NBTS

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MM : 720 **Time : 3.00 Hrs**

NCERT Booster Test Series

(*for* NEET-2022)

Topics covered :

Physics : Work, Energy and Power, System of particles and Rotational motion.

Chemistry : Chemical Bonding and Molecular Structure, States of Matter, Thermodynamics.

Botany : Biological Classification, Morphology of Flowering Plant.

Zoology : Breathing and exchange of gases, Body Fluids and Circulation, Excretory Products and their Elimination.

Instructions :

(i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.

(iii) Use blue/black ballpoint pen only to darken the appropriate circle.

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

PHYSICS

Choose the correct answer :

SECTION-A

1. Consider the following two statements.

A. A body can't exert force on another body from a distance.

B. No external force is required to keep the body in uniform motion.

Select the **correct** options.

(1) Statement A is correct while statement B is incorrect

(2) Statement B is correct while statement A is incorrect

(3) Both statement A and B are correct

(4) Both statement A and B are incorrect

2. According to Aristotelian idea of motion

(1) Force is not always in the direction of acceleration

(2) An external force is required to keep a body in motion

(3) A body may change its state of rest even without any external force

(4) Every action has an equal and opposite reaction

3. Two particles each of mass 100 g have position vectors $(2\hat{i}+8\hat{j}+12\hat{k})$ and $(-6\hat{i}+4\hat{j}+2\hat{k})$. The position vector of their centre of mass will be

(1) $(-2\hat{i}+6\hat{j}+7\hat{k})$

(2) $(\hat{i}+8\hat{j}+6\hat{k})$

(3) $(-4\hat{i}+12\hat{j}+14\hat{k})$

(4) $(-14\hat{i}-12\hat{j}+7\hat{k})$

4. A body of mass 10 kg is acted upon by two perpendicular forces 16 N and 12 N. Magnitude of acceleration of the body is

(1) 1 ms^{-2} (2) 2 ms^{-2}

(3) 3 ms^{-2} (4) 4 ms^{-2}

5. A bullet of mass 0.05 kg moving with a speed of 100 ms^{-1} enters a heavy wooden block and is stopped after a distance of 60 cm. Average resistance force exerted by the block on the bullet is nearly

(1) 318 N (2) 521 N

(3) 417 N (4) 627 N

6. **Statement A :** Algebraic sum of moments of masses about the centre of mass is zero.

Statement B : For small bodies, on earth's surface, centre of mass coincides with centre of gravity.

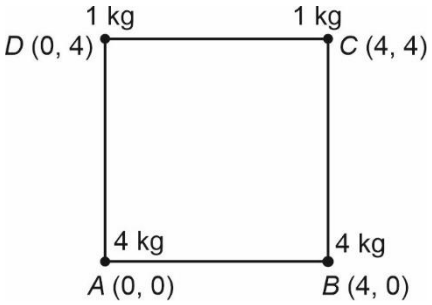
(1) Only A is correct

(2) Only B is correct

(3) Both A and B are correct

(4) Neither A nor B are correct

7. Four particles of masses 4 kg, 4 kg, 1 kg and 1 kg are arranged at the corners *A*, *B*, *C*, *D* of a square *ABCD* of side 4 m as shown in figure. The distance of centre of mass from the side *AB* is



(1) 2 m (2) 0.4 m

(3) 1 m (4) 0.8 m

8. Which of the following statement is correct regarding friction on a body?

(1) Static friction acting on the body is $f_s = \mu_s N$

(2) Static friction opposes impending motion

(3) Kinetic friction opposes motion of the body

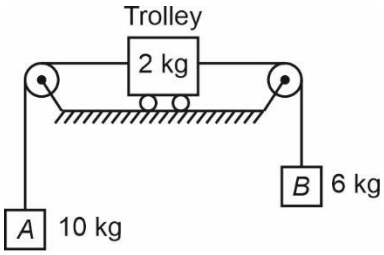
(4) Static friction depends on the area of contact between two bodies

