

# ULTIMATE TEST SERIES NEET 2020

## TEST-04

### PATTERN : NEET

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the Examination Hall before the end of the test.

Name :

M.M.: 720

Time : 3 hrs

BRANCH : DEHRADUN, KOTDWAR, HALDWANI, AGRA, SAHARANPUR Test Date : 11-03-2020

#### TOPIC :

- Physics** : Gravitation, Mechanical Properties of Solids, Mechanical Properties of Fluids, Thermal Properties of Matter.
- Chemistry** : Redox Reactions, Inorganic Chemistry, Hydrogen s-Block Elements, Some p-block Elements (B,C)
- Biology** : Cell Structure : The cell - The unit of Life, The cell Cycle and Cell Division; Plants Physiology : Transport in Plants, Mineral Nutrition. Human Physiology-II Body Fluids and Circulation, Excretory Products and their Elimination, Locomotion and Movement

#### INSTRUCTIONS :

- Attempt **All** the questions. This Test booklet consists of **180** questions. The maximum marks are 720
- There are three parts in the question paper of **Physics, Chemistry and Biology (Botany, Zoology)** having **45** questions .
- Each question is allotted **4 (four)** marks for each correct response
- There is **1/4th** negative marking for each wrong attempt The total duration of the test is **3 hrs**.
- There is no negative marking for un-attempted questions.
- Use Blue/black ball point pen to fill the **OMR**
- Write your **Name** and **Roll number** carefully on the **OMR** sheet as well as the question paper.



## AVIRAL CLASSES

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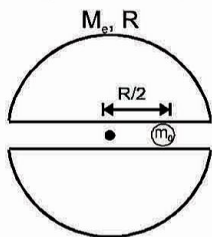
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# PHYSICS

1. A very small groove is made in the earth, and a particle of mass  $m_0$  is placed at  $\frac{R}{2}$  distance from the centre. Find the escape speed of the particle from that place.



- (1)  $\sqrt{\frac{4GM}{R}}$                       (2)  $\sqrt{\frac{2GM}{R}}$   
 (3)  $\sqrt{\frac{GM}{4R}}$                       (4)  $\sqrt{\frac{11GM}{4R}}$

2. Water is flowing through two horizontal pipes of different diameters which are connected together. The diameters of the two pipes are 3 cm and 6 cm respectively. If the speed of water in narrower pipe is 4 m/sec and the pressure is  $2.0 \times 10^4$  pascal, then the speed of water in the wider pipe is :-

- (1) 4 m/sec                      (2) 2 m/sec  
 (3) 1 m/sec                      (4) 16 m/sec

3. A wire can be broken by applying a load of 200 N. The force required to break another wire of the same length and same material, but double in diameter, is :-

- (1) 200 N                      (2) 400 N  
 (3) 600 N                      (4) 800 N

4. Two wires are made of the same material and have the same volume. However wire 1 has cross-sectional area A and wire 2 has cross-section area 3A. If the length of wire 1 increases by  $\Delta x$  on applying force F, how much force is needed to stretch wire 2 by the same amount?

- (1) F                      (2) 4 F                      (3) 6 F                      (4) 9 F

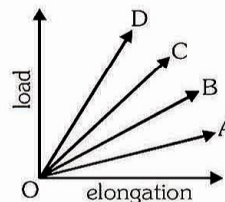
5. If T is the surface tension of soap solution, then the amount work done in increasing diameter of a soap bubble from D to 2D is :-

- (1)  $2 \pi D^2 T$                       (2)  $4 \pi D^2 T$   
 (3)  $6 \pi D^2 T$                       (4)  $8 \pi D^2 T$

6. Water rises to a height h in a capillary at the surface of earth. On the surface of the moon the height of water column in the same capillary will be:-

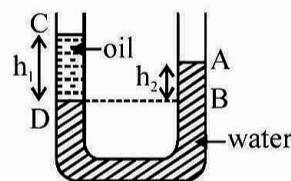
- (1) 6h                      (2)  $\frac{1}{6}h$                       (3) h                      (4) Zero

7. The load versus elongation graph for four wires of the same material and same length is shown in the figure. The thinnest wire is represented by the line



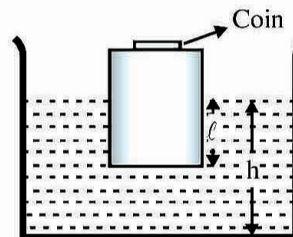
- (1) OA                      (2) OB                      (3) OC                      (4) OD

8. In a U-tube experiment, a column AB of water is balanced by a column 'CD' of oil, as shown in the figure. Then the relative density of oil is:-



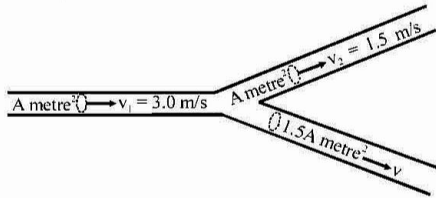
- (1)  $\frac{h_2}{h_1}$                       (2)  $\frac{h_1}{h_2}$   
 (3)  $\frac{(h_1 - h_2)}{h_1}$                       (4)  $\frac{h_2}{(h_1 + h_2)}$

9. A wooden block with a coin placed on its top floats in water as shown in figure.  $\ell$  and h are as shown. After some time the coin falls into the water then :-



- (1)  $\ell$  decrease and h increase  
 (2)  $\ell$  increase and h decrease  
 (3) Both  $\ell$  & h increase  
 (4) Both  $\ell$  & h decrease

10. Pressure at the bottom of a tank of water is  $3P$ , where  $P$  is atmospheric pressure. If water is drawn out till the level of water is lowered by one fifth, then the pressure at the bottom of the tank is :-  
 (1)  $2P$  (2)  $13P/5$  (3)  $8P/5$  (4)  $4P/5$
11. An incompressible liquid flows through a horizontal tube as shown in the figure. Then, the velocity  $v$  of the fluid is :-



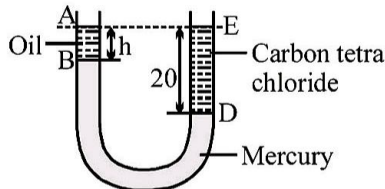
- (1) 3.0 m/s (2) 1.5 m/s  
 (3) 1.0 m/s (4) 2.25 m/s
12. A tank of height 5 m is full of water. There is a hole of cross sectional area  $1 \text{ cm}^2$  in its bottom. The initial volume of water that will come out from this hole per second is  
 (1)  $10^{-3} \text{ m}^3/\text{s}$  (2)  $10^{-4} \text{ m}^3/\text{s}$   
 (3)  $10 \text{ m}^3/\text{s}$  (4)  $10^{-2} \text{ m}^3/\text{s}$
13. A ball rises to surface at a constant velocity in a liquid whose density is 4 times greater than that of the material of the ball. The ratio of the force of friction acting on the rising ball and its weight is :  
 (1) 3 : 1 (2) 4 : 1 (3) 1 : 3 (4) 1 : 4
14. Two capillaries of same material but of different radii are dipped in a liquid. In one of the capillary the liquid rises to a height of 22 cm and in other to 66 cm. The ratio of their radii is :-  
 (1) 9 : 1 (2) 1 : 9 (3) 3 : 1 (4) 1 : 3
15. The excess pressure inside an air bubble of radius  $r$  just below the surface of water is  $p_1$ . The excess pressure inside a drop of the same radius just outside the surface is  $p_2$ . If  $T$  is surface tension, then  
 (1)  $p_1 = 2p_2$  (2)  $p_1 = p_2$   
 (3)  $p_2 = 2p_1$  (4)  $p_2 = 0, p_1 \neq 0$
16. The length of a metal wire is  $l_1$ , when the tension in it is  $T_1$  and is  $l_2$  when the tension is  $T_2$ . The unstretched length of the wire is :-

- (1)  $\sqrt{l_1 l_2}$  (2)  $\frac{l_1 + l_2}{2}$   
 (3)  $\frac{l_1 T_2 - l_2 T_1}{T_2 - T_1}$  (4)  $\frac{l_1 T_2 + l_2 T_1}{T_2 + T_1}$

