

# TEST SERIES - 16

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## **TOPICS COVERED:**

- PHYSICS** : Centre of mass, Collision and Rotational Motion, Gravitation  
**CHEMISTRY** : Chemical bonding, Gaseous State, Thermodynamics, Chemical Equilibrium (Part-I) Hydrogen  
**Botany** : Plant Morphology, Plant Anatomy, Systematics and Transport in Plant  
**Zoology** : Cell Cycle and Cell Division, Biomolecules, Animal Tissues, Digestion and Absorption
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## **INSTRUCTIONS :**

- (1) The paper contains 180 objective type questions (45 each in Physics, Chemistry, Botany & Zoology). Four alternatives are given for each question out of which only one is correct. Darken the correct alternative on the given answer-sheet, with a pencil or pen.
- (2) All the questions carry four marks each.
- (3) For each incorrect answer 1 mark will be deducted.
- (4) For unattempted questions the award is neither positive nor negative.
- (5) No student is permitted to leave examination hall before the time is complete.
- (6) Use of calculator is not permitted.
- (7) Use of unfair means shall invite cancellation of the test.
- (8) **Answer once marked should not be changed.**

	<b>Physics</b>	<b>Chemistry</b>	<b>Botany</b>	<b>Zoology</b>
Objective				
Total				

Name of the Student : \_\_\_\_\_

Centre : \_\_\_\_\_

Invigilator's Signature: \_\_\_\_\_

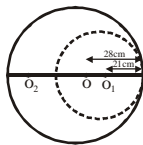
**Choose the correct answers :**

1. Three identical spheres, each of mass 1 kg are placed touching each other with their centres on a straight line. Their centre are marked  $P$ ,  $Q$  and  $R$  respectively. The distance of centre of mass of the system from  $P$  is

(1)  $\frac{PQ + PR + QR}{3}$       (2)  $\frac{PQ + PR}{3}$

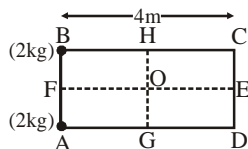
(3)  $\frac{PQ + QR}{3}$       (4)  $\frac{PR + QR}{3}$

2. A circular plate of uniform thickness has a diameter of 56 cm. A circular portion of diameter 42 cm is removed from one edge as shown in the figure. The centre of mass of the remaining portion from the centre of plate will be



- (1) 5 cm                      (2) 7 cm  
 (3) 9 cm                      (4) 11 cm

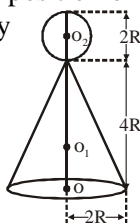
3. Masses of 2 kg each are placed at the corners  $B$  and  $A$  of a rectangular plate  $ABCD$  as shown in the figure. A mass of 8 kg has to be placed on the plate so that the centre of mass of the system should be at the centre  $O$ . Then the mass should be placed at



- (1) 1 m from  $O$  on  $OE$  (2) 2 m from  $O$  on  $OF$   
 (3) 2 m from  $O$  on  $OG$  (4) 2 m from  $O$  on  $OH$

4. A carpenter has constructed a toy as shown in the adjoining figure. If the density of the material of the sphere is 12 times that of cone, the position of the centre of mass of the toy is given by

- (1) at a distance of  $2R$  from  $O$   
 (2) at a distance of  $3R$  from  $O$   
 (3) at a distance of  $4R$  from  $O$   
 (4) at a distance of  $5R$  from  $O$



5. The motion of the centre of mass of system of two particles is not affected by the internal forces  
 (1) irrespective of their directions  
 (2) only when they act along the line joining the particles  
 (3) only when the forces are perpendicular to each other  
 (4) When the angle between the lines of action of the forces lies between  $0^\circ$  and  $90^\circ$
6. Two bodies  $A$  and  $B$  are attracted towards each other due to gravitation. Given that  $A$  is much heavier than  $B$ , which of the following correctly describes the relative motion of the centre of mass of the bodies ?  
 (1) It moves towards  $A$   
 (2) It remains at rest  
 (3) It moves towards  $B$   
 (4) It moves perpendicular to the line joining the particles
7. Two particles of masses  $m_1$  and  $m_2$  separated by a distance  $d$  are at rest initially. If they move towards each other under mutual interaction (say electric, gravitational or elastic), where will they meet ?  
 (1) At the centre of line joining the two particles  
 (2) Anywhere in between two masses  
 (3) At the centre of mass of the system of two particles  
 (4) None of the above
8. Two blocks of masses 5 kg and 2 kg are placed on a frictionless surface and connected by a spring. An external kick gives a velocity of 14 m/sec to the heavier block in the direction of lighter one. The velocity gained by the centre of mass is  
 (1)  $14 \text{ m s}^{-1}$                       (2)  $7 \text{ m s}^{-1}$   
 (3)  $12 \text{ m s}^{-1}$                       (4)  $10 \text{ m s}^{-1}$
9. A 500 kg boat is 9 m long and is floating without motion on still water. A man of mass 100 kg is at one end and if he runs to the other end of the boat and stops, the displacement of the boat is  
 (1) 1.5 m in the direction of displacement of the man  
 (2) 0.75 m in the direction of displacement of the man

(3) 1.5 m in the direction opposite to the displacement of the man

(4) 0.75 m in the direction opposite to the displacement of the man

10. A man of mass  $m$  climbs a rope of length  $L$  suspended below a balloon of mass  $M$ . The balloon is stationary with respect to ground. if the man begins to climb up the rope at a speed  $v_{rel.}$  (relative to rope) in what direction and with what speed (relative to ground) will the balloon move ?

(1)  $\vec{V} = \frac{m}{M} v_{rel.}$  (2)  $\vec{V} = -\frac{m}{M} v_{rel.}$

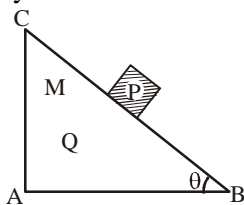
(3)  $\vec{V} = -\frac{m}{m+M} v_{rel.}$  (4)  $\vec{V} = +\frac{m}{m+M} v_{rel.}$

11. The two bodies of masses  $m_1$  and  $m_2$  ( $m_1 > m_2$ ) respectively are tied to the ends of a string which passes over a light frictionless pulley. The masses are initially at rest and released. the acceleration of the centre of mass is

(1)  $\left(\frac{m_1 - m_2}{m_1 + m_2}\right)^2 g$  (2)  $\left(\frac{m_1 - m_2}{m_1 + m_2}\right) g$

(3)  $g$  (4) zero

12. A block Q of mass  $M$  is placed on a horizontal frictionless surface AB and a body P of mass  $m$  is released on its frictionless slope. As P slides by a length  $L$  on this slope of inclination  $\theta$ , the block Q would slide by a distance



(1)  $\frac{m}{M} L \cos \theta$  (2)  $\frac{m}{M+m} L$

(3)  $\frac{M+m}{mL \cos \theta}$  (4)  $\frac{mL \cos \theta}{m+M}$

13. Three particles of masses 1 kg, 2 kg and 3 kg are subjected to forces  $(3\hat{i} - 2\hat{j} + 2\hat{k})N$ ,  $(-\hat{i} + 2\hat{j} - \hat{k})N$  and  $(\hat{i} + \hat{j} + \hat{k})N$  respectively. The magnitude of the acceleration of the CM of the system is