9. Two sides of a parallelogram are given by two vectors $\vec{a}=(3\hat{i}-4\hat{j}+5\hat{k})$ and $\vec{b}=(-2\hat{i}+\hat{j}-3\hat{k})$m. The area of the parallelogram will be

(1) 5 m^2 (2) $5\sqrt{3}$ m^2

(3) 3 m^2 (4) $3\sqrt{3}$ m^2

10. If the coefficient of kinetic friction between the trolley and the surface in given situation is 0.4, acceleration of block *A* will be



(1) $\frac{6}{17}$ ms^{-2} (2) $\frac{19}{7}$ ms^{-2}

(3) $\frac{16}{9}$ ms^{-2} (4) $\frac{14}{5}$ ms^{-2}

11. Which of the following is a self adjusting force?
(1) Static friction (2) Kinetic friction
(3) Both (1) and (2) (4) None of these

12. A monkey of mass 60 kg climbs on a rope which can withstand a maximum tension of 900 N. For which of the following value of acceleration monkey will not be able to climb safely on the rope?
(1) 4 ms^{-2} (2) 5 ms^{-2}
(3) 0.8 ms^{-2} (4) 8 ms^{-2}

13. A particle of mass 0.2 kg is moving with linear velocity $(\hat{i}-\hat{j}+2\hat{k})$ m/s. If the radius vector is $\vec{r}=(4\hat{i}+\hat{j}-\hat{k})$ m, then the angular momentum of the particle will be
(1) 2.14 kgm^2/s (2) $\sqrt{4.28}$ kgm^2/s
(3) 5 kgm^2/s (4) $\sqrt{107}$ kgm^2/s

14. Normal reaction acting on a body of mass 'M' placed over a surface is
(1) Always equal to *mg*
(2) Always greater than *mg*
(3) Always less than *mg*
(4) May be less than, greater than or equal to *mg*

15. A constant torque of 1000 Nm acts on a wheel of moment of inertia 200 kgm^2 about an axis through centre. The angular velocity of the wheel at t = 2 s will be (wheel was at rest initially)
(1) 15 rad/s (2) 10 rad/s
(3) 6 rad/s (4) 12 rad/s

16. A stone of mass *m* tied to the end of a string revolves in a vertical circle of radius *R*. If speed of the particle at lowest point of its path is *v* then net force acting on the mass at this position. (T is tension in string at this position)
(1) $mg+\frac{mv^2}{R}$
(2) $T-\frac{mv^2}{R}$
(3) mg
(4) $\frac{mv^2}{R}$

17. A nucleus at rest in the laboratory frame of reference. If it disintegrates into two smaller nuclei of unequal masses then
(1) The products must move in same direction
(2) The products may move in any random direction
(3) The products must move in opposite directions
(4) The products must move perpendicular to each other

18. Angle between the force $\vec{F}=(3\hat{i}-2\hat{j}-4\hat{k})$ N and the displacement $\vec{d}=(\hat{i}+2\hat{j}-4\hat{k})$ m is
(1) $\sin^{-1}\left(\frac{15}{\sqrt{609}}\right)$ (2) $\cos^{-1}\left(\frac{15}{\sqrt{609}}\right)$
(3) $\cos^{-1}\left(\frac{-15}{\sqrt{609}}\right)$ (4) $\cos^{-1}\left(\frac{23}{\sqrt{609}}\right)$

19. A ballet dancer spin about a vertical axis at 60 rpm with his armed closed. Now he stretched his arms such that moment of inertia increased by 50%. The new speed of revolution is
(1) 80 rpm (2) 40 rpm
(3) 90 rpm (4) 30 rpm

20. The moment of inertia of a uniform circular disc about its diametric axis is *I*. Its moment of inertia about a tangent perpendicular to the plane will be
(1) 3*I* (2) 2*I*
(3) 6*I* (4) *I*

