b) 5.0 gm
 (c) 1.95×10^{-9} gm (d) 2×10^{-10} gm
58. Total number of stereoisomers of the following compounds are respectively:
 (i)  (ii) 
 (a) 4, 6 (b) 8, 0
 (c) 6, 6 (d) 8, 8
59. The increasing order of the first ionization enthalpies of the elements B, P, S and F is:
 (a) $\text{B} < \text{P} < \text{S} < \text{F}$ (b) $\text{B} < \text{S} < \text{P} < \text{F}$
 (c) $\text{F} < \text{S} < \text{P} < \text{B}$ (d) $\text{P} < \text{S} < \text{B} < \text{F}$
60. Some pairs of ions are given below. In which pair, first ion is more stable than second ion ?



61. What is the name of the following reaction?



- (a) Hell-Volhard reaction
 (b) Clemmensen reaction
 (c) Cannizzaro reaction
 (d) None of the options

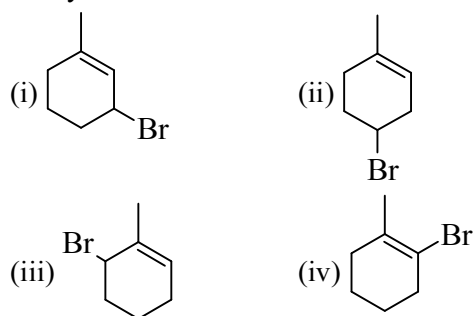
62. Inorganic graphite is:

- (a) $\text{B}_2\text{N}_3\text{H}_6$ (B) B_2H_6
 (c) BN (d) BF_3

63. Rank the following in decreasing order of basic strength:

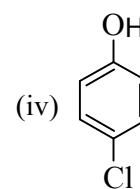
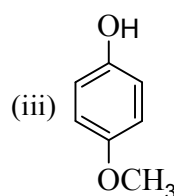
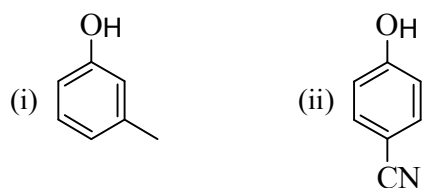
- (i) $\text{CH}_3-\text{CH}_2-\text{C}\equiv\text{C}^-$ (ii) $\text{CH}_3-\text{CH}_2-\text{S}^-$
 (iii) $\text{CH}_3-\text{CH}_2-\text{CO}_2^-$ (iv) $\text{CH}_3-\text{CH}_2-\text{O}^-$
 (a) $\text{ii} > \text{i} > \text{iv} > \text{iii}$ (b) $\text{iv} > \text{i} > \text{ii} > \text{iii}$
 (c) $\text{i} > \text{iv} > \text{ii} > \text{iii}$ (d) $\text{i} > \text{iv} > \text{iii} > \text{ii}$

64. Among the given compound choose the two that yield same carbocation on ionization.



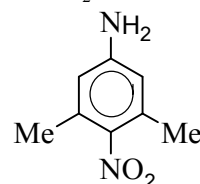
- (a) (i),(iii) (b) (ii),(iv)
 (c) (i),(ii) (d) (ii),(iii)

65. Increasing order of acidic strength of given compounds is :



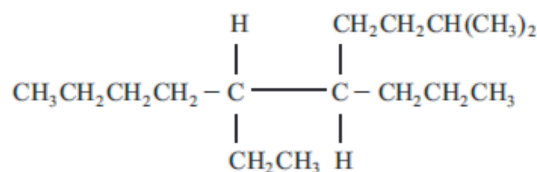
- (a) $\text{iii} < \text{i} < \text{iv} < \text{ii}$ (b) $\text{ii} < \text{i} < \text{iv} < \text{iii}$
 (c) $\text{i} < \text{iii} < \text{iv} < \text{ii}$ (d) $\text{i} < \text{iii} < \text{ii} < \text{iv}$

66. Which of the following effects of $-\text{NO}_2$ group operates on $-\text{NH}_2$ group in this molecule?



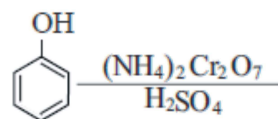
- (a) Only $-\text{I}$ effect
 (b) Only $+\text{M}$ effect
 (c) Only $-\text{M}$ effect
 (d) Both $-\text{I}$ and $-\text{M}$ effect