(1)  $\frac{\sqrt{11}}{6} ms^{-2}$  (2)  $\frac{\sqrt{22}}{6} ms^{-2}$

(3)  $\frac{\sqrt{14}}{6} ms^{-2}$  (4)  $\frac{22}{6} ms^{-2}$

14. In a carbon monoxide molecule, the carbon and the oxygen atoms are separated by a distance  $1.12 \times 10^{-10}$  m. The distance of the centre of mass from the carbon atom is

(1)  $0.48 \times 10^{-10}$  m (2)  $0.51 \times 10^{-10}$  m

(3)  $0.56 \times 10^{-10}$  m (4)  $0.64 \times 10^{-10}$  m

15. Using usual notation, radius of gyration is given by

(1)  $\sqrt{\frac{M}{I}}$  (2)  $\sqrt{\frac{I}{M}}$

(3)  $\sqrt{I \times M}$  (4)  $\frac{1}{\sqrt{MI}}$

16. The moment of inertia of a circular ring of radius  $R$  and mass  $M$  about a tangent in its plane is

(1)  $MR^2$  (2)  $\frac{1}{2}MR^2$

(3)  $\frac{3}{2}MR^2$  (4)  $2MR^2$

17. The moment of inertia of a cylinder of radius  $R$ , length  $L$  and mass  $M$  about an axis passing through its centre of mass and normal to its length is

(1)  $\frac{1}{12}ML^2$  (2)  $\frac{1}{4}MR^2$

(3)  $M \left[ \frac{L^2}{12} + \frac{R^2}{4} \right]$  (4)  $M \left[ \frac{L^2}{12} + \frac{R^2}{2} \right]$

18. Let  $I$  be the moment of inertia of a uniform square plate about an axis AB that passes through its centre and is parallel to two of its sides. CD is a line in the plane of the plate that passes through the centre of the plate and makes an angle  $\theta$  with AB. The moment of inertia of the plate about the axis CD is then equal to

(1)  $I$  (2)  $I \sin^2 \theta$

(3)  $I \cos^2 \theta$  (4)  $I \cos^2(\theta/2)$

19. A disc and ring have same mass and same radius. If we denote the moment of inertia of disc by  $I_d$  and that of the ring by  $I_r$ , then

(1)  $I_r > I_d$

(2)  $I_r < I_d$

- (3)  $I_r = I_d$   
 (4) their relation depends on the nature of material
20. The diameter of a flywheel increases by 1%. What will be percentage increase in moment of inertia about axis of symmetry ? (assume no change in mass)  
 (1) 2% (2) 4%  
 (3) 1% (4) 0.5%
21. When a mass is rotating in a plane about a fixed axis, its angular momentum is directed along  
 (1) the radius  
 (2) the tangent to the orbit  
 (3) the line at an angle of  $5^\circ$  to the plane of rotation  
 (4) the axis of rotation
22. Angular momentum  $\vec{L}$  is defined as  
 (1)  $\vec{r} \times \vec{F}$  (2)  $\vec{F} \times \vec{r}$   
 (3)  $\vec{r} \times \vec{p}$  (4)  $\vec{p} \times \vec{r}$
23. If the KE of rotation of a body about an axis is 9 J and the moment of inertia is  $2 \text{ kg-m}^2$ , then the angular velocity of the body about the axis of rotation in rad/sec is  
 (1) 2 (2) 3  
 (3) 1 (4) 9
24. The angular velocity of a car engine increases from 600 rev/min to 1500 rev/min in 6 sec, then the angular acceleration is  
 (1)  $15.5 \text{ rad/sec}^2$  (2)  $2.5 \text{ rad/sec}^2$   
 (3)  $5 \text{ rad/sec}^2$  (4) none of these
25. A particle performs uniform circular motion with an angular momentum  $L$ . If the frequency of particle's motion is doubled and its kinetic energy halved, the angular momentum becomes  
 (1)  $2L$  (2)  $4L$   
 (3)  $L/2$  (4)  $L/4$
26. Two bodies with moment of inertia  $I_1$  and  $I_2$  ( $I_1 > I_2$ ) have equal angular momentum. If the KE of rotation is  $E_1$  and  $E_2$ , then  
 (1)  $E_1 > E_2$  (2)  $E_1 < E_2$   
 (3)  $E_1 = E_2$  (4) none of these
27. A uniform sphere of mass 200 gm rolls without slipping on a plane surface so that its centre moves at a speed of 2.00 cm/sec. Its KE is  
 (1)  $5.6 \times 10^{-5} \text{ J}$  (2)  $5.6 \times 10^{-4} \text{ J}$   
 (3)  $5.6 \times 10^{-3} \text{ J}$  (4)  $5.6 \times 10^{-2} \text{ J}$
28. The flywheel of a motor has a moment of inertia of  $900 \text{ kg-m}^2$ . If the motor produces a constant torque of  $2700 \text{ N-m}$ , the the flywheel starts from rest with an angular acceleration of  
 (1)  $3 \text{ rad/sec}^2$  (2)  $9 \text{ rad/sec}^2$   
 (3)  $16 \text{ rad/sec}^2$  (4)  $20 \text{ rad/sec}^2$
29. A ring is rolling on a surface without slipping. What is the ratio of its translational to rotational kinetic energies ?  
 (1) 5 : 7 (2) 2 : 5  
 (3) 2 : 7 (4) 1 : 1
30. A light string is wound several times around a spool of mass  $M$  and radius  $R$ . The free end of the string is attached to a fixed point and the spool is held so that the part of the string not in contact with it is vertical. if the spool is let go, the acceleration is  
 (1)  $g/3$  (2)  $2g/3$   
 (3)  $g$  (4)  $3g/4$
31. The speed of a homogeneous solid sphere after rolling down an inclined plane of vertical height  $h$ , without sliding is  
 (1)  $\sqrt{gh}$  (2)  $\sqrt{(6/5)gh}$   
 (3)  $\sqrt{(4/3)gh}$  (4)  $\sqrt{(10/7)gh}$
32. If a solid sphere, disc and cylinder are allowed to roll down an inclined plane from the same height  
 (1) the cylinder will reach the bottom first  
 (2) the disc will reach the bottom first  
 (3) the sphere will reach the bottom first  
 (4) all will reach the bottom at the same time
33. A solid sphere of mass 2 kg rolls on a smooth horizontal surface at 10 m/s. it then rolls up a smooth inclined plane of inclination  $30^\circ$  with the horizontal. The height attained by the sphere before it stops, is  
 (1) 1.7 m (2) 4.5 m  
 (3) 5.4 m (4) 7.1 m
34. What should be the minimum coefficient of static friction between the plane and the cylinder, for the cylinder not to slip on an inclined plane ?  
 (1)  $\frac{1}{3} \tan \theta$  (2)  $\frac{1}{3} \sin \theta$