21. A body constrained to move along the z-axis of a co-ordinate system is subject to a constant force $\vec{F}$ given by $\vec{F}=(2\hat{i}+3\hat{j}-5\hat{k})$ N. Work done by this force in moving the body by a distance of 6 m along negative z-axis is
(1) 10 J (2) 20 J
(3) 30 J (4) 40 J

22. Which of the following statement is correct?
(1) If a conservative force does positive work on a body, the potential energy of the body increases.
(2) Work done by a body against friction always results in a loss of its total energy
(3) The rate of change of total momentum of a many particle system is proportional to the external force on the system
(4) Both (2) & (3)

23. According to work energy theorem, total work done by net force acting on the body is equal to

(1) Change in potential energy of the body

(2) Change in kinetic energy of the body

(3) Change in mechanical energy of the body

(4) Change in internal energy of the body

24. For a collision, which of the following statement is not true?

(1) The total linear momentum of system is conserved at each instant of the collision

(2) Kinetic energy of colliding bodies is conserved at each instant of the collision in elastic collision

(3) For elastic collision, kinetic energy before collision is equal to kinetic energy after collision

(4) Linear momentum of individual body in collision does not remain conserved.

25. A uniform rod is 4 m long and weight is 10 kg. If it is supported on a knife edge at one metre from one end, what weight should be placed at that end to keep the rod horizontal?

(1) 8 kg

(2) 10 kg

(3) 12 kg

(4) 16 kg

26. A bullet of mass 50 gram and horizontal speed 80 ms^{-1} strikes a block of wood of mass 500 gram and instantly comes to rest with respect to the block. The block is suspended from the ceilling by means of thin long wire. The height to which the block rises will be

(1) 7.84 cm (2) 12.5 cm

(3) 2.64 m (4) 3.7 m

27. A ring and a disc of same mass and radius rolls without slipping on a rough horizontal surface with same velocity. If the kinetic energy of ring is 8 J, then kinetic energy of the disc is

(1) 2 J (2) 6 J

(3) 4 J (4) 16 J

28. Which of the following statement is correct among the following?

(1) In an elastic collision of two bodies, the momentum and energy of each body is conserved

(2) Total energy of a system is always conserved, no matter what internal and external forces on the body are present

(3) Work done in the motion of a body over a closed loop is zero for every force in nature

(4) In an elastic collision final kinetic energy is equal to initial kinetic energy of the system

29. A hollow sphere starts rolling down a 30° incline of length 6 m without slipping. The speed of centre of mass at the bottom of the plane will be

(1) 6 m/s (2) 3 m/s

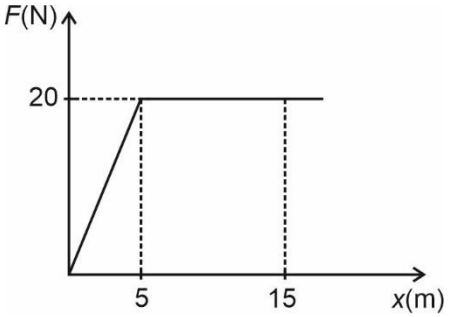
(3) $6\sqrt{2}$ m/s (4) $3\sqrt{2}$ m/s

30. A car of mass 2000 kg moving with a speed of 54 km/h on a road collides with a horizontally mounted spring. If maximum compression in the spring is 4 m, then value of spring constant of the spring is

(1) 3125 Nm^{-1} (2) 62125 Nm^{-1}

(3) 28125 Nm^{-1} (4) 67215 Nm^{-1}

31. A man pushes a trunk on a railway platform which has a rough surface. Variation of force with the distance travelled by the trunk is shown in the figure. Work done by the man on the trunk over distance of 10 m will be



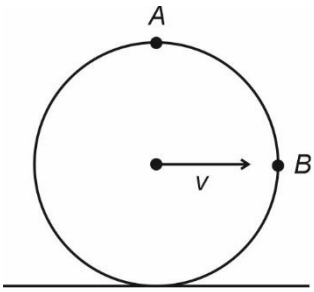
(1) 250 J

(2) 150 J

(3) 175 J

(4) 375 J

32. A uniform circular ring is rolling without slipping on rough horizontal surface as shown in figure. The ratio of the speed of point *A* to the point *B* will be