67. Provide an acceptable name for the alkane shown below :



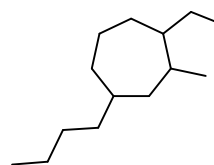
- (a) 6-ethyl-2-methyl-5-propyldecane
 (b) 5-ethyl-6-methyl-2-propyldecane
 (c) 2-ethyl-6-methyl-2-propyldecane
 (d) 2-ethyl-6-methyl-5-propyldecane

68. What is the product in the following reaction ?

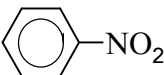
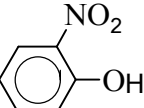
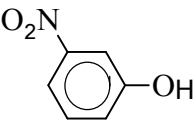
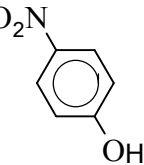
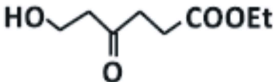
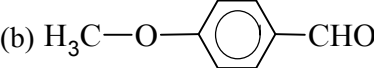
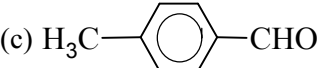
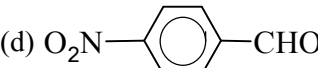
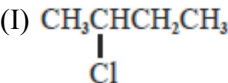


- (a) Benzoic Acid
 (b) Benzoquinone
 (c) Cyclohexane-1-one
 (d) Benzoic sulphate

69. Provide the systematic name of the compound shown:



- (a) 4-butyl-1-ethyl-2-methylcycloheptane

- (b) 4-butyl-2-ethyl-1-methylcycloheptane
 (c) 1-butyl-4-ethyl-3-methylcycloheptane
 (d) 2-butyl-4-ethyl-1-methylcycloheptane
70. In aldol addition reaction product is always:
 (a) β - hydroxyaldehyde
 (b) β - hydroxyketone
 (c) α , β - unsaturated aldehyde
 (d) α , β - unsaturated ketone
71. Which one of the following compounds will have the highest dipole moment?
 (a)  (b) 
 (c)  (d) 
72. The number of moles of Grignard reagent consumed per mole of the compound :

 (a) 4 (b) 2
 (c) 3 (d) 1
73. The paramagnetic species is :
 (a) KO_2 (b) SiO_2
 (c) TiO_2 (d) BaO_2
74. Which one of the following has the highest Nucleophilicity?
 (a) F^- (b) OH^-
 (c) CH_3^- (d) NH_2^-
75. In view of ΔG° for the following reactions :
 $\text{PbO}_2 + \text{Pb} \rightarrow 2\text{PbO}$, $\Delta_r G^\circ < 0$
 $\text{SnO}_2 + \text{Sn} \rightarrow 2\text{SnO}$, $\Delta_r G^\circ > 0$
 Which oxidation state is more characteristic for lead and tin?
 (a) For lead +4, for tin +2
 (b) For lead +2, for tin +2
 (c) For lead +4, for tin +4
 (d) For lead +2, for tin +4
76. At Critical Micell Concentration (CMC), the surfactant molecules:
 (a) decompose
 (b) dissociate
 (c) associate
 (d) become completely soluble
77. Which one of the following will be reactive for Perkin condensation?
 (a) $\text{C}_6\text{H}_5\text{-CHO}$
 (b) 
 (c) 
 (d) 
78. The increasing order of the reactivity of the following halides for the $\text{S}_{\text{N}}1$ reaction is
 (I)  (II) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
 (III) $\text{p-H}_3\text{CO-C}_6\text{H}_4\text{-CH}_2\text{Cl}$
 (a) (III) < (II) < (I) (b) (II) < (I) < (III)
 (c) (I) < (III) < (II) (d) (II) < (III) < (I)
79. The radius of the second Bohr orbit for hydrogen atom is :
 (Plank's const. $h = 6.6262 \times 10^{-34}$ Js ; mass of electron = 9.1091×10^{-31} kg; charge of electron $e = 1.60210 \times 10^{-19}$ C ; permittivity of vacuum $\epsilon = 8.854185 \times 10^{-12}$ $\text{kg}^{-1} \text{m}^{-3} \text{A}^2$)
 (a) 1.65 \AA (b) 4.76 \AA
 (c) 0.529 \AA (d) 212 \AA
80. pK_a of a weak acid (HA) and pK_b of a weak base (BOH) are 3.2 and 3.4, respectively. The pH of their salt (AB) solution is
 (a) 7.2 (b) 6.9
 (c) 7.0 (d) 1.0
81. The formation of which of the following polymers involves hydrolysis reaction?
 (a) Nylon 6 (b) Bakelite
 (c) Nylon 6, 6 (d) Terylene
82. Both lithium and magnesium display several similar properties due to the diagonal relationship; however, the one which is incorrect is:
 (a) Both form basic carbonates
 (b) Both form soluble bicarbonates
 (c) Both form nitrides
 (d) Nitrates of both Li and Mg yield NO_2 and O_2 on heating
83. 3-Methyl-pent-2-ene on reaction with HBr in presence of peroxide forms an addition product. The number of possible stereoisomers for the product is :-