- (3)  $\frac{2}{3} \tan \theta$                       (4)  $\frac{2}{3} \sin \theta$
35. The gravitational force of earth on a ball of mass one kilogram is 9.8N. The attraction of ball on the earth is  
 (1) 9.8 N  
 (2) negligible  
 (3) slightly less than 9.8 N  
 (4) more than 9.8 N
36. The gravitational force of attraction between two bodies is  $F$  newtons. If the mass of each body and the distance between them are doubled, then the gravitational force between them in newton is  
 (1)  $16F$                               (2)  $F/16$   
 (3)  $F/4$                                 (4)  $F$
37. If the radius of earth were to shrink by one per cent, its mass remaining the same, the acceleration due to gravity on the earth's surface would  
 (1) decrease                          (2) remain unchanged  
 (3) increase                          (4) nothing will happen
38. If the density of the earth is doubled keeping its radius constant then acceleration due to gravity (present value  $9.8 \text{ ms}^{-2}$ ) will be  
 (1)  $2.45 \text{ ms}^{-2}$                       (2)  $4.9 \text{ ms}^{-2}$   
 (3)  $9.8 \text{ ms}^{-2}$                         (4)  $19.6 \text{ ms}^{-2}$
39. The height at which the acceleration due to gravity decreases by 36% of its value on the surface of the earth is (assume radius of the earth is  $R$ )  
 (1)  $R/4$                                 (2)  $R/2$   
 (3)  $R/6$                                 (4)  $4R$
40. The escape velocity of a body on the surface of the earth is 11.2 km/sec. If the earth's mass increases to twice its present value and radius of the earth becomes half, the escape velocity becomes  
 (1) 5.6 km/s                          (2) 11.2 km/s  
 (3) 22.4 km/s                        (4) 44.8 km/s
41. The period of revolution of planet A around the sun is 8 times that of B. The distance of A from the sun is how many times greater than that of B from the sun ?  
 (1) 2                                      (2) 3  
 (3) 4                                      (4) 5
42. If the earth were to rotate faster than its present speed, the weight of an object will  
 (1) increase at the equator but remain unchanged at the poles  
 (2) decrease at the equator but remain unchanged at the poles  
 (3) remain unchanged at the equator but decrease at the poles  
 (4) remain unchanged at the equator but increase at the poles
43. A satellite is launched into a circular orbital of radius  $R$  around the earth. A second satellite is launched into an orbit of radius  $1.01 R$ . The time period of the second satellite is larger than that of the first one by approximately  
 (1) 0.5%                                (2) 1.5%  
 (3) 1%                                    (4) 3.0%
44. When you move from equator to pole, the value of acceleration due to gravity ( $g$ )  
 (1) increases  
 (2) decreases  
 (3) remains the same  
 (4) increases then decreases
45. The period of a satellite in a circular orbit of radius  $R$  is  $T$ . What is the period of another satellite in a circular orbit of radius  $4R$ ?  
 (1)  $4T$                                   (2)  $T/8$   
 (3)  $T/4$                                  (4)  $8T$
46. The numerical value of  $a$  the van der Waal's constant is maximum for  
 (1)  $\text{NH}_3$                                 (2)  $\text{H}_2$   
 (3)  $\text{O}_2$                                  (4)  $\text{He}$
47. A bottle of dry  $\text{NH}_3$  and bottle of dry  $\text{HCl}$  connected through a long tube are opened simultaneously at both ends, the white ( $\text{NH}_4\text{Cl}$ ) ring first formed will be  
 (1) at the centre of the tube  
 (2) near the  $\text{HCl}$  bottle  
 (3) near the ammonia bottle  
 (4) throughout the length of the tube
48. At STP, the order of root mean square speed of molecules of  $\text{H}_2$ ,  $\text{N}_2$ ,  $\text{O}_2$  and  $\text{HBr}$  is  
 (1)  $\text{H}_2 > \text{N}_2 > \text{O}_2 > \text{HBr}$   
 (2)  $\text{HBr} > \text{O}_2 > \text{N}_2 > \text{H}_2$   
 (3)  $\text{HBr} > \text{H}_2 > \text{O}_2 > \text{N}_2$   
 (4)  $\text{N}_2 > \text{O}_2 > \text{H}_2 > \text{HBr}$
49. The average kinetic energy of an ideal gas per molecule in SI units at  $25^\circ\text{C}$  will be

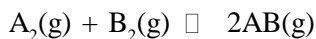
- (1)  $6.17 \times 10^{-21}$  kJ    (2)  $6.17 \times 10^{-17}$  J  
 (3)  $6.17 \times 10^{-20}$  J    (4)  $7.16 \times 10^{-20}$  J
50. Helium atom is two times heavier than a hydrogen molecule. At 15°C, the average KE of helium atom is  
 (1) twice that of hydrogen molecule  
 (2) same as that of hydrogen molecule  
 (3) four times that of hydrogen molecule  
 (4) half that of hydrogen molecule
51. If for two gases of molecular weights  $M_A$  and  $M_B$  at temperature  $T_A$  and  $T_B$ ,  $T_A M_A = T_B M_B$ , then which property has the same magnitude for both the gases?  
 (1) Density                      (2) Pressure  
 (3) KE per mol                (4) RMS speed
52. Which pair of the gaseous species diffuse through a small jet with the same rate of diffusion at same  $P$  and  $T$  ?  
 (1) NO, CO                      (2) NO, CO<sub>2</sub>  
 (3) NH<sub>3</sub>, PH<sub>3</sub>                (4) NO, C<sub>2</sub>H<sub>6</sub>
53. The kinetic energy of molecule is zero at  
 (1) 0°C                            (2) 273°C  
 (3) -273°C                      (4) 116°C
54. At low pressure, van der Waal's equation is reduced to  $\left[ P + \frac{a}{V^2} \right] V = RT$ . The compressibility factor can be given as  
 (1)  $1 - \frac{a}{RTV}$                       (2)  $1 - \frac{RTV}{a}$   
 (3)  $1 + \frac{a}{RTV}$                       (4)  $1 + \frac{RTV}{a}$
55. In van der Waal's equation of state of the gas, the constant  $b$  is a measure of  
 (1) intermolecular collisions per unit volume  
 (2) intermolecular attraction  
 (3) volume occupied by molecules  
 (4) intermolecular repulsions
56. When the temperature is increased, surface tension of water  
 (1) increases  
 (2) decreases  
 (3) remains constant  
 (4) shows irregular behaviour
57. Two ice cubes are pressed over each other and unite to form one cube. Which force is responsible for holding them together ?  
 (1) van der Waal's forces  
 (2) Covalent attraction  
 (3) Hydrogen bond formation  
 (4) Dipole-dipole attraction
58. The type of bonds present in CuSO<sub>4</sub>.5H<sub>2</sub>O are ..... only.  
 (1) Electrovalent and covalent  
 (2) Electrovalent and co-ordinate  
 (3) Electrovalent, covalent and co-ordinate  
 (4) Covalent and co-ordinate
59. Which contains a co-ordinate and covalent bond?  
 (1) BaCl<sub>2</sub>                          (2) NH<sub>4</sub>Cl  
 (3) HCl                            (4) H<sub>2</sub>O
60. Which of the following has fractional bond order ?  
 (1) O<sub>2</sub><sup>2-</sup>                            (2) O<sub>2</sub>  
 (3) F<sub>2</sub>                              (4) H<sub>2</sub><sup>-</sup>
61. The unequal sharing of bonded pair of electrons between two atoms in a molecule gives rise to  
 (1) ionic bond  
 (2) polar covalent bond  
 (3) non-polar covalent bond  
 (4) none of the above
62. Which compound is non-polar ?  
 (1) CHCl<sub>3</sub>                          (2) SiCl<sub>4</sub>  
 (3) SnCl<sub>2</sub>                          (4) NH<sub>3</sub>
63. The lattice energy order for lithium halide is  
 (1) LiF > LiCl > LiBr > LiI  
 (2) LiCl > LiF > LiBr > LiI  
 (3) LiBr > LiCl > LiF > LiI  
 (4) LiI > LiBr > LiCl > LiF
64. In water molecule, oxygen is  
 (1) *sp*-hybridised                (2) *sp*<sup>3</sup>-hybridised  
 (3) *sp*<sup>2</sup>-hybridised              (4) none of these
65. Which has the largest distance between the carbon hydrogen atom ?  
 (1) Ethane                          (2) Ethene  
 (3) Ethyne                          (4) Benzene
66. The correct order of decreasing polarity is  
 (1) HF > SO<sub>2</sub> > H<sub>2</sub>O > NH<sub>3</sub>  
 (2) HF > H<sub>2</sub>O > SO<sub>2</sub> > NH<sub>3</sub>  
 (3) HF > NH<sub>3</sub> > SO<sub>2</sub> > H<sub>2</sub>O  
 (4) H<sub>2</sub>O > NH<sub>3</sub> > SO<sub>2</sub> > HF
67. Net work done by a system is given by  
 (1) decrease in Gibbs free energy ( $\Delta G$ )  
 (2) decrease in internal energy  
 (3) decrease in heat enthalpy  
 (4) none of these