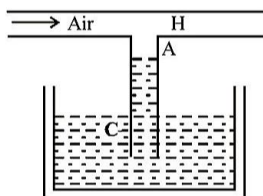
17. When the temperature of a rod increases from  $t$  to  $t + \Delta t$ , Its moment of inertia increases from  $I$  to  $I + \Delta I$ . If  $\alpha$  be the coefficient of linear expansion of the rod, then the value of  $\frac{\Delta I}{I}$  is:-  
 (1)  $2\alpha\Delta t$  (2)  $\alpha\Delta t$   
 (3)  $\frac{\alpha\Delta t}{2}$  (4)  $\frac{\Delta t}{\alpha}$
18. The Young's modulus of brass and steel are respectively  $1 \times 10^{10} \text{ N/m}^2$  and  $2 \times 10^{10} \text{ N/m}^2$ . A brass wire and a steel wire of the same length are extended by 1mm under the same force; the radii of brass and steel wires are  $R_B$  and  $R_S$  respectively. Then  
 (1)  $R_S = \sqrt{2}R_B$  (2)  $R_S = \frac{R_B}{\sqrt{2}}$   
 (3)  $R_S = 4R_B$  (4)  $R_S = \frac{R_B}{4}$
19. The surface energy of a liquid drop is  $E$ . It is sprayed into 1000 equal droplets. Then net surface energy becomes :-  
 (1)  $E$  (2)  $10E$  (3)  $100E$  (4)  $1000E$
20. 10 gm of ice at  $-20^\circ\text{C}$  is added to 10gm of water at  $50^\circ\text{C}$ . Specific heat of water =  $1 \text{ cal/gm}^\circ\text{C}$ , specific heat of ice =  $0.5 \text{ cal/gm}^\circ\text{C}$ . Latent heat of ice =  $80 \text{ cal/gm}$ . Then, resulting temperature is :  
 (1)  $-20^\circ\text{C}$  (2)  $15^\circ\text{C}$  (3)  $0^\circ\text{C}$  (4)  $50^\circ\text{C}$
21. Water rises in a capillary tube to a height  $h$ . Choose the false statement regarding a capillary rise from the following.  
 (1) On the surface of Jupiter, height will be less than  $h$ .  
 (2) In a lift moving up with constant acceleration, height is less than  $h$ .  
 (3) On the surface of the moon, the height is more than  $h$ .  
 (4) In a lift moving down with constant acceleration height is less than  $h$ .
22. A metallic sphere floats in an immiscible mixture of water ( $\rho_w = 10^3 \text{ kg/m}^3$ ) and a liquid ( $\rho_L = 13.5 \times 10^3 \text{ kg/m}^3$ ) such that its  $(4/5)^{\text{th}}$  portion is in water and  $(1/5)^{\text{th}}$  portion is in the liquid. The density of metal is :-  
 (1)  $4.5 \times 10^3 \text{ kg/m}^3$  (2)  $4.0 \times 10^3 \text{ kg/m}^3$   
 (3)  $3.5 \times 10^3 \text{ kg/m}^3$  (4)  $1.9 \times 10^3 \text{ kg/m}^3$

23. A beaker is completely filled with water at  $4^{\circ}\text{C}$ . It will overflow :-  
 (1) When heated but not when cooled  
 (2) When cooled but not when heated  
 (3) Both when heated or cooled  
 (4) neither when heated nor when cooled

24. Calculate the value of  $h$  in U-tube shown in the following figure.  
 Density of oil =  $0.9 \text{ g/cm}^3$   
 Density of carbon tetrachloride =  $1.6 \text{ g/cm}^3$   
 Density of mercury =  $13.6 \text{ g/cm}^3$

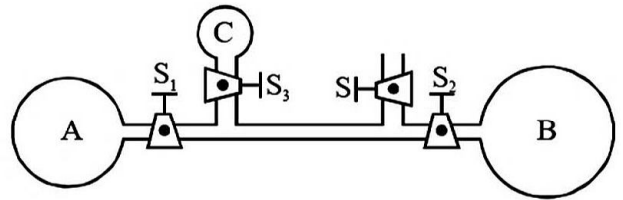


- (1) 18.9 cm                      (2) 20.9 cm  
 (3) 30.9 cm                      (4) 40.9 cm
25. A thin copper wire of length  $L$  increases in length by 1% when heated from  $0^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ . If a thin copper plate of area  $2L \times L$  is heated from  $0^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ , the percentage increase in its area will be  
 (1) 1%      (2) 2%      (3) 3%      (4) 4%
26. Figure shows a capillary tube  $C$  dipped in a liquid that wets it. The liquid rises to a point  $A$ . If we blow air through the horizontal tube  $H$ , what will be happen to the liquid column in the capillary tube?



- (1) Level will rise above  $A$   
 (2) Level will fall below  $A$   
 (3) Level will remain at  $A$   
 (4) It is difficult to predict

27. The shown figure shows three soap bubbles  $A$ ,  $B$  and  $C$  prepared by blowing the capillary tube fitted with four stop cocks  $S$ ,  $S_1$ ,  $S_2$  and  $S_3$  with stop cock  $S$  closed and stop cocks  $S_1$ ,  $S_2$  and  $S_3$  opened.



- (1)  $B$  will start collapsing with volumes of  $A$  &  $C$  increasing.  
 (2)  $A$  and  $C$  will start collapsing with the volume of  $B$  increasing.  
 (3)  $C$  will start collapsing with volumes of  $A$  &  $B$  increasing.  
 (4) Volumes of  $A$ ,  $B$  and  $C$  will become equal at equilibrium.
28. It values of  $Y$  and  $\eta$  for a substance are  $2 \times 10^{11}$  Pascal and  $8 \times 10^{10}$  Pascal respectively. Find Posson's ratio ( $\sigma$ ).

- (1) 0.25                              (2) 0.50  
 (3) 0.75                              (4) 1
29. What is excess pressure inside the drop of mercury of radius  $6.0 \text{ mm}$  at room temp. [surface tension =  $4.65 \times 10^{-1} \text{ Nm}^{-1}$ ]  
 $1 \text{ atm} = 1.01 \times 10^5 \text{ Pa}$   
 (1) 155 Pa                              (2) 310 Pa  
 (3) 460 Pa                              (4) None of these

30. If the terminal speed of a sphere of gold (density =  $19.5 \text{ kg/m}^3$ ) is  $0.2 \text{ m/s}$  in a viscous liquid (density =  $1.5 \text{ kg/m}^3$ ), find the terminal speed of a sphere of silver (density =  $10.5 \text{ kg/m}^3$ ) of the same size in the same liquid  
 (1)  $0.1 \text{ m/s}$                               (2)  $0.2 \text{ m/s}$   
 (3)  $0.4 \text{ m/s}$                               (4)  $0.133 \text{ m/s}$

31. Kerosene rises in the wicks of a stove due to the property -  
 (1) High viscosity  
 (2) Low density  
 (3) Due to capillary action  
 (4) Evaporation of oil at low temperature

32. The Young's modulus of a metal is  $1.2 \times 10^{11} \text{ Nm}^{-2}$  and its inter atomic force constant is  $3.6 \times 10^9 \text{ N/m}$ , then the average distance between atoms is -  
 (1)  $15 \text{ \AA}$                               (2)  $3 \times 10^{-16} \text{ m}$   
 (3)  $3 \times 10^{-20} \text{ m}$                               (4) none of these