- (a) Six (b) Zero
(c) Two (d) Four
84. A metal crystallises in a face centred cubic structure. If the edge length of its unit cell is 'a', the closest approach between two atoms in metallic crystal will be :-
(a) 2a (b) $2\sqrt{2}a$
(c) $\sqrt{2}a$ (d) $a/\sqrt{2}$
85. Two reactions R_1 and R_2 have identical preexponential factors. Activation energy of R_1 exceeds that of R_2 by 10 kJ mol^{-1} . If k_1 and k_2 are rate constants for reactions R_1 and R_2 respectively at 300 K, then $\ln(k_2/k_1)$ is equal to:- ($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$)
(a) 8 (b) 12
(c) 6 (d) 4
86. The Tyndall effect is observed only when following conditions are satisfied :-
(A) The diameter of the dispersed particles is much smaller than the wavelength of the light used.
(B) The diameter of the dispersed particle is not much smaller than the wavelength of the light used.
(C) The refractive indices of the dispersed phase and dispersion medium are almost similar in magnitude.
(D) The refractive indices of the dispersed phase and dispersion medium differ greatly in magnitude.
(a) (A) and (D) (b) (B) and (D)
(c) (A) and (C) (d) (B) and (C)
87. Which of the following reactions is an example of a redox reaction ?
(a) $\text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow \text{XeF}_6 + \text{O}_2$
(b) $\text{XeF}_2 + \text{PF}_5 \rightarrow [\text{XeF}]^+\text{PF}_6^-$
(c) $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow \text{XeOF}_4 + 2\text{HF}$
(d) $\text{XeF}_6 + 2\text{H}_2\text{O} \rightarrow \text{XeO}_2\text{F}_2 + 4\text{HF}$
88. The products obtained when chlorine gas reacts with cold and dilute aqueous NaOH are
(a) ClO^- and ClO_3^- (b) ClO_2^- and ClO_3^- .
(c) Cl^- and ClO^- (d) Cl^- and ClO_2^-
89. Sodium salt of an organic acid 'X' produces effervescence with conc. H_2SO_4 . 'X' reacts with the acidified aqueous CaCl_2 solution to give a white precipitate which decolourises acidic solution of KMnO_4 . 'X' is :-
(a) $\text{C}_6\text{H}_5\text{COONa}$ (b) HCOONa
(c) CH_3COONa (d) $\text{Na}_2\text{C}_2\text{O}_4$
90. On treatment of 100 mL of 0.1 M solution of $\text{CoCl}_3 \cdot 6\text{H}_2\text{O}$ with excess AgNO_3 ; 1.2×10^{22} ions are precipitated. The complex is :-
(a) $[\text{Co}(\text{H}_2\text{O})_4 \text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$
(b) $[\text{Co}(\text{H}_2\text{O})_3\text{Cl}_3] \cdot 3\text{H}_2\text{O}$
(c) $[\text{Co}(\text{H}_2\text{O})_6]\text{Cl}_3$
(d) $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$