(1) 2 : 1 (2) 1 : 1

(3) $\sqrt{2}:1$ (4) 3 : 1

33. An elevator, which can carry a maximum load of 1600 kg (elevator + passengers), is moving up with a constant speed of 3 ms^{-1}. The frictional force opposing the motion is 6000 N. Minimum power delivered by the motor to the elevator is

(1) 68000 W (2) 48000 W

(3) 59 hp (4) 88.5 hp

34. A shaft rotating at 3000 rpm is transmitting a power of 3.14 kW. The magnitude of the driving torque is

(1) 6 Nm (2) 10 Nm

(3) 15 Nm (4) 22 Nm

35. A body is initially at rest. It undergoes one-dimensional motion with constant acceleration. Power delivered to the body at time *t* is proportional to

(1) t (2) t^2

(3) $t^{1/2}$ (4) $t^{3/2}$

SECTION-B

36. Three uniform discs each of mass '*M*' and radius '*r*' kept touching each other, such that their centres form a triangle. The moment of inertia of the system about the median of this triangle is

(1) $\frac{5}{4}Mr^2$ (2) $\frac{3}{2}Mr^2$

(3) $\frac{9}{4}Mr^2$ (4) $\frac{11}{4}Mr^2$

37. If a disc of diameter *R* is removed from a large disc of radius *R*, from one side, then the shift in centre of mass will be

(1) $\frac{R}{6}$ (2) $\frac{R}{3}$

(3) $\frac{R}{8}$ (4) $\frac{R}{9}$

38. A circular race track of radius 200 m is banked at an angle of 30°. If the coefficient of friction between the wheels of a race-car and the road is 0.3, then the value of optimum speed of the race-car to avoid wear and tear on its tyres will be

(1) $\sqrt{\frac{2000}{\sqrt{3}}}\ ms^{-1}$ (2) $\sqrt{\frac{2000}{\sqrt{5}}}\ ms^{-1}$

(3) $2000\sqrt{3}\ ms^{-1}$ (4) $\sqrt{\frac{\sqrt{3}}{2000}}\ ms^{-1}$

39. A cyclist comes to a skidding stop in 15 m. During this process, the force on the cycle due to the road is 120 N. Work done by the cycle on the road during this process is

(1) 1800 J (2) –1800 J

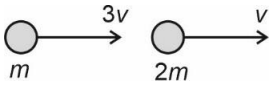
(3) 3000 J (4) Zero

40. A metre stick is balanced on a knife edge at its centre. When two coins, each of mass 9 g are put one over the other at 15 cm mark, stick is found to be balanced about 30 cm. Mass of the stick is

(1) 2 g (2) 4 g

(3) 13.5 g (4) 6 g

41. Two small balls of masses *m* and 2*m*, moving along a straight line, collides inelastically as shown in the figure. Speed of combined system formed after collision is



(1) $\frac{3v}{5}$

(2) $\frac{v}{3}$

(3) $\frac{v}{5}$

(4) $\frac{5v}{3}$

42. A road is banked at angle θ. If coefficient of friction between the road and tyre of the car moving on the road is μ, then maximum possible safe speed of car moving over the road on a circular track of radius *R* will be

(1) $\sqrt{Rg\left(\frac{\mu-\tan\theta}{1+\mu\tan\theta}\right)}$ (2) $\sqrt{Rg\left(\frac{\mu+\tan\theta}{1-\mu_s\tan\theta}\right)}$

(3) $\sqrt{Rg\left(\frac{1-\mu\tan\theta}{\mu+\tan\theta}\right)}$ (4) $\sqrt{Rg\left(\frac{1+\mu\tan\theta}{\mu-\tan\theta}\right)}$

43. For a system to be in equilibrium, the torques acting on it must balance. This is true only if the torques are taken about

(1) The centre of mass of the system

(2) The centre of gravity of the system

(3) Any point on the system

(4) Any point on the system or outside it

44. A train runs along an unbanked circular track of radius 40 m at a speed of 72 km/h. The mass of the train is 10^6 kg. The centripetal force required for this purpose is provided

(1) By the force applied by engine on train

(2) By the thrust applied by train on the rail

(3) By the lateral thrust by the rail on the flanges of the wheels

(4) By the flanges of the wheels on the rail.