33. A vessel of height  $2d$  is half-filled with a liquid of refractive index  $\sqrt{2}$  and the other half with a liquid of refractive index  $n$ . (The given liquids are immiscible). Then the apparent depth of the inner surface of the bottom of the vessel (neglecting the thickness of the bottom of the vessel) will be :-
- (1)  $\frac{n}{d(n+\sqrt{2})}$  (2)  $\frac{d(n+\sqrt{2})}{n\sqrt{2}}$   
 (3)  $\frac{\sqrt{2}n}{d(n+\sqrt{2})}$  (4)  $\frac{nd}{d+\sqrt{2}n}$
34. The additional kinetic energy to be provided to a satellite of mass  $m$  revolving around a planet of mass  $M$ , to transfer it from a circular orbit of radius  $R_1$  to another of radius  $R_2$  ( $R_2 > R_1$ ) is :-
- (1)  $GmM\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$  (2)  $2GmM\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$   
 (3)  $\frac{1}{2}GmM\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$  (4)  $GmM\left(\frac{1}{R_1^2} - \frac{1}{R_2^2}\right)$
35. An engine pumps water through a hose pipe. Water passes through the pipe and leaves it with a velocity of  $2$  m/s. The mass per unit length of water in the pipe is  $100$  kg/m. What is the power of the engine ?
- (1)  $800$  W (2)  $400$  W  
 (3)  $200$  W (4)  $100$  W
36. Water is flowing continuously from a tap having an internal diameter  $8 \times 10^{-3}$  m. The water velocity as it leaves the tap is  $0.4$  ms $^{-1}$ . The diameter of the water stream at a distance  $2 \times 10^{-1}$  m below the tap is close to :-
- (1)  $9.6 \times 10^{-3}$  m (2)  $3.6 \times 10^{-3}$  m  
 (3)  $5.0 \times 10^{-3}$  m (4)  $7.5 \times 10^{-3}$  m
37. Work done in increasing the size of a soap bubble from a radius of  $3$  cm to  $5$  cm is nearly (Surface tension of soap solution =  $0.03$  Nm $^{-1}$ ) :-
- (1)  $2\pi$  mJ (2)  $0.4\pi$  mJ  
 (3)  $4\pi$  mJ (4)  $0.2\pi$  mJ
38. A certain block weight  $15$  N in air. It weight  $12$  N when immersed in water when immersed in another liquid it weighs  $13$  N, the relative density of the block is :-
- (1)  $5$  (2)  $12$  (3)  $15$  (4) None
39. The time period ( $T$ ) of an artificial satellite of the earth depends on the density ( $d$ ) of the earth (assumed constant) as :-
- (1)  $T \propto d$  (2)  $T \propto \sqrt{d}$  (3)  $T \propto \frac{1}{\sqrt{d}}$  (4)  $T \propto \frac{1}{d}$
40. An ideal fluid is flowing in a pipe in streamline flow. Pipe has maximum and minimum diameter of  $6.4$  cm and  $4.8$  cm respectively. Find out the ratio of minimum to maximum velocity.
- (1)  $\frac{81}{256}$  (2)  $\frac{9}{16}$   
 (3)  $\frac{3}{4}$  (4)  $\frac{3}{16}$
41. Three planets of same density with radii  $R_1$ ,  $R_2$  and  $R_3$  such that  $R_1 = 2R_2 = 3R_3$  have escape velocities  $v_1$ ,  $v_2$  and  $v_3$  respectively. Then the value of  $v_1 : v_2 : v_3$  is :
- (1)  $1 : 2 : 3$  (2)  $3 : 2 : 1$   
 (3)  $2 : 3 : 6$  (4)  $6 : 3 : 2$
42. According to Kepler's law, the period of revolution of a planet ( $T$ ) and its mean distance from the sun ( $R$ ) are related by the equation:-
- (1)  $T^2R = \text{constant}$  (2)  $T^2R^{-3} = \text{constant}$   
 (3)  $TR^3 = \text{constant}$  (4)  $T^3R^3 = \text{constant}$
43. If  $v_0$  be the orbital velocity of a satellite in a circular orbit close to earth's surface and  $v_e$  is the escape velocity from the earth, then relation between the two is :-
- (1)  $v_0 = v_e$  (2)  $v_e = \sqrt{2}v_0$  (3)  $v_e = \sqrt{3}v_0$  (4)  $v_e = 2v_0$
44. Two identical spheres of same density each with radius  $r$  are placed so that their centres are at a distance of  $6r$ . The gravitational force of attraction between them will be proportional to :-
- (1)  $r^4$  (2)  $r^2$  (3)  $r^6$  (4)  $r^{-2}$
45. What should be the angular velocity of earth about own axis so that a person's weight at equator will be  $\frac{3}{5}$  of his weight at poles ?
- (1)  $\sqrt{\frac{g}{R}}$  (2)  $\sqrt{\frac{2g}{3R}}$  (3)  $\sqrt{\frac{2g}{5R}}$  (4)  $\sqrt{\frac{3g}{2R}}$

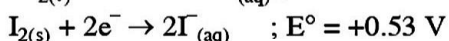
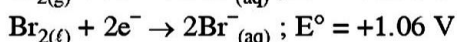
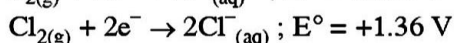
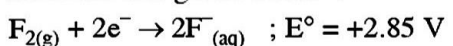
**CHEMISTRY**

46. Which is not obtained when metal carbides react with  $H_2O$ :-  
 (1)  $Al_4C_3 + H_2O \rightarrow CH_3-CH_2-CH_3$   
 (2)  $CaC_2 + H_2O \rightarrow CH \equiv CH$   
 (3)  $Mg_2C_3 + H_2O \rightarrow CH_3C \equiv CH$   
 (4)  $Be_2C + H_2O \rightarrow CH_4$
47. Which cannot be used to generate  $H_2$ ?  
 (1)  $Al + NaOH$                       (2)  $Zn + NaOH$   
 (3)  $Mg + NaOH$                       (4)  $LiH + H_2O$
48. Which does not exist in solid state :-  
 (1)  $NaHCO_3$                       (2)  $NaHSO_3$   
 (3)  $LiHCO_3$                       (4)  $CaCO_3$
49. Borax bead on heating with cobalt oxide forms a bead of :-  
 (1)  $Co(BO_2)_2$                       (2)  $CoBO_3$   
 (3)  $Co_3(BO_3)_2$                       (4)  $Na_2Co(BO_3)_2$
50. Among the following the paramagnetic compound is :-  
 (1)  $Na_2O_2$     (2)  $O_3$             (3)  $N_2O$     (4)  $KO_2$
51. Which of the following carbonate decomposes on heating into metal oxide and  $CO_2$  :-  
 (1)  $Li_2CO_3, Na_2CO_3$             (2)  $Na_2CO_3, K_2CO_3$   
 (3)  $Li_2CO_3, MgCO_3$             (4)  $Na_2CO_3, MgCO_3$
52. Which of the following ion is smallest :-  
 (1)  $Na^+$     (2)  $Mg^{2+}$     (3)  $Al^{3+}$     (4)  $Si^{4+}$
53. In solid ice oxygen atom is surrounded :-  
 (1) Tetrahedrally by 4 hydrogen atoms  
 (2) Octahedrally by 2 oxygen and 4 hydrogen atoms  
 (3) Tetrahedrally by 2 hydrogen and 2 oxygen atoms  
 (4) Octahedrally by 6 hydrogen atoms
54. Which of the following order of solubility in water is correct?  
 (1)  $Ba(OH)_2 < Mg(OH)_2$   
 (2)  $BaCO_3 > CaCO_3$   
 (3)  $CaSO_4 < MgSO_4$   
 (4)  $Be(OH)_2 > Ba(OH)_2$
55. Which shows maximum metallic character :-  
 (1) Li                                      (2) Ca  
 (3) K                                        (4) Ba
56. 1<sup>st</sup> ionisation energy of Mg and Al are respectively (in eV) :-  
 (1) 7.64, 5.98  
 (2) 7.64, 7.64  
 (3) 5.98, 7.64  
 (4) 5.98, 5.98
57. Which statement is correct :-  
 (1) Dihydrogen is paramagnetic  
 (2) Dinitrogen is diamagnetic  
 (3) Dioxygen is diamagnetic  
 (4) Dihelium is paramagnetic
58. Which element becomes passive on exposure in air :-  
 (1) Li                                      (2) K  
 (3) Na                                      (4) Be
59. We use polymetaphosphates as water softeners as they :-  
 (1) Form precipitates with cations of hard water  
 (2) Form precipitates with anions of hard water  
 (3) Form soluble complexes with the cations of hard water  
 (4) Form soluble complexes with the anion of hard water
60. Repeating unit of organosilicon polymers is :-  
 (1)  $\{R_2Si\}_n$                               (2)  $\{R_2Si-O\}_n$   
 (3)  $\{R_2SiO\}_n$                               (4) All of these
61. Tetrahalides of group 14 elements (except that of carbon) act as :-  
 (1) Reducing agents                      (2) Lewis acid  
 (3) Lewis bases                              (4) None of these
62. Which of the following alkaline earth metal does not exhibit colour when heated :-  
 (1) Ca    (2) Mg    (3) Be    (4) Both 2 and 3

63. Match the column-I with column-II and mark the appropriate choice.

Column-I		Column-II	
(P) Borax		(i) $\text{Na}_3\text{AlF}_6$	
(Q) Inorganic benzene		(ii) $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$	
(R) Cryolite		(iii) $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$	
(S) Bauxite		(iv) $\text{B}_3\text{N}_3\text{H}_6$	
(P) (Q)	(R) (S)	(i) (iii)	(ii) (iv)
(1) (ii) (iv)		(i) (iii)	
(2) (i) (ii)		(iii) (iv)	
(3) (ii) (iii)		(i) (iv)	
(4) (iii) (i)		(ii) (iv)	