BIOLOGY

91. Lenticels & hydathods are small pores with following common characters;
(a) Their opening & closing is not regulated
(b) They allow exchanges of gases
(c) They always remains closed
(d) They are found on the same organ of the plant
92. Casprian strip is made up of;
(a) Lignin (b) Pectin
(c) Suberin (d) Cellulose
93. Monocot stem with secondary growth is;
(a) Liliium (b) Ficus
(c) Yucca (d) Asparagus
94. Sugarcane plant has;
(a) Reticulate venation
(b) Capsular fruits
(c) Pentamerous flower
(d) Dumb-bell shaped guard cells
95. Desert grasses roll their leaves due to presence of;
(a) Oily surface (b) Bulliform cells
(c) Spines (d) None of these
96. Thorn develops from;
(a) Root (b) Leaf
(c) Axillary bud (d) Peduncle
97. Some plants of arid regions modify their stems into flattened (Opuntia), or fleshy cylindrical (Euphorbia) green structures called;
(a) Phyllode (b) Rhizome
(c) Phylloclade (d) Cladode
98. The stem develops from;
(a) Hypocotyl (b) Epicotyl
(c) Radicle (d) Plumule
99. Pneumatophores are useful in;
(a) Respiration (b) Transpiration
(c) Guttation (d) Protein synthesis
100. Stilt roots grow from;
(a) Lower internodes (b) Lower nodes
(c) Upper nodes (d) Upper internodes

- 101.** The fruit is a characteristic of;
 (a) Gymnosperms only
 (b) Dicots only
 (c) Monocots only
 (d) Flowering plants only
- 102.** Leafbase is swollen to form pulvinus in;
 (a) Some leguminous plants
 (b) Some crucifers
 (c) Some monocots
 (d) Some cycads
- 103.** Which of the following parianths are found?
 (a) Lily (b) China rose
 (c) Rose (d) Pea
- 104.** Basal placentation develops when the ovary has;
 (a) Single ovule
 (b) Many ovules
 (c) Many locules
 (d) Single ovule in each locule
- 105.** Plant cells differ from animal cells in having-
 (a) Large vacuole, plastid & cell wall
 (b) Cell wall, plastid, centriole
 (c) Cell wall, plastid & mitochondria
 (d) Cell membrane, plastid & cell wall
- 106.** In cell membrane, lipids are arranged in a;
 (a) Bilayer
 (b) Monolayer
 (c) Multilayer
 (d) Unilayer at some places & bilayers at other places
- 107.** The most abundant lipid in the cell membrane lipid;
 (a) Cutin
 (b) Cholesterol
 (c) Steroid
 (d) Phospholipidphosphoglycerides
- 108.** Which one is the important site of synthesis of glycoprotein & glycolipid ?
 (a) GB (b) RER
 (c) Lysosome (d) None
- 109.** Algal cell wall consists of;
 (a) Cellulose
 (b) Galactans
 (c) Mannans & minerals like CaCO_3
 (d) All
- 110.** Middle lamellae;
 (a) Mainly consists of Ca-pectate
 (b) Holds different neighbouring cells together
 (c) Is formed as cell plate during cytokinesis
 (d) All of these
- 111.** Which of the following cell organelle(s) is/are double membrane bound?
 (a) Nucleus (b) Chloroplasts
 (c) Mitochondria (d) All
- 112.** What would be Ψ_p of a fully flaccid cell?
 (a) +3 (b) +2
 (c) -3 (d) 0
- 113.** When the plasmolysed cell is placed in water or hypotonic solution, what happens?
 (a) T.P of cell decreases
 (b) T.P of cell becomes zero
 (c) TV increases
 (d) Water potential of cell decreases
- 114.** Water moving through the apoplast from the soil to stele cells must cross a plasma membrane in the cells of;
 (a) Root hairs (b) Cortex
 (c) Endodermis (d) Vessel
- 115.** Which one is highly selective?
 (a) Simple diffusion & Active transport
 (b) Active transport & Facilitated diffusion
 (c) Simple diffusion & Facilitated diffusion
 (d) Active transport & Passive transport
- 116.** Transport proteins that simultaneously move two molecules across a membrane in the same direction are called;
 (a) Uniport (b) Antiport
 (c) Symport (d) Diffusive ports
- 117.** A watermelon has how much water?
 (a) More than 92% (b) About 10 to 15%
 (c) 100% (d) 5 liters
- 118.** O.P Of pure water is;
 (a) 0 (b) 1
 (c) 10 (d) 100
- 119.** The energy source that drives the upward flow of water is;
 (a) Light (b) Sucrose
 (c) Solar heat (d) ATP
- 120.** Loading of phloem is related to;
 (a) Increase of sugar in phloem
 (b) Elongation of phloem cell
 (c) Separation of phloem parenchyma
 (d) Strengthening of phloem fibres
- 121.** Attraction of water molecules to polar surface is called;
 (a) Cohesion (b) Adhesion
 (c) Capillarity (d) Tensile strength
- 122.** More than elements of the discovered so far are found in different plants;
 (a) 60, 105 (b) 105, 60
 (c) 30, 60 (d) 4, 105
- 123.** Hydroponic has been successfully employed as a technique for the commercial production of vegetables like;