45. A hollow sphere rolls down without slipping from rest on a 30° incline. It's linear acceleration is

(1) $\frac{5g}{7}$ (2) $\frac{3g}{10}$

(3) $\frac{3g}{7}$ (4) $\frac{g}{2}$

46. A molecule in a gas container hits a horizontal wall with speed 375 ms^{-1} and at angle 60° with the normal to the wall and rebounds with the same speed. In this phenomenon,

(1) Linear momentum of gas molecule is conserved

(2) Linear momentum of wall of container is conserved

(3) Linear momentum of (wall + molecule) system is conserved

(4) Both (1) and (2)

47. An electron and a proton are detected in a experiment, the first with kinetic energy 10 keV and second with kinetic energy 100 keV. Which particle is moving faster?

(1) Electron

(2) Proton

(3) Both are moving equally faster

(4) Either electron or proton, depending on the experiment

48. A thin circular ring and a disc of equal mass and radii roll down from the top of the rough inclined plane. The ratio of time taken by them to reach the bottom will be

(1) $2:\sqrt{3}$ (2) 2 : 1

(3) $\sqrt{3}:1$ (4) 2 : 3

49. The radius of gyration of a uniform rod of mass *M* and length *l* about an axis perpendicular to the length and passing through a distance $\frac{l}{3}$ from its one end will be

(1) $\frac{l}{\sqrt{3}}$

(2) $\frac{l}{3}$

(3) $\frac{l}{\sqrt{2}}$

(4) $\frac{l}{2}$

50. Which of the statement is not correct about impulse?

(1) Impulse is the product of force and time which equals change in momentum

(2) The notion of impulse is useful when a large force acts for a short time to produce a measurable change in momentum

(3) There must be an appreciable change in the position of the body during the action of the impulsive force

(4) SI unit of impulse is $kgms^{-1}$

CHEMISTRY

SECTION-A

51. Which among the following has maximum bond length?

(1) C = O (2) N = O

(3) C = C (4) C ≡ N

52. Consider the following statements.

(a) NO_2 and NO are odd-electron molecules.

(b) Expanded octet is observed in SF_6 and SCl_2 molecules.

(c) Octet theory explains the relative stability of molecules.

The incorrect statements are

(1) (a) and (b) only (2) (b) and (c) only

(3) (a) and (c) only (4) (a), (b) and (c)

53. The pair of species having same bond order is

(1) N_2 and NO^+ (2) F_2 and O_2^-

(3) H_2 and He_2^+ (4) B_2 and C_2

54. Correct order of dipole moments of the given molecules is

(1) $H_2O > NH_3 > H_2S$ (2) $NH_3 > H_2S > H_2O$

(3) $H_2O > H_2S > NH_3$ (4) $NH_3 > H_2O > H_2S$

55. Isostructural pair among the following is

(1) ClF_3 and PCl_3

(2) SF_4 and $\overset{\oplus}{N}H_4$

(3) SO_3 and BCl_3

(4) PCl_3F_2 and BrF_5

56. Incorrect statement among the following is

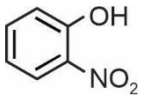
(1) In SF_6, the central atom is sp^3d^2 hybridised

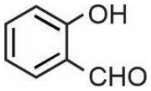
(2) SF_6 molecule is octahedral in shape

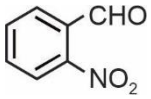
(3) In PCl_5 molecule, the five sp^3d orbitals of phosphorus overlap with the singly occupied *p* orbitals of chlorine atoms to form five P – Cl sigma bonds