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



The strongest oxidising and reducing agents respectively are :

- (1)  $\text{Cl}_2$  and  $\text{Br}^-$                       (2)  $\text{Cl}_2$  and  $\text{I}_2$   
 (3)  $\text{F}_2$  and  $\text{I}^-$                          (4)  $\text{Br}_2$  and  $\text{Cl}^-$

65. Which one of the alkali metals, forms only, the normal oxide,  $\text{M}_2\text{O}$  on heating in air?

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

66. In the case of alkali metals, the covalent character decreases in the order :-

- (1)  $\text{MI} > \text{MBr} > \text{MCl} > \text{MF}$   
 (2)  $\text{MCl} > \text{MI} > \text{MBr} > \text{MF}$   
 (3)  $\text{MF} > \text{MCl} > \text{MBr} > \text{MI}$   
 (4)  $\text{MF} > \text{MCl} > \text{MI} > \text{MBr}$

67. Which of the following oxides is not expected to react with sodium hydroxide ?

- (1) BeO                                      (2)  $\text{B}_2\text{O}_3$   
 (3) CaO                                      (4)  $\text{SiO}_2$

68. Which among the following acts as oxidant and reductant both:-

- (a)  $\text{H}_2\text{O}_2$                                   (b)  $\text{SO}_2$   
 (c)  $\text{HNO}_2$                                   (d)  $\text{H}_2\text{SO}_4$   
 (1) a, b, c                                  (2) a, b, d  
 (3) a, c, d                                  (4) b, c,

69. In  $\text{Na}_2\text{S}_2\text{O}_3$ ,  $\text{H}_2\text{S}_2\text{O}_8$  oxidation no. of central sulphur will be respectively:-

- (1) +6, +6                                  (2) +6, +2  
 (3) +6, +4                                  (4) +4, +2

70. Number of  $\text{sp}^3$  hybridised atoms present in anionic part of borax :-

- (1) 2      (2) 4      (3) 11      (4) 9

71. Correct order of density is :-

- (1)  $\text{Be} < \text{Mg} < \text{Ca} < \text{Sr} < \text{Ba}$   
 (2)  $\text{Li} < \text{Na} < \text{K} < \text{Rb} < \text{Cs}$   
 (3)  $\text{Ca} < \text{Mg} < \text{Be} < \text{Sr} < \text{Ba}$   
 (4)  $\text{Li} > \text{Na} > \text{K} > \text{Rb} > \text{Cs}$

72. The compound which can act both as oxidising as well as reducing agent is :-

- (1)  $\text{Al}_2\text{O}_3$                                   (2)  $\text{CrO}_3$   
 (3)  $\text{H}_2\text{SO}_4$                                   (4)  $\text{SO}_2$

73. Which of the following is used as both oxidising and reducing agent ?

- (1)  $\text{H}_2\text{O}_2$     (2)  $\text{H}_2\text{SO}_4$     (3)  $\text{HNO}_3$     (4) None

74. Most probable oxidation state of Pb and Sn will be :-

- (1)  $\text{Pb}^{+4}, \text{Sn}^{+4}$                                   (2)  $\text{Pb}^{+4}, \text{Sn}^{+2}$   
 (3)  $\text{Pb}^{+2}, \text{Sn}^{+2}$                                   (4)  $\text{Pb}^{+2}, \text{Sn}^{+4}$

75. Correct order of thermal stability is :

- (1)  $\text{BeCO}_3 < \text{MgCO}_3 < \text{CaCO}_3 < \text{SrCO}_3$   
 (2)  $\text{BeCO}_3 > \text{MgCO}_3 > \text{CaCO}_3 > \text{SrCO}_3$   
 (3)  $\text{MgCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{BeCO}_3$   
 (4)  $\text{MgCO}_3 > \text{CaCO}_3 > \text{SrCO}_3 > \text{BeCO}_3$

76.  $\text{H}_2\text{O}_2$  reduces  $\text{K}_4\text{Fe}(\text{CN})_6$

- (1) In neutral solution                      (2) In acidic solution  
 (3) In non-polar solvent                      (4) In alkaline solution

77. Max. number of moles of electrons taken up by one mole of  $\text{NO}_3^-$  when it is reduced to

- (1)  $\text{NH}_3$     (2)  $\text{NH}_2\text{OH}$   
 (3)  $\text{NO}$     (4)  $\text{NO}_2$

78. Which of the following is redox reaction

- (1)  $\text{H}_2\text{SO}_4$  with  $\text{NaOH}$   
 (2) In atmosphere,  $\text{O}_3$  from  $\text{O}_2$  by lightning  
 (3) Evaporation of  $\text{H}_2\text{O}$   
 (4) Nitrogen oxides form nitrogen and oxygen by lightning

79. Several blocks of magnesium are fixed to the bottom of a ship to

- (1) Keep away the sharks  
 (2) Make the ship lighter  
 (3) Prevent action of water and salt  
 (4) Prevent puncturing by under-sea rocks

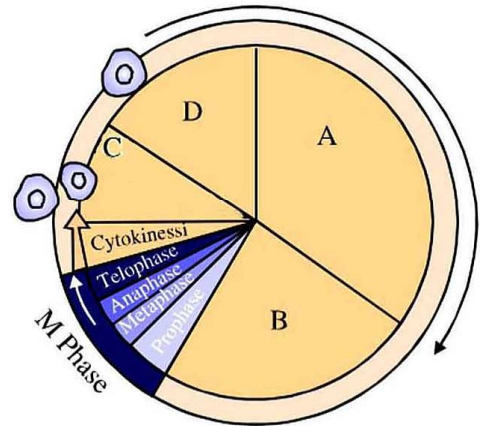
80. Which of the following behaves as both oxidising and reducing agents  
 (1)  $H_2SO_4$  (2)  $SO_2$   
 (c)  $H_2S$  (4)  $HNO_3$
81. In  $C + H_2O \rightarrow CO + H_2$ ,  $H_2O$  acts as  
 (1) Oxidising agent (2) Reducing agent  
 (3) (a) and (b) both (4) None of these
82. Strongest reducing agent is  
 (1)  $F^-$  (2)  $Cl^-$   
 (3)  $Br^-$  (4)  $I^-$
83. When  $NaCl$  is dissolved in water the sodium ion becomes  
 (1) Oxidised (2) Reduced  
 (3) Hydrolysed (4) Hydrated
84. Strongest reducing agent is  
 (1)  $K$  (2)  $Mg$   
 (3)  $Al$  (4)  $Br$
85. Which substance is serving as a reducing agent in the following reaction  
 $14H^+ + Cr_2O_7^{2-} + 3Ni \rightarrow 2Cr^{3+} + 7H_2O + 3Ni^{2+}$   
 (1)  $H_2O$  (2)  $Ni$   
 (3)  $H^+$  (4)  $Cr_2O_7^{2-}$
86. In the conversion  $Br_2 \rightarrow BrO_3^-$ , the oxidation state of bromine changes from  
 (1) -1 to -1 (2) 0 to -1  
 (3) 0 to +5 (4) 0 to -5
87. The oxidation number of chlorine in  $HOCl$   
 (1) -1 (2) 0  
 (c) +1 (4) +2
88. The oxidation states of phosphorus vary from  
 (1) -3 to +5 (2) -1 to +1  
 (3) -3 to +3 (4) -5 to +1
89. The oxidation number of  $S$  in  $H_2S_2O_8$  is  
 (1) +2 (2) +4  
 (3) +6 (4) +7
90. The oxidation state of nitrogen in  $N_3H$  is  
 (1)  $+\frac{1}{3}$  (2) +3  
 (3) -1 (4)  $-\frac{1}{3}$



## BIOLOGY

91. How much amount of blood is received by ventricles in each cardiac cycle under normal conditions :
- (1) 70 ml (2) 120 ml (3) 30 ml (4) 50 ml
92. A coma patient virtually supported by machines which replace heart and lungs. The patient is otherwise brain dead. What is **incorrect** about this patient :-
- (1) This patient is still a living entity  
 (2) This patient has lost its consciousness  
 (3) This patient still exhibit metabolism  
 (4) This patient is living but has lost its self consciousness
93. Read the following (A - D) statements :-
- (A) Plasma is a straw coloured, viscous fluid constituting 55 percent of the blood.  
 (B) 90-92 percent of plasma is water and proteins contribute 6-8 percent of it  
 (C) Globulins are needed for clotting or coagulation of Blood  
 (D) Fibrinogens are primarily involved in defence mechanism of the body.
- How many of the above statements are correct:  
 (1) Four (2) Three (3) Two (4) One
94. How many structure given below are not the part of endomembranous system, Peroxysome, Golgi body, ER, Centrosome, Lysosome, Mitochondria, Chromoplast, Vacuole,
- (1) Four (2) Five  
 (3) Three (4) Six
95. Which of the following pair is not matched correctly :-
- (1) P-wave  $\Rightarrow$  Atrial depolarization  
 (2) QRS complex  $\Rightarrow$  Ventricular depolarization  
 (3) Father of E.C.G  $\Rightarrow$  Einthoven  
 (4) S-T interval  $\Rightarrow$  One complete heart beat