- (a) Tomato (b) Seedless cucumber
(c) Lettuce (d) All
124. To the plants soil is not the source of;
(a) C (b) H
(c) O (d) all of these
125. Minerals which maintain cation-anion balance in cells are;
(a) Cl & K (b) K & Fe
(c) Cl & Mg (d) Ca & Mg
126. Minerals associated with redox reaction are;
(a) Na, Cu (b) N, Cu
(c) Fe, Cu (d) Ca, Fe
127. Nitrogen fixation is
(a) Converting nitrogen in the air to form a usable form by plants.
(b) Recycling nitrogen from organic matter in the soil
(c) Absorbing nitrogen from the soil
(d) Conversion NO_3 to N_2
128. Which mineral is required in larger amount in comparison to other micronutrients?
(a) Mo (b) B
(c) Fe (d) Zn
129. Nitrosomonas, Nitrococcus & Nitrobacter are;
(a) Photoautotroph (b) Chemoheterotroph
(c) Chemoautotroph (d) Decomposers
130. Which is not true for nitrogenase enzyme in root nodules in legumes?
(a) Synthesized by nif genes of Rhizobium
(b) Site of reduction of N_2 into NH_3
(c) It is a Mo-Fe protein
(d) Resistant to O_2 conc
131. The amino acids which plays a central role in nitrogen metabolism is/are;
(a) Glutamic acid
(b) α -ketoglutaric acid
(c) Aspartic acid
(d) Double aminated keto acids
132. Leg-haemoglobin is found in which of the following organism?
(a) Anthoceros (b) Aulosira
(c) Nostoc (d) Groundnut
133. Photosynthesis is;
(a) A physical process
(b) A chemical process
(c) A physio-chemical process
(d) An energy wasting process
134. Half leaf experiment proves that;
(a) Light is essential for photosynthesis
(b) CO_2 is essential for photosynthesis
(c) O_2 releases during photosynthesis
(d) Chlorophyll is essential for photosynthesis
135. Which one of the following statements is correct, with reference to enzymes?
(a) Apoenzyme = Holoenzyme + Coenzyme
(b) Holoenzyme = Apoenzyme + Coenzyme
(c) Coenzyme = Apoenzyme + Holoenzyme
(d) Holoenzyme = Coenzyme + Cofactor
136. Which cells of 'Crypt of Lieberkuhn' secrete antibacterial lysozyme?
(a) Argentaffin cells (b) Paneth cells
(c) Zymogen cells (d) Kupffer cells
137. Match the following sexually transmitted diseases (Column-I) with their causative agent Column-II
- | Column I | | Column II | | | |
|----------|---------------|-----------|-----------------------|------|--|
| (a) | Gonorrhoea | (i) | HIV | | |
| (b) | Syphilis | (ii) | Neisseria | | |
| (c) | Genital Warts | (iii) | Treponema | | |
| (d) | AIDS | (iv) | Human papilloma virus | | |
| | A | B | C | D | |
| (a) | (ii) | (iii) | (iv) | (i) | |
| (b) | (iii) | (iv) | (i) | (ii) | |
| (c) | (iv) | (ii) | (iii) | (i) | |
| (d) | (iv) | (iii) | (ii) | (i) | |
138. Out of 'X' pairs of ribs in humans only 'Y' pairs are true ribs. Select the option that correctly represents values of X and Y and provides their explanation.
(a) X = 12, Y = 7 True ribs are attached dorsally to vertebral column and ventrally to the sternum.
(b) X = 12, Y = 5 True ribs are attached dorsally to vertebral column and sternum on the two ends.
(c) X = 24, Y = 7 True ribs are dorsally attached to vertebral column but are free on ventral side.
(d) X = 24, Y = 7 True ribs are dorsally attached to vertebral column but are free on ventral side.
139. Receptor sites for neurotransmitters are present on
(a) membranes of synaptic vesicles