68. Change in entropy for a reaction is given by
- (1)  $2.303 nR \log_{10} \frac{V_2}{V_1}$  (2)  $nR \ln \frac{V_2}{V_1}$
- (3)  $nR \ln \frac{P_1}{P_2}$  (4) all of these
69. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant  $K_c$  is
- (1)  $\Delta G^\circ = RT \ln K_c$  (2)  $-\Delta G^\circ = RT \ln K_c$
- (3)  $\Delta G = RT \ln K_c$  (4)  $\Delta G^\circ = +2.303nRT \ln K_c$
70. Considering entropy ( $S$ ) as a thermodynamic parameter, the criterion for the spontaneity of any process is
- (1)  $\Delta S_{\text{system}} + \Delta S_{\text{surroundings}}$  be +ve
- (2)  $\Delta S_{\text{system}} - \Delta S_{\text{surroundings}}$  be +ve
- (3)  $\Delta S_{\text{system}}$  be zero
- (4)  $\Delta S_{\text{surroundings}}$  be zero
71. Hard water becomes free from \_\_\_\_\_ ions when passed through ion exchange resin containing RCOOH groups.
- (1)  $\text{Cl}^-$  (2)  $\text{SO}_4^{2-}$
- (3)  $\text{H}_3\text{O}^+$  (4)  $\text{Ca}^{2+}$
72. Hydrogen adsorbed on palladium is known as
- (1) atomic H (2) nascent H
- (3) occluded H (4) heavy H
73. Hard water is not fit for washing clothes because
- (1) it contains  $\text{Na}_2\text{SO}_4$  and KCl
- (2) it gives precipitate with soap
- (3) it contains impurities
- (4) it is acidic in nature
74. Para hydrogen is
- (1) less stable than ortho hydrogen
- (2) more stable than ortho hydrogen
- (3) as stable as ortho hydrogen
- (4) none of the above
75. 30 volume hydrogen peroxide means
- (1) 30%  $\text{H}_2\text{O}_2$  solution
- (2)  $30 \text{ cm}^3$  of the solution contains 1 g of  $\text{H}_2\text{O}_2$
- (3)  $1 \text{ cm}^3$  of the solution liberates  $30 \text{ cm}^3$  of  $\text{O}_2$  at STP
- (4)  $30 \text{ cm}^3$  of the solution contains 1 mole of  $\text{H}_2\text{O}_2$
76. The percentage of para hydrogen in ordinary hydrogen increases when
- (1) temperature is lowered
- (2) temperature is increased
- (3) pressure is increased and temperature is decreased
- (4) none of the above
77. Ionic hydrides react with water to give
- (1) acidic solutions (2) basic solutions
- (3) hydride ion (4) protons
78. Calgon is an industrial name given to
- (1) normal sodium phosphate
- (2) sodium meta-aluminate
- (3) sodium hexa meta-phosphate
- (4) hydrated sodium aluminium silicate
79. An ideal gas enclosed in a cylinder-piston arrangement undergoes an adiabatic compression. The work done on the gas is 4 J. Which of the following statements is correct ?
- (1)  $dQ = 0$ ,  $dU = 0$ ,  $dW = 4 \text{ J}$
- (2)  $dQ = 0$ ,  $dU = +4 \text{ J}$ ,  $dW = -4 \text{ J}$
- (3)  $dQ = 0$ ,  $dU = dW = 4 \text{ J}$
- (4)  $dQ = 0$ ,  $dU = -4 \text{ J}$ ,  $dW = 4 \text{ J}$
80. The equilibrium constant  $K_c$  for the reaction  $\text{P}_4(\text{g}) \rightleftharpoons 2\text{P}_2(\text{g})$  is 1.4 at  $400^\circ\text{C}$ . Suppose that 3 moles of  $\text{P}_4(\text{g})$  and 2 moles of  $\text{P}_2(\text{g})$  are mixed in 2 litre container at  $400^\circ\text{C}$ , what is the value of reaction quotient (Q) ?
- (1)  $\frac{3}{2}$  (2)  $\frac{2}{3}$
- (3) 1 (4)  $\frac{1}{3}$
81. For the reaction  $2\text{A}(\text{g}) \rightleftharpoons \text{B}(\text{g}) + 3\text{C}(\text{g})$ , at a given temperature,  $K_c = 16$ . What must be the volume of the flask, if a mixture of 2 mole each of A, B and C exist in equilibrium ?
- (1)  $\frac{1}{4}$  (2)  $\frac{1}{2}$
- (3) 1 (4)  $\frac{1}{3}$
82. At  $87^\circ\text{C}$ , the following equilibrium is established.
- $\text{H}_2(\text{g}) + \text{S}(\text{s}) \rightleftharpoons \text{H}_2\text{S}(\text{g}); K_c = 0.08$
- If 0.3 mole hydrogen and 2 mole sulphur are heated to  $87^\circ\text{C}$  in a 2 L vessel, what will be the concentration of  $\text{H}_2\text{S}$  at equilibrium ?

(1) 0.011 M                      (2) 0.022 M

(3) 0.044 M                      (4) 0.08 M

83. Consider the reaction at 460 K temperature



If 10 moles of  $A_2$ ; 15 moles of  $B_2$  and 5 moles of AB are placed in a 2 litre vessel and allowed to come to equilibrium, the final concentration of AB is 7.5 M.

$K_C$  for the reaction is :

(1) 4.5                              (2) 1.5

(3) 0.6                              (4) 5.4

84. Pure  $PCl_5$  is introduced into an evacuated chamber and comes to equilibrium at  $247^\circ C$  and 2.0 atm. The equilibrium gaseous mixture contains 40% chlorine by volume.