96. Which of the following is correctly matched with the cell cycle



- (1) (A) - Chromosome as well as DNA of cell remain same  
 (2) (B) - Corresponds to the interval between mitosis and initiation of DNA replication  
 (3) (C) - Cell in this stage remain metabolically active but no longer proliferate  
 (4) (D) - Centriole undergo duplication and begin to move towards opposite poles of the cells
97. Read the following statement (A-D):-
- (A) Locomotion requires a perfect coordinated activity of muscular, skeletal and neural systems  
 (B) Visceral muscles are primarily involved in locomotory actions and changes of body postures  
 (C) Based on appearance, cardiac muscles are striated  
 (D) The central part of thin filament not overlapped by thick filament is called the 'H' zone
- How many of the above statements are false :-  
 (1) 3 (2) 1 (3) 2 (4) 4
98. When sucrose is loaded in the sieve tubes it's :-
- (1) Water potential decreases  
 (2) Osmotic pressure increases  
 (3) Solute potential increases  
 (4) All of these

99. Correct match list-1 with list-2

List-1		List-2	
(A)	Glycosuria	(i)	Inflammation of glomeruli of kidney
(B)	Ketonuria	(ii)	Presence of glucose in urine
(C)	Glomerulonephritis	(iii)	Excess of urea in blood
(D)	Uremia	(iv)	Presence of ketone bodies of urine

- (1) A-(i), B-(ii), C-(iii), D-(iv)  
 (2) A-(ii), B-(iv), C-(iii), D-(i)  
 (3) A-(ii), B-(iv), C-(i), D-(iii)  
 (4) A-(i), B-(ii), C-(iv), D-(iii)

100. Which of the following factors decreases renin secretion :-

- (a) Increased BP  
 (b) Increased plasma Na<sup>+</sup> concentration  
 (c) **Decreased GFR**  
 (d) Angiotensin-II

- (1) a,b,d (2) a,b,c (3) a,c,d (4) b,c

101. Progressive degeneration of skeletal muscles mostly due to genetic disorder is called :-

- (1) Myasthenia gravis  
 (2) Muscular dystrophy  
 (3) Tetany  
 (4) Gout

102. Match column-I with column-II :-

Column-I		Column-II (number of bones)	
A.	Cranial bones	(i)	24
B.	Ribs	(ii)	26
C.	Vertebral column	(iii)	8
		(iv)	12

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

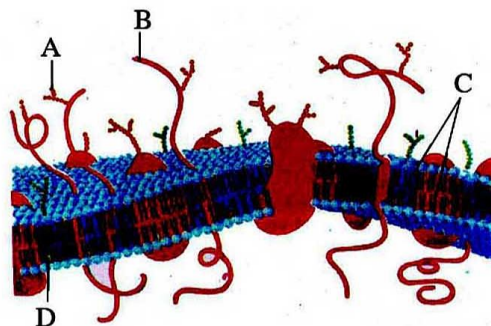
103. In which phase of meiosis, the chromosomes do undergoes some dispersion, but they do not reach the extremely extended state of the interphase nucleus ?

- (1) Prophase-I (2) Metaphase-I  
 (3) Telophase-I (4) Prophase-II

104. Which one of the following cellular parts is correctly described ?

- (1) Ribosomes - Those on chloroplasts are larger (80s) while in the cytoplasm are smaller (70s)  
 (2) Centrioles - Site for active RNA synthesis  
 (3) Thylakoids - Flatted membranous sacs forming the grana of chloroplasts  
 (4) Golgi body - Not surrounded by membrane

105. Identify the A, B, C and D select the correct statements regarding to A, B, C and D.



- (1) Percentage of "A" is maximum in the membrane  
 (2) Percentage of "B" is minimum in the membrane  
 (3) Lateral movement of "B" help in the measurement of fluidity of membrane  
 (4) The fluidity of membrane is due to "D"

106. Steroidal hormone are synthesised in :-

- (1) Rough endoplasmic reticulum  
 (2) Golgi body  
 (3) Smooth endoplasmic reticulum  
 (4) Mitochondria



113. Find incorrect statement with regard to meiosis :-
- (1) During meiosis only a single cycle of DNA replication take place.
  - (2) In Anaphase - I sister chromatids remain associated at their centromeres.
  - (3) Diakinesis represents transition to metaphase
  - (4) Four haploid cells are formed at the end of meiosis-II which are genetically identical.

114. The lysosome differs from the ER because it's:-

- (1) having unit membrane
- (2) bear ribosomes on their surface
- (3) Enzymes optimally active at acidic pH
- (4) Site for formation of glycoprotein and glycolipids

115. Given below are four statements (A-D) each with one or two blanks. Select the option which correctly fill up the blank in two statements :-

**Statements :**

- (A) Cilia are small structure which work like ....., causing the movement of either the cell or the surrounding fluid.
- (B) Normally, there is only one ..... per cell.
- (C) The ..... chromosome has centromere slightly away from the middle of the centromere whereas the ..... chromosome has terminal centromere.
- (D) Chromatin contains DNA and some basic protein called .....

- (1) (A) (i) Oars  
(B) Mitochondria
- (2) (B) Nucleus  
(C) (i) Acrocentric, (ii) Telocentric
- (3) (C) (i) Sub-meta centric, (ii) Telocentric  
(D) Histone
- (4) (D) Non - Histone  
(A) (i) Oars

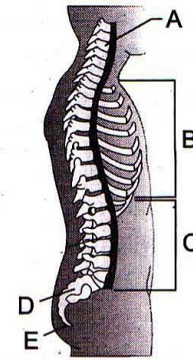
116. Every chromosomes essentially has a ..... on the sides of which disc shaped structure called ..... are present :-

- (1) Satellite, NOR
- (2) Secondary constriction, centriole
- (3) Primary constriction, centriole
- (4) Centromere, Kinetochores

117. Protoplasm term given by :-

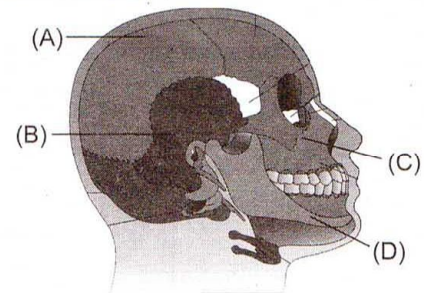
- (1) Dujardin
- (2) Purkinje
- (3) Schultze
- (4) Huxley

118. Identify the parts labelled as A to E in the given figure of a vertebral column and select the correct option.



	A	B	C	D	E
(a)	Thoracic vertebra	Cervical vertebra	Lumbar vertebra	Sacrum	Coccyx
(b)	Thoracic vertebra	Cervical vertebra	Lumbar vertebra	Coccyx	Sacrum
(c)	Lumbar vertebra	Thoracic vertebra	Cervical vertebra	Coccyx	Sacrum
(d)	Cervical vertebra	Thoracic vertebra	Lumbar vertebra	Sacrum	Coccyx

119. Examine the given diagrammatic view of human skull given below and identify the skull bones labelled from A-D.



- | A             | B        | C        | D        |
|---------------|----------|----------|----------|
| (a) Frontal   | Temporal | Maxilla  | Mandible |
| (b) Occipital | Frontal  | Mandible | Maxilla  |
| (c) Parietal  | Temporal | Maxilla  | Mandible |
| (d) Temporal  | Parietal | Mandible | Maxilla  |

- 120.

List-I	List-II
(a) Gliding joint	Between the carpals
(b) Cartilaginous joint	Between the adjacent vertebrae
(c) Pivot Joint	Between atlas and axis
(d) Hinge joint	Knee Joint
(e) Fibrous joint	Between skull bones
(f) Ball and socket Joint	Between humerus and pectorial girdle

How many joints are correctly matched :

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

121. Read the following statements :-
- Acute chest pain appears
  - The heart stops beating
  - No enough oxygen is reaching the heart muscle.
  - congestion of the lungs is one of the main symptoms of this disease.
  - It is more common among the middle aged and elderly.
  - It occurs due to conditions that affect the blood flow.