- (b) pre-synaptic membrane
(c) Tips of axons
(d) post -synaptic membrane
- 140.** Artificial selection to obtain cows yielding high milk output represents
(a) Stabilising selection as it stabilizes this character in the population
(b) Directional as it pushes the mean of the character in one direction
(c) disruptive as it splits the population into two, one yielding higher output and the other lower output
(d) stabilising followed by disruptive as stabilizes the population of produce higher yielding cows
- 141.** The hepatic portal vein drains blood to liver from
(a) heart (b) stomach
(c) kidneys (d) intestine
- 142.** A baby boy aged two years is admitted to play school and passes through a dental check-up. The dentist observed that the boy had twenty teeth. Which teeth were absent?
(a) Incisors (b) Canines
(c) Premolars (d) molars
- 143.** An important characteristic that hemichordates share with chordates is
(a) absence of notochord
(b) ventral tubular nerve cord
(c) pharynx with gill slits
(d) pharynx without gill slits
- 144.** Transplantation of tissues/organs fails often due to non-acceptance by the patient's body. Which type of immune-response is responsible for such rejections?
(a) Autoimmune response
(b) Cell-mediated immune response
(c) Hormonal immune response
(d) Physiological immune response
- 145.** Adult human RBCs are enucleate. Which of the following statement(s) is/are most appropriate explanation for this feature?
(I) They do not need to reproduce.
(II) They are somatic cells.
(III) They do not metabolise.
(IV) All their internal space is available for oxygen
Codes
(a) Only (IV) (b) Only (I)
(c) (I), (III) and (IV) (d) (II) and (III)
- 146.** Lungs are made up of air-filled sacs, the alveoli. They do not collapse even after forceful expiration, because of
(a) Residual Volume (RV)
(b) Inspiratory Reserve Volume (IRV)
(c) Tidal Volume (TV)
(d) Expiratory Reserve Volume (ERV)
- 147.** Select the correct route for the passage of sperms in male frogs:
(a) Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogenital duct → cloaca
(b) Testes → Vasa efferentia → Kidney → seminal vesicle → Urinogenital duct → cloaca
(c) Test → Vasa efferentia → Bidder's canal → Ureter → Cloaca
(d) Testes → Vasa efferentia → Kidney → Bidder s canal → Urinogenital duct → Cloaca
- 148.** Which of the following statements is correct?
(a) The ascending limb of loop of Henle is impermeable to water
(b) The descending limb of loop of Henle is impermeable to water
(c) The ascending limb of loop of Henle is permeable to water
(d) The descending limb of loop of Henle is permeable to electrolytes
- 149.** The function of cooper ions in copper releasing IUD's is:-
(a) they suppress sperm motility and fertilising capacity of sperms
(b) they inhibit gametogenesis
(c) they make uterus unsuit able for implantation
(d) they inhibit ovulation
- 150.** Hypersecretion of growth hormone in adults does not cause further increase in height because
(a) growth hormone becomes inactive in adults
(b) epiphyseal plates close after adolescence
(c) bones loose their sensitivity to growth hormone in adults
(d) muscle fibres do not grow in size after birth
- 151.** A temporary endocrine gland in the human body is:-
(a) pineal gland (b) corpus cardiacum
(c) corpus luteum (d) Corpus allatum
- 152.** GnRH, a hypothalamic hormone needed in reproduction, acts on
(a) anterior pituitary gland and stimulates secretion of LH and oxytocin
(b) Anterior pituitary gland and stimulates secretion LH and FSH
(c) Posterior pituitary gland and stimulates secretion of oxytocin and FSH
(d) Posterior pituitary gland and stimulates secretion of LH and relaxin
- 153.** Which among these is the correct combination of aquatic mammals?
(a) Seals, Dolphins, Sharks
(b) Dolphins, Seals, Trygon