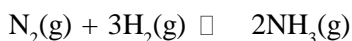
Calculate  $K_p$  at  $247^\circ C$  for the reaction



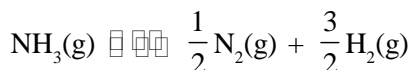
(1) 0.625 atm                      (2) 4 atm

(3) 1.6 atm                        (4) 1.24 atm

85. One mole of  $N_2(g)$  is mixed with 2 moles of  $H_2(g)$  in a 4 litre vessel. If 50% of  $N_2(g)$  is converted to  $NH_3(g)$  by the following reaction :



What will be the value of  $K_C$  for the following equilibrium ?



(1) 256                              (2) 16

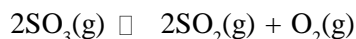
(3)  $\frac{1}{16}$                               (4)  $\frac{1}{8}$

86. A reaction viz.  $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$  is in equilibrium in one litre vessel at a given temperature was found to have 0.12 mole each of  $SO_2$  and  $SO_3$  and 5 mole of  $O_2$ . Another vessel of one litre contains 32 g of  $SO_2$  at the same temperature. What mass of  $O_2$  must be added to this vessel in order that at equilibrium 20% of  $SO_2$  is oxidized to  $SO_3$  ?

(1) 0.4125 g                      (2) 13.2 g

(3) 11.6 g                        (4) 18.6 g

87. One mole of  $SO_3$  was placed in a two litre vessel at a certain temperature. The following equilibrium was established in the vessel



the equilibrium mixture reacted with 0.2 mole  $KMnO_4$  in acidic medium. Hence,  $K_C$  is

(1) 0.50                              (2) 0.25

(3) 0.125                        (4) 0.0625

88. The equilibrium  $SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$  is attained at  $25^\circ C$  in a closed container and an inert gas Helium is introduced. Which of the following statement is correct ?

(1) Concentrations of reactant and product will not change

(2) More  $Cl_2$  is formed

(3) Conc. of  $SO_2$  decreases

(4) Reaction will be favoured in backward direction

89. Predict which one of the following conditions would be unfavourable for the formation of  $SO_3$  gas :



(g)                              (g)

(1) Low temperature

(2) High temperature

(3) High pressure

(4) High concentration of  $SO_2$

90. On adding A to  $AB(S) \rightleftharpoons A(g) + B(g)$ ; the new equilibrium concentration of A becomes double. The equilibrium concentration of B would become

(1) 1/2 of its original value

(2) 1/4 of its original value

(3) 1/8 of its original value

(4) Twice of its original value



91. Branch of taxonomy which is based on all observable characteristics and uses computation of data is called
- (1) Cytotaxonomy
  - (2) Experimental taxonomy
  - (3) Numerical taxonomy
  - (4) Cladistics
92. Fibrous roots of grasses arise from
- (1) Primary root
  - (2) Lower nodes of stem
  - (3) Internodes of stem
  - (4) All nodes of stem
93. The plant in which stem is modified into flattened green structure having limited growth and reduced scaly leaves is found in
- (1) *Asparagus*
  - (2) *Ruscus*
  - (3) *Acacia*
  - (4) All except (3)
94. Swollen leaf base is called ..... and is found in .....
- (1) Phyllode; *Parkinsonia*
  - (2) Pulvinus; *Mimosa*
  - (3) Bulb; *Vallisneria*
  - (4) Pulvinus; *Eichornia*
95. When solute is mixed, the water potential of a cell
- (1) Increases
  - (2) Decreases
  - (3) Remains same
  - (4) First increases then decreases
96. Smallest petals in groundnut are ..... in position
- (1) Posterior
  - (2) Lateral
  - (3) Anterior
  - (4) Anterolateral
97. How many stamens are/is present in a male flower of *rom* ?
- (1) One
  - (2) Two
  - (3) Many
  - (4) Zero
98. Which is not true for root pressure ?
- (1) It is positive hydrostatic pressure
  - (2) It is maximum during day and minimum during night
  - (3) It re-establishes the continuous chains of water molecules in xylem
  - (4) It doesn't account for majority of water transport
99. Match the following placentation
- | Column I         | Column II             |
|------------------|-----------------------|
| (a) Marginal     | (i) Tomato            |
| (b) Axile        | (ii) Groundnut        |
| (c) Parietal     | (iii) <i>Dianthus</i> |
| (d) Free central | (iv) <i>Argemone</i>  |
- (1) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)
  - (2) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)
  - (3) (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv)
  - (4) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)
100. Screw pine (*Pandanus*) exhibits
- (1) Buttress roots
  - (2) Climbing roots
  - (3) Stilt roots
  - (4) Prop roots
101. The floral formula
- $$\oplus \overset{\circ}{K}_{(5)} \overset{\circ}{C}_{(5)} \overset{\circ}{A}_{(5)} \overset{\circ}{G}_{(2)}$$
- stands for family
- (1) Solanaceae
  - (2) Liliaceae
  - (3) Fabaceae
  - (4) Brassicaceae
102. Scutellum is
- (1) Outer integument in monocot seed
  - (2) Large shield shaped cotyledon in grasses
  - (3) A sheath that enclose radicle
  - (4) Reduced flap like structure in monocot seed
103. Which is the single most important reason for underground modification of stem?
- (1) Storage of food
  - (2) Vegetative propagation
  - (3) Perennation
  - (4) All of these
104. Fruit that develops from inflorescence which is characterised by having flask shaped fleshy receptacle is
- (1) Sorosis – Pineapple
  - (2) Sorosis – Jackfruit
  - (3) Syconus – Fig
  - (4) Syconus – Mulberry
105. In grass seeds, ploidy and nature of aleurone layer is
- (1) Haploid and proteinaceous
  - (2) Triploid and proteinaceous
  - (3) Diploid and proteinaceous
  - (4) Haploid and enzymatic