How many statements correct about Angina.

- Two
- Three
- Four
- Five

122. Read the following statements :-
- Dialysis fluid contain all the constituents as in plasma except ----(a)----
  - A chordate animal having flame cells as excretory structure is -----(b)-----
  - Reabsorption of water from distal parts of the tubule is facilitated by hormone -----(c)---

In above statements (a), (b), (c) are :-

- Glucose, Planaria, ADH
- Nitrogenous wastes, Planaria, ADH
- Nitrogenous wastes, Amphioxus, ADH
- NaCl, Rotifers, Aldosterone

123. (a) Essential elements are components of energy related compounds
- (b) Essential elements are components of structural element of cells
- (c)  $Mn^{2+}$  is an activator of alcohol dehydrogenase
- All are correct
  - Only (a) is incorrect
  - Only (b) is incorrect
  - Only (c) is incorrect

124. Three of the following pairs of the human skeletal parts are correctly matched with their respective inclusive skeletal category and one pair is not matched. Identify the non-matching pair

	Pairs of skeletal parts	Category
(1)	Malleus and stapes	Ear ossicles
(2)	Sternum and Ribs	Axial skeleton
(3)	Clavicle and Glenoid Cavity	Pelvic girdle
(4)	Humerus and ulna	Appendicular skeleton

125. The principal nitrogenous excretory compound in humans is synthesised :
- in the liver, but eliminated mostly through kidneys
  - in kidneys but eliminated mostly through liver
  - in kidneys as well as eliminated by kidneys
  - in liver and also eliminated by the same through bile

126. Which one of the following statements in regard to the excretion by the human kidneys is correct?
- Ascending limb of Loop of Henle is impermeable to electrolytes
  - Descending limb of Loop of Henle is impermeable to water
  - Distal convoluted tubule is incapable of reabsorbing  $HCO_3^-$ ;
  - Nearly 99 per cent of the glomerular filtrate is reabsorbed by the renal tubules

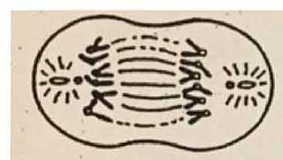
127. Given below are four statements (a-d) regarding human blood circulatory system :
- Arteries are thick-walled and have narrow lumen as compared to veins.
  - Angina is acute chest pain when the blood circulation to the brain is reduced
  - Persons with blood group AB can donate blood to any person with any blood group under ABO system.
  - Calcium ions play a very important role in blood clotting.

Which two of the above statements are correct?

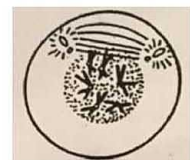
- (a) and (b)
- (b) and (c)
- (c) and (d)
- (a) and (d)

128. Compared to blood our lymph has :-
- More RBCs and less WBCs
  - No plasma
  - Plasma without proteins
  - More WBCs and no RBCs

129. Which stages of cell division do the following figures A and B represent respectively ?



A



B

- Prophase – Anaphase
- Metaphase – Telophase
- Telophase – Metaphase
- Late Anaphase – Prophase

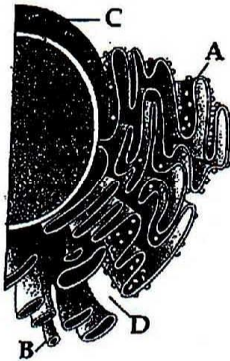


130. Select the wrong statement from the following :
- (1) The chloroplasts are generally much larger than mitochondria
  - (2) Both chloroplasts and mitochondria contain an inner and an outer membrane
  - (3) Both chloroplasts and mitochondria have an internal compartment, the thylakoid space bounded by the thylakoid membrane
  - (4) Both chloroplasts and mitochondria contain DNA

131. Keeping in view the "fluid mosaic model" for the structure of cell membrane, which one of the following statements is *correct* with respect to the movement of lipids and proteins from one lipid monolayer to the other (described as flipflop movement) ?

- (1) While proteins can flip-flop, lipids can not
- (2) Neither lipids, nor proteins can flip-flop
- (3) Both lipids and proteins can flip-flop
- (4) While lipids can rarely flip-flop, proteins can not

132. Identify the components labelled A, B, C and D in the diagram below from the list (i) to (viii) given with



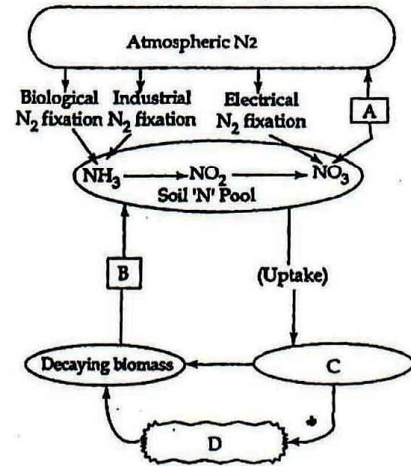
**Components :**

- (i) Cristae of mitochondria
- (ii) Inner membrane of mitochondria
- (iii) Cytoplasm
- (iv) Smooth endoplasmic reticulum
- (v) Rough endoplasmic reticulum
- (vi) Mitochondrial matrix
- (vii) Cell vacuole
- (viii) Nucleus

The correct component are :

- | A        | B    | C      | D     |
|----------|------|--------|-------|
| (1) (i)  | (iv) | (viii) | (vi)  |
| (2) (vi) | (v)  | (iv)   | (vii) |
| (3) (v)  | (i)  | (iii)  | (ii)  |
| (4) (v)  | (iv) | (viii) | (iii) |

133. Study the cycle shown below and select the option which gives correct words for all the four blanks A, B, C and D. :



	A	B	C	D
(1)	Denitrification	Ammonification	Plants	Animals
(2)	Nitrification	Denitrification	Animals	Plants
(3)	Denitrification	Nitrification	Plants	Animals
(4)	Nitrification	Ammonification	Animals	Plants

134. Anastral mitosis is characteristic of :-
- (1) Higher plants
  - (2) Higher animals
  - (3) All living organism
  - (4) Lower animals

135. Match the following :-

	Column I		Column II
a	Cristae	(i)	Flat membranous sac in stroma
b	Cisternae	(ii)	Infolding in mitochondria
c	Thylakoids	(iii)	Disc-shaped sacs in golgi apparatus
d	Stroma lamellae	(iv)	Fret channel

**Options :**

- (1) a-iii, b-ii, c-i, d-iv
- (2) a-ii, b-iii, c-iv, d-i
- (3) a-ii, b-iii, c-i, d-iv
- (4) a-iii, b-ii, c-iv, d-i

136. The enzyme recombinase is required at which stage of meiosis ?

- (1) Pachytene
- (2) Diplotene
- (3) Zygotene
- (4) Diakinesis

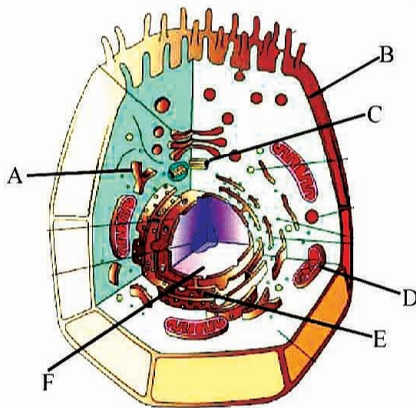
137. Chiasmata are formed in meiosis :-  
 (1) before metaphase I (2) after metaphase I  
 (3) during prophase II (4) during metaphase II

138. Cell division is primarily regulated at :-  
 (1) G1- stage (2) S- stage  
 (3) G2- stage (4) G0- stage

139. Which one of the following function is **not** associated with microtubules ?  
 (1) Help in anaphase movement of chromosomes  
 (2) Form the cytoskeleton of cilia and flagella  
 (3) Help in pseudopodia formation  
 (4) Spindle formation

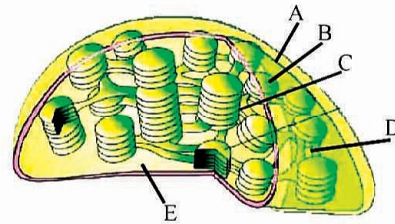
140. In the chromosome chromatids are joined at :-  
 (1) Synaptonemal complex (2) Centromere  
 (3) Telomere (4) Nucleolar organizer