- (c) Whales, Dolphins, Seals
(d) Trygon, Whales, Seals
- 154.** Thalassaemia and sickle-cell anaemia are caused due to a problem in globin molecule synthesis. Select the correct statement.
(a) Both are due to qualitative defect in globin chain synthesis
(b) Both are due to a quantitative defect in globin chain synthesis
(c) Thalassaemia is due to less synthesis of globin chain synthesis
(d) Sickle-cell anaemia is due to a quantitative problem of globin molecules
- 155.** MALT constitutes about percent of the lymphoid tissue in human body.
(a) 50% (b) 20%
(c) 70% (d) 10%
- 156.** Identify the incorrect match from those given below
(a) Jelly fish *Aurelia aurita* Scyphozoa
(b) Paddle Chaetopterus Polychaeta worm
(c) Cray fish *Oniscus* Crustacean
(d) Acorn *Balanoglossus* Enteropneusta worm (Hemichordata)
- 157.** Match the larval stages (in column I) with their corresponding animals (in column II) and select correct option
- | | Column I | Column II |
|-----|-----------------|------------------------------|
| I. | Planula | i. Holothuria (sea cucumber) |
| II | Trochophore | ii. Hermit crab |
| III | Glochidium | iii. Obelia I |
| IV | Glaucothoe | iv. Nereis II
v. unio |
- | | I | II | III | IV |
|-----|----------|-----------|------------|-----------|
| (a) | (i) | (iii) | (v) | (iv) |
| (b) | (iii) | (iv) | (v) | (ii) |
| (c) | (i) | (ii) | (iii) | (iv) |
| (d) | (iii) | (i) | (ii) | (v) |
- 158.** The best description of natural selection is
(a) the survival of the fittest
(b) the struggle for existence
(c) the reproductive of the members of a population best adapted to the environment
(d) a change in the proportion of variations within a population
- 159.** **Statement I** Microtubules are formed only in animal cells.
Statement II Microtubules are made up of a protein called myosin.
Choose the correct option.
(a) statement I is correct and statement II is incorrect.
(b) Statement II is correct and statement I is incorrect.
- (c) Both statements are correct.
(d) Both statements are incorrect.
- 160.** Torsion of visceral mass is seen in animals belonging to class
(a) Cephalopoda (b) Scaphopoda
(c) Amphineura (d) gastropoda
- 161.** Match the following columns.
- | | Column I | Column II |
|----|------------------|---------------------------|
| A. | Sacral nerves | 1. 1 Pair |
| B. | Thoracic nerves | 2. 8 Pairs |
| C. | Coccygeal nerves | 3. 7 Pairs |
| D. | Cervical nerves | 4. 12 Pairs
5. 5 Pairs |
- Codes**
- | | A | B | C | D |
|-----|----------|----------|----------|----------|
| (a) | 4 | 1 | 3 | 2 |
| (b) | 5 | 3 | 1 | 2 |
| (c) | 5 | 4 | 1 | 2 |
| (d) | 2 | 5 | 3 | 1 |
- 162.** Oxygen dissociation curve of haemoglobin is
(a) sigmoid (b) hyperbolic
(c) linear (d) hypobolic
- 163.** A hormone, secreted by the endocrinal cells of duodenal mucosa which influences the release of pancreatic juice is
(a) relaxin (b) cholecystokinin
(c) secretin (d) progesterone
- 164.** The globular head of myosin contains
(a) calcium ions in large quantities
(b) troponin
(c) ATPase enzyme
(d) ATP
- 165.** Gastrula is the embryonic stage in which
(a) cleavage occurs (b) blastocoels form
(c) germinal layers form (d) villi form
- 166.** Dense regular connective tissue is present in
(a) ligament and tendons
(b) joint capsule and Wharton's Jelly
(c) periosteum and endosteum
(d) pericardium and heart valves
- 167.** Note the following features and choose the ones applicable to *Wuchereria bancrofti*.
- | | |
|------|-------------------------------------|
| I. | Coeleozoic parasite |
| II. | Histozoic parasite |
| III. | Monogenetic parasite |
| IV. | Digenetic parasite |
| V. | Monomorphic, acoelomate parasite |
| VI. | Dimorphic, pseudocoelomate parasite |
- | | | | |
|-----|------------|-----|-------------|
| (a) | II, III, V | (b) | II, III, VI |
| (c) | II, IV, VI | (d) | I, III, VI |
- 168.** The secretory phase in the human menstrual cycle is also called as
(a) luteal phase and last for about 6 days
(b) follicular phase lasting for about 6 days
(c) luteal phase and last for about 13 days