106. In scorpioid cyme, if all the lateral branches lie in one plane the inflorescence is described as  
 (1) Cincinnus (2) Drepanium  
 (3) Bostryx (4) Rhipidium
107. Trees with excurrent habit show  
 (1) Cymose branching and umbrella shaped appearance  
 (2) Racemose branching and conical appearance  
 (3) Acropetal branching and umbrella shaped appearance  
 (4) Growth by lateral buds
108. In which one of the following a sepal and a bract act as advertising flag?  
 (1) *Bougainvillea* and rose  
 (2) *Mussaenda* and Poinsettia  
 (3) *Agave* and *Calotropis*  
 (4) Mulberry and jack fruit
109. Gynostegium is a term used for  
 (1) Fused stamens and carpels  
 (2) Fused anthers and stigmas  
 (3) Fused sepals and petals  
 (4) Fused tepals and stamens
110. Which one of incorrectly matched (w.r.t. placentation)?  
 (1) Axile – Multilocular ovary bearing ovules on central axis  
 (2) Parietal – Bi to multicarpellary ovary bearing ovules on ovary wall  
 (3) Basal – Mono to tricarpellary ovary bearing single ovule at the base  
 (4) Marginal – Monocarpellary, bilocular ovary with single ovule
111. Dry indehiscent single seeded fruit formed from bicarpellary, syncarpous inferior ovary is  
 (1) Cremocarp (2) Caryopsis  
 (3) Cypsela (4) Berry
112. In the beginning, ovary with parietal placentation is unilocular, but later it becomes bilocular, due to the development of false septum. this type of fruit is characteristic of family  
 (1) Cucurbitaceae (2) Brassicaceae  
 (3) Fabaceae (4) Asteraceae
113. A slender lateral branch arises from the base of main axis and after growing aerially for some time arch downwards to touch the water surface, such modification of stem is called  
 (1) Offset – e.g., *Pistia*  
 (2) Runner – e.g., *Oxalis*  
 (3) Stolon – e.g., *Jasminum*  
 (4) Sucker – e.g., *Chrysanthemum*
114. Tubers of potatoes arise from the tip of  
 (1) Adventitious roots (2) Tap roots  
 (3) Suckers (4) Stolons
115. Chasmocleistogamous flowers occur in  
 (1) *Ficus* (2) *Commelina*  
 (3) *Ixora* (4) *Vallisneria*
116. When the apex of reproductive shoot gets converted into a flower, this type of inflorescence is defined as  
 (1) Raceme (2) Racemose  
 (3) Cymose (4) Spike
117. Match the following – (w.r.t. phyllotaxy)
- |  | Column I  | Column II               |
|--|-----------|-------------------------|
| (a) Alternate                                      |           | (i) <i>Nerium</i>       |
| (b) Opposite                                       |           | (ii) <i>Eugenia</i>     |
|  | decussate |                         |
| (c) Whorled  |           | (iii) <i>Calotropis</i> |
| (d) Superposed                                     |           | (iv) <i>Sunflower</i>   |
| (1) (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i) |           |                         |
| (2) (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii) |           |                         |
| (3) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii) |           |                         |
| (4) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii) |           |                         |
118. When a cell is kept in 0.5 M solution of sucrose, its volume does not alter. If the same cell is placed in 0.5 M solution of sodium chloride, the volume of the cell will:  
 (1) Increase  
 (2) Decrease  
 (3) Cell will be plasmolysed  
 (4) Not show any change
119. A protostele having central xylem core of radiating ribs surrounded by phloem and the pericycle, has been termed as  
 (1) Haplostele (2) Plectostele  
 (3) Actinostele (4) Solenostele

120. If cell A with OP = 5 and TP = 4 is surrounded by the cells with OP = 3 and TP = 1 what will be the direction of water movement ?
- (1) From cell A to other cells
  - (2) From other cells to cell A
  - (3) Water will not move at all
  - (4) Water will move in both directions
121. Epidermal tissue system is derived from the meristem, namely
- (1) Mass meristem
  - (2) Protoderm
  - (3) Corpus
  - (4) Periblem
122. If the cell wall is elastic instead of being rigid and if the cell is put in a medium of sugar solution of higher concentration than that of cell, then
- (1) The cytoplasm will shrink away from the wall
  - (2) The wall will break up as the cytoplasm shrinks
  - (3) The wall as well as the cytoplasm will shrink
  - (4) The cell size and shape will not change
123. During absorption of water by roots, the water potential of cell sap is lower than that of
- (1) Pure water and soil solution
  - (2) neither pure water nor soil solution
  - (3) Pure water but higher than that of soil solution
  - (4) Soil solution but higher than that of pure water
124. Interxylary phloem is
- (1) Internal primary phloem
  - (2) Originating from procambium
  - (3) Associated with bicollateral bundles
  - (4) Secondary phloem formed within the secondary xylem
125. Intrafascicular cambium is
- (1) Ontogenetically primary meristem
  - (2) Ontogenetically and functionally primary meristem
  - (3) Ontogenetically secondary meristem
  - (4) Functionally primary and ontogenetically secondary meristem
126. Early wood and late wood are distinct in
- (1) All plants of temperate climate
  - (2) Dicot plants of temperate climate
  - (3) Dicot plants of tropical climate
  - (4) All flowering plants of tropical climate
127. Lateral meristem of extra-stelar region in dicot stems forms which one of the secondary structures ?
- (1) Duramen
  - (2) Phellogen
  - (3) Phellem
  - (4) Sapwood
128. Hard wood is
- (1) Gymnospermic wood
  - (2) Nonporous wood
  - (3) Homoxylous wood
  - (4) Porous wood
129. Tyloses are
- (1) Compound sieve plates
  - (2) Lactiferous channels
  - (3) Specialized secretory cells
  - (4) Tacheal plugs which plug the lumen of vessels and tracheids
130. How many statements are incorrect ?
- (i) Transport proteins are extrinsic factors
  - (ii) The porins form pores in the outer membranes of plastids, mitochondria and bacteria
  - (iii) Active transport is highly selective
  - (iv) If pressure greater than atmospheric pressure is applied to pure water, its water potential decreases
  - (v) Pressure potential is usually negative
- (1) 1
  - (2) 2
  - (3) 3
  - (4) 5
131. The crystals of calcium carbonate, which appear like a bunch of grapes in epidermal cells of the leaves of some plants, are called
- (1) Sphaeraphides
  - (2) Raphides
  - (3) Otoliths
  - (4) Cystoliths
132. Lateral root branches normally arise from parent root by formation of root primordia by division in
- (1) Pericycle cells lying in areas between two protoxylem points
  - (2) Pericycle cells lying opposite to protoxylem group
  - (3) Cortical cells opposite to protoxylem group
  - (4) Endodermal cells situated opposite to protoxylem group
133. During guttation, water is lost in the form of
- (1) Water vapours
  - (2) Dilute solution of sugar
  - (3) Pure water
  - (4) Dilute solution of salts and organic substances

134. Experiment used to identify the tissues through which food is transported

- (1) Girdling experiment
- (2) Flashing light experiment
- (3) Bubbler experiment
- (4) Half leaf experiment

135. The plant factor which affects the rate of transpiration is

- (1) Leaf area                      (2) Temperature
- (3) Humidity                      (4) Wind speed

136. Prosthetic groups are organic compounds and are distinguished from other cofactors in that they are tightly bound to the apoenzyme. For example, in peroxidase and catalase, which catalyze the breakdown of hydrogen peroxide to water and oxygen. The prosthetic group for these enzyme is

- (1) NAD                              (2) Haem
- (3) Biotin                            (4) None of these

137. Cholera patients are given saline drip because

- (1)  $\text{Cl}^-$  produces HCl in stomach
- (2)  $\text{Cl}^-$  is a component of plasma
- (3)  $\text{Na}^+$  retains water in the body and helps in selective transport across cell membrane
- (4) NaCl is a component of blood and helps dissolve proteins

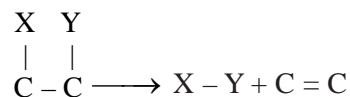
138. The functions of large intestine are:

- (A) Absorption of some water, minerals and certain drugs;
  - (B) Secretion of mucus which helps in adhering the waste (undigested) particles together and lubricating it for an easy passage.
  - (C) Digestion of cellulose by enzyme cellulose secreted by epithelium
- (1) Only A and C are correct
  - (2) Only A, B and C are correct

(3) Only B and C are correct

(4) Only A and B are correct

139. Name the category of the enzymes which catalyses the following reaction



- (1) Transferases                  (2) Ligases
- (3) Hydrolases                    (4) Lyases

140 Which of the following will not result in a blood clot?

- (1) Breakdown of platelets.
- (2) Absence of prothrombin in blood.
- (3) Absence of antithrombin activity in blood.
- (4) Presence of factor VIII in blood.