141. Identify the **correct** statement about the given cell :-



- (A) Concerned with lipid and steroidal hormone synthesis  
 (B) Outer non-living rigid structure which gives shape to the cell and Protects from mechanical damage and infection  
 (C) Both lie perpendicular to each other and each has an organisation like the cart wheel  
 (D) Responsible for trapping light energy for the synthesis of sugar  
 (E) Present in cells actively involved in protein synthesis and secretion  
 (F) Spherical structures, rich in hydrolytic enzymes  
 (1) A,D,E (2) B,C,D  
 (3) A,C,E (4) A,B,C,F

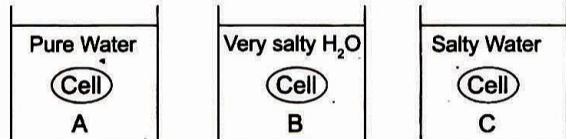
142. Consider the following five statements (A to E) about chloroplast shown below. Select the correct option stating which ones are True (T) and which ones are false (F) :-



- (A) It is impermeable and lack porins  
 (B) It is selectively permeable, having carrier proteins for transport  
 (C) Staked thylakoids one over other which is the site of production of assimilatory power  
 (D) present between two grana and contains enzymes of dark reaction  
 (E) It contains enzymes for the synthesis of sugar and proteins

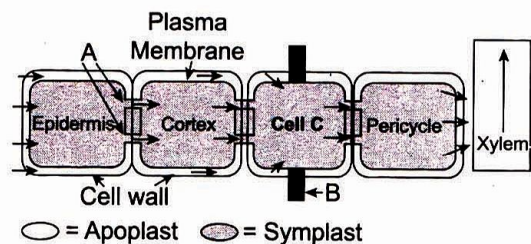
	A	B	C	D	E
(1)	F	T	T	T	T
(2)	F	T	T	F	T
(3)	T	F	T	T	T
(4)	T	F	f	T	T

143. What is correct for diagram below?



- (a) Cell "A" will lose H<sub>2</sub>O, Cell "B" will gain H<sub>2</sub>O and Cell "C" neither gains nor loses H<sub>2</sub>O  
 (b) Cell "A" neither gains nor loses H<sub>2</sub>O, Cell "B" will gain H<sub>2</sub>O and Cell "C" will lose H<sub>2</sub>O  
 (c) Cell "A" will gain, Cell "B" neither gains nor loses H<sub>2</sub>O and Cell "C" will lose H<sub>2</sub>O  
 (d) Cell "A" will gain H<sub>2</sub>O, Cell "B" will lose H<sub>2</sub>O and Cell "C" neither gains nor loses H<sub>2</sub>O

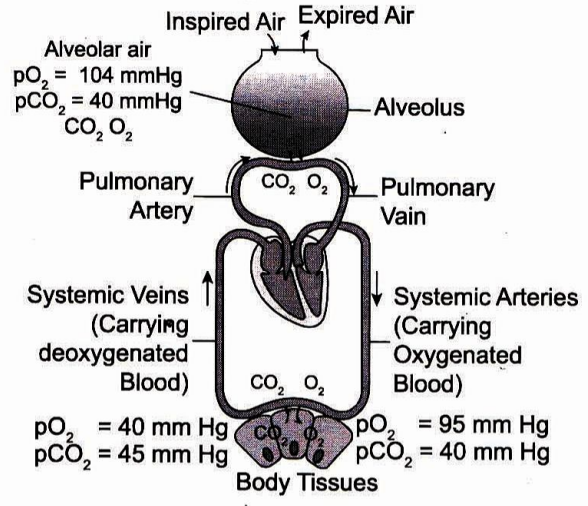
144. The following show the pathway of water movement in the root. A, B and C, are respectively



- (a) Desmosome, Casparian strip, Endodermis  
 (b) Gap junction, Casparian strip, Endodermis  
 (c) Tight junction, Casparian strip, Endodermis  
 (d) Plasmodesmata, Casparian strip, Endodermis

145. Chromosome is an example of:-  
 (1) Chromo protein  
 (2) Nucleoprotein  
 (3) Lipoprotein  
 (4) Chromolipid
146. Phloem sap is mainly made of  
 (a) water and sucose  
 (b) water and minerals  
 (c) oligosaccharides and hormones  
 (d) none of these
147. Reaction carried out by  $N_2$  metabolising microbes include  
 (i)  $2NH_3 + 3O_2 \longrightarrow 2NO_2 + 2H^+ + H_2O$   
 (ii)  $2NO_2^- + O_2 \longrightarrow 2NO_3^-$   
 Which of these is wrong : -  
 (a) Step (i) is carried out by *Nitrosomonas* or *Nitrococcus*  
 (b) Step (ii) is carried out by *Nitrobacter*  
 (c) Both steps (i) and (ii) can be called nitrification  
 (d) Bacteria carrying out these steps are usually photoautotrophs
148. A mineral deficiency is likely to affect older leaves more than younger leaves if the  
 (a) mineral is a micronutrient  
 (b) deficiency persists for a long time  
 (c) mineral is very mobile within the plant  
 (d) older leaves are in direct contact of sunlight
149. Manganese is required in  
 (a) chlorophyll synthesis  
 (b) nucleic acid synthesis  
 (c) plant cell wall formation  
 (d) photolysis of water during photosynthesis
150. Which of the following statements is incorrect?  
 (a) Blood group is designated on the basis of the presence of antibodies in the blood plasma  
 (b) A person of 'O' blood group has anti 'A' and anti 'B' antibodies in his blood plasma  
 (c) A person of 'B' blood group cannot donate blood to a person of 'A' blood group  
 (d) A person of AB blood group is a universal recipient
151. Monocytes are  
 (a) 6-8% of total WBC  
 (b) has kidney shaped nucleus  
 (c) largest WBC  
 (d) all of these

152. Identify the diagram and select the right option related to the diagram.



Types of circulation	Present in
(a) Complete double circulation	Fishes
(b) Incomplete double circulation	Aves
(c) Complete double circulation	Amphibians
(d) Complete double circulation	Crocodiles

153. Select the answer with correct match.
- | Column-I      | Column-II          | Column-III          |
|---------------|--------------------|---------------------|
| (a) SA Node   | Right atrium       | Pacemaker           |
| (b) AV Node   | Left Ventricle     | Slowest conduction  |
| (c) Vena cava | Oxygenated blood   | Pump to left atrium |
| (d) Aorta     | deoxygenated blood | Pump to lungs       |
154. In a Portal system of man  
 (a) A vein starts from an organ and ends in heart  
 (b) A vein enters into organ other than heart and breaks in capillaries  
 (c) An artery breaks in an organ and restarts by union of its capillaries  
 (d) Blood from intestine is brought into the kidneys and then in IVC
155. "Bundle of His" is a network of  
 (a) Muscle fibres distributed throughout the heart walls  
 (b) Muscle fibres found only in the ventricle wall  
 (c) Nerve fibres distributed in ventricles  
 (d) Nerve fibres found throughout the heart
156. Consider the following four statements (1-4) and select the option which includes all the correct ones  
 (1) Skeletal muscle fibre is a syncytium as the sarcoplasm contains many nuclei.  
 (2) In the centre of each "I band" is an elastic fibre called H-line which bisects it.  
 (3) In the resting state a subunit of troponin masks the active binding sites for myosin on the actin filaments.  
 (4) The contraction of a muscle fibre takes place by the sliding of the thick filaments over the thin filaments.  
 (a) (2), (3), (4)      (b) (2), (4)  
 (c) (1), (3)          (d) (1), (3), (4)



157. (A) Plenty of mitochondria  
 (B) Myoglobin content is high  
 (C) Amount of sarcoplasmic reticulum is high  
 (D) Depend on aerobic process for ATP production  
 (E) Gives a reddish appearance  
 How many points are correct about Red fibres of muscle?  
 (a) Three (b) Four  
 (c) Five (d) Six

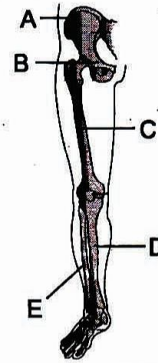
158. What would be the cardiac output of a person having 'X' heart beats per minute and a stroke volume of 'Y' ml?  
 (a)  $x-y$  ml  
 (b)  $x \times y$  ml  
 (c)  $x+y$  ml  
 (d)  $x \div y$  ml

159. Given below are the statements related to blood clotting—  
 a. Enzymes thrombin converts inactive fibrinogen into active fibrin  
 b. Thrombin makes heparin inactive  
 c. Thrombokinase converts inactive prothrombin into active thrombin  
 d. Calcium ions play a very important role in clotting.  
 Which of the above statements are true?  
 (1) a & d (2) c & d  
 (3) a, b & d (4) a, c & d

160. Myasthenia is an.....disorder affecting neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscles—  
 (1) Arthritic (2) Autoimmune  
 (3) Agnosic (4) Amnesic

161. Cardiovascular reflex is controlled by—  
 (1) Medulla oblongata (2) Hypothalamus  
 (3) Pons (4) Basal ganglia

162. The figure showing part of right pelvic girdle and lower limb bones is given here. Identify the parts labelled as A to E and select the correct option.