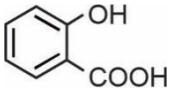
(4) In PCl_5, equatorial bonds are longer than axial bonds

57. Intramolecular hydrogen bond is absent in which of the given molecules?

(1) 

(2) 

(3) 

(4) 

58. Diamagnetic species among the following is

(1) N_2^- (2) O_2^{2-}

(3) B_2 (4) O_2^+

59. Highest occupied molecular orbital of B_2^+ ion is

(1) σ (2) σ*

(3) π (4) π*

60. The species which is see-saw in shape is

(1) XeO_2F_2 (2) $SiCl_4$

(3) XeF_4 (4) SO_4^{2-}

61. Bond order of N_2^+ ion is

(1) 1.5 (2) 2.5

(3) 3 (4) 2

62. Maximum number of atoms present in a plane in SbF_5 is

(1) 5 (2) 4

(3) 3 (4) 2

63. Correct order of critical temperature of the given gases is

(1) $N_2 > He > H_2 > NH_3$ (2) $NH_3 > N_2 > He > H_2$

(3) $NH_3 > N_2 > H_2 > He$ (4) $NH_3 > He > N_2 > H_2$

64. A gas present in a closed cylinder exerts a pressure of 0.41 atm at 127°C. If density of gas is 0.8 g/L, then the molar mass of the gas will be

(1) 16 g/mol

(2) 32 g/mol

(3) 44 g/mol

(4) 64 g/mol

65. For a given gas at fixed temperature which of the following relation is correct?

(1) $U_{mp} > U_{av} > U_{rms}$ (2) $U_{rms} > U_{av} > U_{mp}$

(3) $U_{av} > U_{rms} > U_{mp}$ (4) $U_{rms} > U_{mp} > U_{av}$

66. Unit of surface tension is

(1) Nm^{-2} (2) Nm^{-1}

(3) Nm^{-3} (4) Nm^{2}

67. Consider the following statements.

(a) Greater is the viscosity, more slowly the liquid flows.

(b) Viscosity coefficient is the force when velocity gradient is unity and the area of contact is unit area.

(c) S.I unit of viscosity coefficient is Nm^{-2}.

The correct statements are

(1) (b) and (c) only (2) (a) and (b) only

(3) (a), (b) and (c) (4) (a) and (c) only

68. A 12 L closed cylinder contains 4 g of H_2 gas and 16 g of He gas at 27°C. The pressure exerted by the mixture of gases is

(1) 4.5 atm (2) 8.2 atm

(3) 12.3 atm (4) 18.4 atm

69. Incorrect statement about kinetic molecular theory of gases is

(1) There is no force of attraction between the particle of a gas at ordinary temperature and pressure

(2) Particles of a gas move in all possible direction in straight lines

(3) At any particular time, different particles in the gas have same speed and hence same kinetic energies

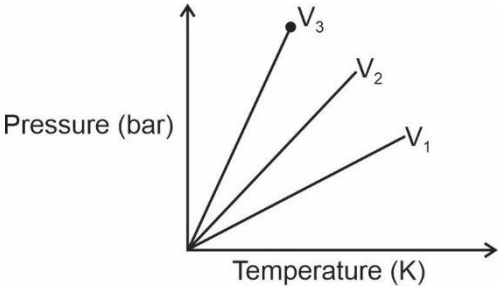
(4) Collisions of gas molecules are perfectly elastic

70. The least compressible gas among the following is

(1) N_2 (2) CO_2

(3) CH_4 (4) O_2

71. For the given pressure-temperature graph for fixed mass of a gas, the correct relation between V_1, V_2 and V_3 is



(1) $V_1 > V_2 > V_3$ (2) $V_2 > V_3 > V_1$

(3) $V_3 > V_2 > V_3$ (4) $V_3 > V_1 > V_2$

72. Dipole-dipole interaction energy between rotating polar molecules is proportional to (r is the distance between polar molecules)