141. The incorrect statement is

- (1) Fatty acids and glycerol being insoluble, cannot be absorbed into the blood, hence absorbed in lacteals in the form of chylomicron
- (2) The muscular activity of different parts of the alimentary canal is moderated by neural mechanism
- (3) The secretion of digestive juices is carried out by the local hormones produced by the gastric and intestinal mucosa
- (4) Rennin is a proteolytic enzyme found in gastric juice of infants which helps in the digestion of milk proteins

142. Which one is a cofactor for the proteolytic enzyme carboxypeptidase ?

- (1) Zinc                              (2) Copper
- (3) Magnesium                    (4) Cobalt

143. Fastest muscles are present in which part of the body

- (1) Heart                            (2) Eye
- (3) Skin                              (4) Uterus

144. Apart from carrying genetic information, the major role played by nucleotide is

- (1) Intracellular communication
- (2) As energy carrier
- (3) As coenzymes
- (4) All of these

145. The wall of alimentary canal from oesophagus to rectum posses four layers. Which one is incorrect pairing in respect to the above statement ?
- (1) Serosa - Outermost, made up of thin mesothelium
  - (2) Muscular layer (Muscularis) - Formed by smooth muscles usually arranged into an inner longitudinal and on an outer circular layer
  - (3) Submucosal layer - Formed of loose connective tissues containing nerves, blood and lymph vessels
  - (4) Mucosa - It forms irregular folds (rugae) in the stomach and small finger - like foldings called villi in the small intestine
146. Cellulose is a
- (1) Branched chain with  $\alpha$ -1, 4 and  $\beta$ -1, 6 bonds
  - (2) Branched chain with  $\alpha$ -1, 6 and  $\beta$ -1, 4 bonds
  - (3) Unbranched chain with  $\alpha$ -1, 6 bond
  - (4) Unbranched chain with  $\alpha$ -1, 4 bond
147. Most of the embryonic skeleton is made up of
- (1) Calcified cartilage
  - (2) Hyaline cartilage
  - (3) White fibrous cartilage
  - (4) Yellow elastic cartilage
148. The weight of liver is approximately
- (1) 600 gm                      (2) 1300 gm
  - (3) 2100 gm                    (4) 300 gm
149. In presence of the enzyme carbonic anhydrase, the rate of reaction is accelerated by about
- (1) 36 million times    (2) 10 million times
  - (3) 200 million times    (4) None of these
150. Sickle-cell anemia is caused by mutation in
- (A) Haemoglobin A    (B) Haemoglobin B  
 (C) Haemoglobin F    (D) Haemoglobin S
- (1) Only A                      (2) A and D
  - (3) B and C                    (4) A and C
151. Which of the following match is incorrect with respect to the action of enzyme and the part of alimentary canal
- (1) Amylase - Buccal cavity
  - (2) Pepsin - Stomach
  - (3) Trypsin - Pancreas
  - (4) Nuclease - Small intestine

152. Match the following :

Column I		Column II	
(A) Proteins		(i) Glycosidic bonds	
(B) Lipids		(ii) Phosphodiester bonds	
(C) Carbohydrates		(iii) Covalent bonds	
(D) Nucleic acid		(iv) Ester bonds	

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

153. This tissue has a free surface, which faces either a body fluid or the outside environment and thus provides a covering or a lining for some part of the body. The cells of this tissue are compactly packed with little intercellular matrix. This tissue is

- (1) Epithial tissue    (2) Muscular tissue
- (3) connective tissue    (4) nervous tissue

154. Mark the statement which is not correct ?

- (1) Inulin is a polymer of fructose
- (2) Cellulose is a heteropolymer of glucose
- (3) Starch give blue colour with Iodine
- (4) Exoskeleton of arthropods is a polysaccharide

155. The incorrect statement is

- (1) Simple squamous epithelium is made of a single thin layer of flattened cells with irregular boundaries and found in the walls of blood vessels and air sacs of lungs
- (2) Stratified cuboidal epithelium is composed of cube-like cells, commonly found in ducts of glands and tubular parts of nephrons in kidneys
- (3) Simple columnar epithelium is composed of a single layer of tall and slender cells with their nuclei at the base and id found in the lining of stomach and intestine
- (4) Tight junctions help to stop substances from leaking across a tissue whereas Gap junctions facilitate the cells to communicate with each other by connecting the cytoplasm of adjoining cells, for rapid transfer of ions, small molecules and sometimes big molecules.

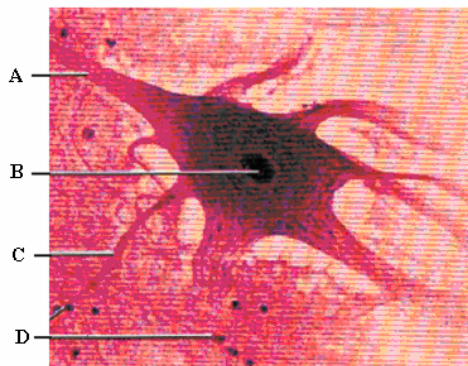
156. Which of the following is not a strict macromolecule?

- (1) Polysaccharides
- (2) Proteins
- (3) Lipids
- (4) All of these

157. The cells of connective tissues secrete fibres of structural proteins called collagen or elastin, which provide strength, elasticity and flexibility to the tissue. Which connective tissues does not secrete fibres

- (1) Areolar connective tissue
- (2) Adipose connective tissue
- (3) Skeletal connective tissue
- (4) Vascular connective tissue

158. Label the given diagram



- (1) A- Cell body; B-Axon; C-Dendrite; D- Neuroglia
- (2) A- Dendrite; B- Cell body; C- Axon; D- Neuroglia
- (3) A-Axon; B- Cell body; C-Dendrite; D- Neuroglia
- (4) A-Axon; B- neuroglia; C- dendrite; D-Cell body

159. Digestion of food involves breaking down of food components into smaller molecules by enzymes. These enzymes are active only at certain hydrogen ion concentrations. As a result, certain food combinations can facilitate or retard the process of digestion. Of the following combinations, one that can result in very efficient digestion is

- (1) Meal with high proteins and acid fruits
- (2) Meal with high starch and high proteins

- (3) Meal with high starch and acid fruits
- (4) Meal with high fat and high proteins

160. Below are given pairs of proteins, which are either structural or functional in nature. Mark the odd pair

- (1) Haemoglobin & myoglobin
- (2) Fibrinogen & collagen
- (3) Insulin and trypsin
- (4) Keratin and fibrin

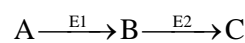
161. Read the following characteristic features

- A. Taper at both ends (fusiform) and do not show striations
- B. Cell junctions hold them together and they are bundled together in a connective tissue sheath.
- C. These are 'voluntary' as their functioning can be directly controlled i.e. we usually are able to make it contract merely by thinking about it as we can do with skeletal muscles.
- D. These are present in the wall of internal organs such as the blood vessels, stomach and intestine.