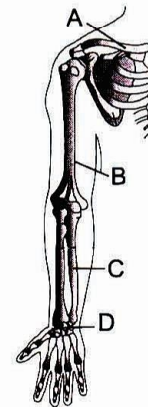
	A	B	C	D	E
(a)	Sacrum	Pubis	Patella	Metatarsal	Fibula
(b)	Ilium	Pubis	Femur	Tibia	Fibula
(c)	Ilium	Ischium	Femur	Fibula	Tibia
(d)	Ischium	Ilium	Patella	Tibia	Tarsal

163. The given figure shows an actin (thin) filament. Identify the labelled parts A, B and C and select the correct option.



- |     | A           | B           | C           |
|-----|-------------|-------------|-------------|
| (a) | Tropomyosin | Troponin    | F-actin     |
| (b) | Troponin    | Myosin      | Tropomyosin |
| (c) | Troponin    | Tropomyosin | Myosin      |
| (d) | Troponin    | Tropomyosin | F-actin     |

164. Examine the figure of pectoral girdle and forelimb and identify the parts labelled as A, B, C and D.



- |     | A        | B       | C      | D       |
|-----|----------|---------|--------|---------|
| (a) | Clavicle | Humerus | Ulna   | Carpals |
| (b) | Scapula  | Femur   | Ulna   | Tarsals |
| (c) | Clavicle | Femur   | Radius | Carpals |
| (d) | Scapula  | Humerus | Ulna   | Tarsals |

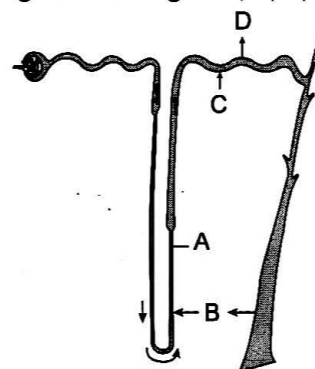
165. Which one of the following correctly explains the function of a specific part of a human nephron?
- (1) *Podocytes* : Create minute spaces (slit pores) for the filtration of blood into the Bowman's capsule
  - (2) *Henle's loop* : most reabsorption of the major substances from the glomerular filtrate
  - (3) *Distal convoluted tubule* : reabsorption of  $K^+$  ions into the surrounding blood capillaries
  - (4) *Afferent arteriole* : carries the blood away from the glomerulus towards renal vein.

166. Human heart is myogenic, because :-
- (1) Normal activities of the heart are regulated intrinsically by specialised muscles.
  - (2) Normal activities of the heart are regulated extrinsically by specialised muscles
  - (3) Normal activities of the heart are regulated intrinsically by specialised neurons
  - (4) Normal activities of the heart are regulated extrinsically by specialised neurons

167. Which of the following statements about the molecular arrangement of actin and myosin in myofibrils is **false** ?

- I. Each actin (thin filament) is made of 2F (filamentous) actins
  - II. F-actin is the polymer of G (globular) actin.
  - III. 2F-actins are twisted into a helix.
  - IV. Two strands of tropomyosin (protein) Also run closed to F Actin
  - V. Troponin molecules (complex proteins) are distributed at regular intervals on the tropomyosin
  - VI. Troponin forms the head of the myosin molecule
  - VII. The myosin is a polymerised protein
- (1) I, III, VII
  - (2) Only VII
  - (3) Only VI
  - (4) Only III

168. Reabsorption and secretion of major substances at different parts of the nephron are shown in the given figure. In this figure A, B, C, D are



- (a)  $HCO_3^-$ , nutrients, urea, NaCl
  - (b) NaCl, urea,  $K^+$ ,  $HCO_3^-$
  - (c) NaCl, urea,  $HCO_3^-$ , ammonia
  - (d)  $H_2O$ , urea, NaCl,  $HCO_3^-$
169. What is true about ribosome?
- (1) They are found only in Eukaryotic cells.
  - (2) They are self splicing introns of some RNA
  - (3) Prokaryotic ribosome are 80S where's stand for sedimentation coefficient.
  - (4) They are composed of Ribonucleic acid & protein.
170. Which type of white blood cells are concerned with the release of histamine and the natural anti-coagulant heparin?
- (a) Eosinophils
  - (b) Monocytes
  - (c) Neutrophils
  - (d) Basophils
171. Satellite is the part or the chromosomes remains after the :-
- (1) Primary constriction
  - (2) Secondary constriction I
  - (3) Secondary constriction II
  - (4) Both 2 and 3
172. Identify the stage of cell division which are given below :



Which one of the following statement is not true for this stage?

- (1) Homologous chromosome separate
- (2) Chromosome moves away from the equatorial plate
- (3) Centromere split
- (4) Centromere of each chromosome is toward the pole

173. 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

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

174. Which of the following are actively secreted into filtrate by tubular cells of nephron :-

- (1)  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{NH}_3$   
 (2)  $\text{K}^+$ ,  $\text{NH}_3$ ,  $\text{H}^+$   
 (3)  $\text{H}^+$ ,  $\text{HCO}_3^-$ ,  $\text{K}^+$   
 (4)  $\text{H}^+$ ,  $\text{NH}_3$ ,  $\text{Na}^+$

175. The process by which a cell secretes macromolecules by fusing a vesicle to the plasma membrane is called :-

- (1) endocytosis  
 (2) pinocytosis  
 (3) phagocytosis  
 (4) exocytosis

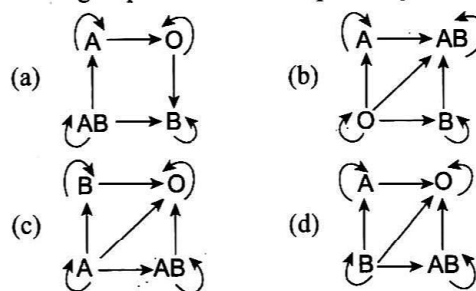
176. With which state of a living muscle are the following events associated ?

- (a)  $\text{Ca}^{++}$  released by sarcoplasmic reticulum  
 (b) Actin forms complex with myosin  
 (c) ATPase is activated  
 (d) Troponin binds  $\text{Ca}^{++}$
- (1) Relaxed state  
 (2) Muscle at the beginning of contraction  
 (3) Muscle in tetanus  
 (4) Muscle at the end of contraction

177. Which of the following statement is **not true** for a chloroplast ?

- (1) It contains DNA  
 (2) It produces ATP  
 (3) It has an electron transport chain  
 (4) It contains a transcription apparatus but no translational apparatus

178. Which of the given option is correct about the blood groups and donor compatibility?



179. Which one of the following is incorrect ?

- (1) S phase of interphase is known as synthesis phase.  
 (2) At the end of  $G_1$  the DNA amount was x then after the end of s phase the DNA amount will be  $2x$ .  
 (3) End of  $G_1$  the chromosome n is 16 then after the end of s phase will be 32.  
 (4) Plant can show mitotic division in both haploid and diploid cell.

180. Arrange the following events of meiosis in the correct sequence.

- (A) Splitting of the centromere.  
 (B) Terminalisation of the chiasmata.  
 (C) Synapsis.  
 (D) Diad of the cell.  
 (E) Dissolution of synaptonemal complex.  
 (F) Crossing over.

- (1)  $E \rightarrow C \rightarrow B \rightarrow D \rightarrow A \rightarrow F$   
 (2)  $C \rightarrow E \rightarrow F \rightarrow B \rightarrow D \rightarrow A$   
 (3)  $C \rightarrow F \rightarrow E \rightarrow B \rightarrow A \rightarrow D$   
 (4)  $C \rightarrow F \rightarrow E \rightarrow B \rightarrow D \rightarrow A$