- (d) follicular phase and last for about 13 days
169. Which one of the following pairs is not correctly matched?
- (a) Vitamin-B₁₃ Pernicious anaemia
 (b) Vitamin-B₆ Loss of appetite
 (c) Vitamin-B₁ Beri-Beri
 (d) Vitamin-B₂ Pellagra
170. Humoral immunity is mediated by
- (a) R-cells (b) T-cells
 (c) NK-cells (d) plasma cells
171. The ornithine cycle removes two waste products from the blood in liver. These products are
- (a) CO₂ and urea
 (b) Ammonia and urea
 (c) CO₂ and ammonia
 (d) Ammonia and uric acid
172. Macromolecule chitin is
- (a) nitrogen containing polysaccharide
 (b) phosphorous containing polysaccharide
 (c) sulphur containing polysaccharide
 (d) Simple polysaccharide
173. Which of the following statement is correct in relation to the endocrine system?
- (a) Adenohypophysis is under direct neural regulation of the hypothalamus
 (b) Organs in the body like gastro-intestinal tract, heart, kidney and liver do not produce any hormones
 (c) Non-nutrient chemicals produced by the body in trace amount that act as inter-cellular messenger are known as hormones
 (d) Releasing and inhibitory hormones are produced by the pituitary gland
174. Taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of
- (a) monographs (b) flora
 (c) Both (a) and (b) (d) None of these
175. Match the following columns.
- | Column I | | Column II | |
|----------------|--|---------------------|--|
| A. Pinocytosis | | 1. Euglena gracilis | |
| B. Holozoic | | 2. Paramecium | |
| C. Parasitic | | 3. Amoeba proteus | |
| D. Mixotrophic | | 4. Monocystis | |
- Codes**
- | | A | B | C | D |
|-----|---|---|---|---|
| (a) | 3 | 2 | 4 | 1 |
| (b) | 2 | 3 | 4 | 1 |
| (c) | 4 | 3 | 1 | 2 |
| (d) | 1 | 4 | 2 | 3 |
176. Monoclonal antibodies and polyclonal antibodies are produced by
- (a) T-memory cells
 (b) NK-cells
 (c) plasma cells of B-lymphocytes
 (d) memory cells of B-lympho
177. Sliding filament theory can be best explained as
- (a) When myofilament, slide pass each other actin filaments shorten shorten while myosin filament donot shorten
 (b) actin myosin filaments shorten and slide pass each other
 (c) actin and myosin filaments do not sorten, but rather slide pass each other.
 (d) When myofilament slide pass each other myosin filament shorten while actin filament do not sorten
178. Select the correct combination of statements regarding Myasthenia gravis
- I. It is an auto Immune disorder.
 II. It causes insufficient acetylcholine binding that effects muscular contraction.
 III. Antibodies are developed against acetylcholine.
 IV. Antibodies are developed against acetylcholine receptors.
 V. It causes drooping of eyelids.
- (a) I, III, IV, V (b) I, III, V, II
 (c) I, II, IV, V (d) II, III, IV, V
179. Foramen ovale
- (a) Connects the two atria in the foetal heart.
 (b) Is a condition in which the heart valves do not completely close
 (c) Is a shallow depression in the inter ventricular septum
 (d) Is a connection between the pulmonary trunk and the aorta in the foetus
180. In a cereal grain, the single cotyledon (shield shaped) of embryo is represented by;
- (a) Coleoptile (b) Coleorhiza
 (c) Scutellum (d) Prophyll

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