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

(3) $\frac{1}{r^3}$ (4) $\frac{1}{r^6}$

73. Under isothermal condition, a gas at 50°C expands from 2.5 L to 3.5 L against a constant external pressure of 4 atm. The work done by the gas is

(1) – 603.4 J (2) – 312.6 J

(3) – 820 J (4) – 405.2 J

74. Extensive property among the following is

(1) Pressure (2) Volume

(3) Temperature (4) Density

75. Standard molar enthalpy of formation of which of the given substances is zero at 298 K?

(1) $C_6H_6(l)$ (2) $H_2O(l)$

(3) $Br_2(l)$ (4) C(diamond)

76. Which of the following is not a state function?

(1) H (2) U

(3) W (4) H – TS

77. For the given reaction, which of the following relation is correct?

$N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$

(1) $\Delta H > 0$ and $\Delta S > 0$

(2) $\Delta H < 0$ and $\Delta S > 0$

(3) $\Delta H < 0$ and $\Delta S < 0$

(4) $\Delta H > 0$ and $\Delta S < 0$

78. Standard entropies of A_2, B_2 and A_2B_3 are 50, 20 and 60 JK^{-1} mol^{-1} respectively.

For the reaction

$A_2 + \frac{3}{2}B_2 \longrightarrow A_2B_3$, $\Delta H° = -7.5$ KJ, to be at equilibrium, the temperature should be

(1) 375 K (2) 350 K

(3) 450 K (4) 475 K

79. For a reaction to be spontaneous at all temperature, which of the given relation is correct?

(1) $\Delta_rH° > 0$ and $\Delta_rS° > 0$

(2) $\Delta_rH° < 0$ and $\Delta_rS° > 0$

(3) $\Delta_rH° > 0$ and $\Delta_rS° < 0$

(4) $\Delta_rH° < 0$ and $\Delta_rS° < 0$

80. $\Delta_rG°$ for the following reaction at 25°C in J mol^{-1} will be

$A(g) + 2B(g) \rightleftharpoons AB_2(g)$

(K_p for the reaction at 25°C = 100)

(1) $-4.606 \times 298 \times 8.314$

(2) $-2.303 \times 298 \times 0.082$

(3) $2.303 \times 298 \times 8.314$

(4) $-298 \times 2 \times 8.314$

81. If one mole of an ideal gas undergoes expansion in volume from 10 L to 100 L at 27°C, isothermally and reversibly, then the work done by the gas is

(1) – 8.4 kJ (2) – 5.7 kJ

(3) – 12.3 kJ (4) – 2.3 kJ

82. For the reaction, $2X(g) + 3Y(g) \longrightarrow X_2Y_3(g)$, if $\Delta U = -4.5$ kcal and $\Delta S = -10$ $calK^{-1}$ at 300 K, then ΔG of the reaction will be