The correct statements for the Smooth muscle fibers are

- (1) All are correct
- (2) A, B and D are correct
- (3) A and C are correct
- (4) B and D are incorrect

162. Consider an enzymatic reaction



If compound D is structurally similar to A but cannot form B, then

- (1) Addition of small quantity of D will block the enzymatic reaction
- (2) D will inhibit reaction non-competitively
- (3) Addition of B will nullify the effect of D
- (4) High enzyme concentration of E1 or E2 will give maximum production

163. Some of the statements are given below. Read them carefully and then answer the correct alternate

I No absorption of food takes place in mouth and oesophagus.

II Absorption of  $H_2O$ , alcohol, simple salts, glucose and chloride takes place in the stomach to a slight extent.

III Whole protein particles can be absorbed by pinocytosis.

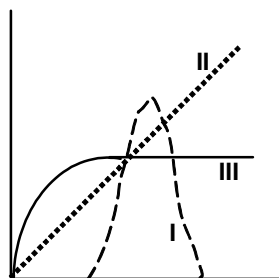
(1) I and II are correct, III rarely correct

(2) All correct

(3) I and III are correct, II incorrect

(4) I and II are correct, III incorrect

164. The graph for rate of reaction is given. The four factors known to affect the rate of enzyme-controlled reaction are pH, Temperature, Enzyme concentration and Substrate concentration. The correct sequence for I, II and III is



(1) Temperature, pH and Enzyme concentration

(2) pH, Enzyme concentration and Substrate concentration

(3) Enzyme concentration, Substrate concentration and Temperature

(4) Substrate concentration Temperature and pH

165. Shape of metacentric chromosome in anaphase is

(1) L-shaped (2) V-shaped

(3) J-shaped (4) I-shaped

166. Colchicine interferes with cell division because of

(1) Splitting of chromosomes

(2) Nonpairing of chromosomes

(3) Double replication of chromosomes

(4) Nonformation of spindle

167. Dyads move towards pole during

(1) Anphase (2) Anaphase I

(3) Anaphase II (4) Telophase

168. Replication of centrioles occurs during

(1) I-phase (2)  $G_1$ -phase

(3) S-phase (4)  $G_2$ - phase

169. Congression is

(1) Coming together of homologous chromosomes

(2) Separation of paired chromosomes

(3) Grouping of chromosomes at the equator

(4) Movement of chromosomes towards the poles

170. In bouquet stage the chromosome converge at a point near

(1) Golgi Apparatus

(2) Centrosome

(3) Middle of nucleus

(4) Roughly their middle

171. During cytokinesis in plant cell, cell plate formation is formed by the secretion of

(1) Endoplasmic reticulum

(2) Pre-existing cell wall

(3) Plasma membrane

(4) Golgi complex

172. The number of teeth appearing twice in humans are

(1) 12 (2) 20

(3) 28 (4) 32

173. Paneth cells are found in

(1) Crypts of Lieberkuhn

(2) Peyer's patches

(3) Organs of corti

(4) Islets of Langerhans

174. Which one of the following does not aid in increasing surface area in the small intestine ?

(a) Taenia coli (b) Villi

(c) Microvilli

(1) a only (2) b only

(3) a and c both (4) b and c both

175. Diastema, toothless area of jaw in certain mammals, occurs between

- (1) Incisors and premolars
- (2) Incisors and canines
- (3) Canines and premolars
- (4) Premolars and molars

176. Chiasmata formation takes place in

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

177. Dyad is pair of

- (1) Non sister chromatids
- (2) Homologous chromosomes
- (3) Sister chromatids
- (4) Sex chromosomes

178. Cyclin is associated with which one of the following

- (1) Glycolysis           (2) Cyclosis
- (3) Haemolysis       (4) Mitosis

179. During cell division nuclear membrane reappears in

- (1) Interphase       (2) S-phase
- (3) Metaphase       (4) Telophase

180. In which of the following types of inhibition,  $K_m$  remains unchanged but  $V_{max}$  is decreased ?

- (1) Competitive inhibition
- (2) Non-competitive inhibition
- (3) Feed back inhibition
- (4) Allosteric inhibition



# ANSWERS

## Physics

1.	(2)	2.	(3)	3.	(1)	4.	(3)	5.	(1)
6.	(2)	7.	(3)	8.	(4)	9.	(3)	10.	(3)
11.	(1)	12.	(4)	13.	(3)	14.	(4)	15.	(2)
16.	(3)	17.	(3)	18.	(1)	19.	(1)	20.	(1)
21.	(4)	22.	(3)	23.	(2)	24.	(1)	25.	(4)
26.	(2)	27.	(1)	28.	(1)	29.	(4)	30.	(2)
31.	(4)	32.	(3)	33.	(4)	34.	(1)	35.	(1)
36.	(4)	37.	(3)	38.	(4)	39.	(1)	40.	(3)
41.	(3)	42.	(2)	43.	(2)	44.	(1)	45.	(4)

## Chemistry

46.	(1)	47.	(2)	48.	(1)	49.	(2)	50.	(2)
51.	(4)	52.	(4)	53.	(3)	54.	(1)	55.	(3)
56.	(2)	57.	(3)	58.	(3)	59.	(2)	60.	(4)
61.	(2)	62.	(2)	63.	(1)	64.	(2)	65.	(1)
66.	(2)	67.	(1)	68.	(4)	69.	(2)	70.	(1)
71.	(4)	72.	(3)	73.	(2)	74.	(1)	75.	(3)
76.	(2)	77.	(2)	78.	(3)	79.	(2)	80.	(2)
81.	(2)	82.	(1)	83.	(1)	84.	(3)	85.	(3)
86.	(3)	87.	(3)	88.	(1)	89.	(2)	90.	(1)

## Botany

91.	(3)	92.	(2)	93.	(4)	94.	(2)	95.	(2)
96.	(3)	97.	(1)	98.	(2)	99.	(4)	100.	(3)
101.	(1)	102.	(2)	103.	(3)	104.	(3)	105.	(2)
106.	(4)	107.	(2)	108.	(2)	109.	(2)	110.	(4)
111.	(3)	112.	(2)	113.	(1)	114.	(4)	115.	(2)
116.	(3)	117.	(4)	118.	(4)	119.	(3)	120.	(1)
121.	(2)	122.	(3)	123.	(1)	124.	(4)	125.	(1)
126.	(2)	127.	(3)	128.	(4)	129.	(4)	130.	(3)
131.	(4)	132.	(2)	133.	(4)	134.	(1)	135.	(3)

## Zoology

136.	(2)	137.	(3)	138.	(4)	139.	(4)	140.	(2)
141.	(4)	142.	(1)	143.	(2)	144.	(4)	145.	(2)
146.	(4)	147.	(2)	148.	(2)	149.	(2)	150.	(4)
151.	(3)	152.	(3)	153.	(1)	154.	(2)	155.	(2)
156.	(3)	157.	(4)	158.	(3)	159.	(1)	160.	(2)
161.	(2)	162.	(1)	163.	(4)	164.	(2)	165.	(2)
166.	(4)	167.	(2)	168.	(3)	169.	(3)	170.	(2)
171.	(4)	172.	(2)	173.	(1)	174.	(1)	175.	(1)
176.	(3)	177.	(3)	178.	(4)	179.	(4)	180.	(2)