(1) – 5.2 kcal (2) – 1.2 kcal

(3) – 3.9 kcal (4) – 4.5 kcal

83. The bond order of P – O bond PO_4^{3-} is

(1) 1.5 (2) 2

(3) 1.25 (4) 1.75

84. The number of π bonds and σ bonds in the given molecule respectively are

$CH_2 = C = CH - CN$

(1) 3 and 7 (2) 4 and 7

(3) 2 and 7 (4) 2 and 6

85. Which among the following has highest number of lone pairs on central atom?

(1) XeO_3 (2) $[ICl_2]^-$

(3) SO_3^{2-} (4) XeF_3^+

SECTION-B

86. Correct order of covalent character of the given compounds is

(1) $MgBr_2 > AlBr_3 > NaBr$

(2) $NaBr > MgBr_2 > AlBr_3$

(3) $AlBr_3 > MgBr_2 > NaBr$

(4) $AlBr_3 > NaBr > MgBr_2$

87. The number of bonding electrons in O_2^- and number of antibonding electrons in N_2^+ respectively are

(1) 8 and 4 (2) 10 and 5

(3) 9 and 5 (4) 10 and 4

88. Which among the following has highest lattice enthalpy?

(1) LiCl (2) NaCl

(3) LiI (4) NaI

89. In which of the given species Cl – O bond length is shortest?

(1) ClO_4^- (2) ClO^-

(3) ClO_2^- (4) ClO_3^-

90. In which of the following transformation, the bond order has increased and magnetic behavior is unchanged?

(1) $O_2^- \longrightarrow O_2^{2-}$ (2) $NO \longrightarrow NO^+$

(3) $N_2 \longrightarrow N_2^+$ (4) $O_2 \longrightarrow O_2^+$

91. At low pressure the compressibility factor of one mole of van der Waals gas will be

(1) $1+\frac{a}{VRT}$ (2) $1+\frac{Pb}{RT}$

(3) $1-\frac{Pb}{RT}$ (4) $1-\frac{a}{VRT}$

92. A closed cylinder containing 8 g helium gas and 64 g methane gas exerts a pressure of 15 atm at 273 K. The partial pressure of helium gas in the cylinder is

(1) 2.5 atm (2) 5 atm

(3) 7.5 atm (4) 10 atm

93. If temperature is increased, then which of the following is an incorrect statement about Maxwell- Boltzmann distribution of speed curve?

(1) The entire curve shifts towards right

(2) The most probable speed increases

(3) The fraction of molecules having most probable speed increases

(4) Fraction of molecules having lower speed decreases

94. Which among the following has highest surface tension at 25°C?

(1) Benzene (2) Water

(3) Acetone (4) Ethanol

95. An open flask containing air is heated from 300 K to 700 K. The fraction of air escaped to the atmosphere is

(1) $\frac{1}{7}$ (2) $\frac{2}{7}$

(3) $\frac{4}{7}$ (4) $\frac{3}{7}$

96. If heat of combustion of carbon to CO_2 is –94 kcal/mol then heat released on the formation of 66 g of CO_2 from carbon is

(1) 592.2 kJ (2) 675.5 kJ

(3) 375.8 kJ (4) 462.5 kJ

97. Which among the following is an exothermic process?

(1) Melting of ice

(2) Sublimation of camphor

(3) Condensation of steam

(4) Vapourisation of water

98. If bond dissociation enthalpy of HCl(g), H_2(g) and Cl_2(g) are 431, 436 and 243 kJ mol^{-1} respectively then enthalpy of formation of HCl will be

(1) – 248 $kJmol^{-1}$ (2) – 91.5 $kJmol^{-1}$

(3) – 463.5 $kJmol^{-1}$ (4) – 65.7 $kJmol^{-1}$

99. For reversible isothermal expansion of an ideal gas which of the following relation is incorrect?

(1) $\Delta H = 0$ (2) $\Delta U = 0$

(3) $q < 0$ (4) $\Delta S > 0$

100. **Statement I:** A spontaneous process is an irreversible process.

Statement II: For spontaneous process, $\Delta S_{total} > 0$.

In the light of the above statements, choose the correct answer from the options given below.

(1) Statement I is incorrect but statements II is correct

(2) Both statement I and statement II are correct

(3) Statement I is correct but statement II is incorrect

(4) Both statement I and statement II are incorrect

BOTANY

SECTION-A

101. Dinoflagellates

(1) Are mostly found in fresh water

(2) Contribute in formation of diatomaceous earth

(3) Have two longitudinally placed flagella

(4) Have cell wall made up of stiff cellulose plates on the outer surface

102. Read the following statements and select the **correct** option.

Statement A: Euglenoids have pigments identical to those in higher plants

Statement B: Euglenoids behave as heterotrophs when deprived of sunlight.

(1) Only statement A is incorrect

(2) Only statement B is incorrect

(3) Both statements are correct

(4) Both statements are incorrect

103. Sexual reproduction in fungi involves formation of
(1) Conidia (2) Zoospores
(3) Sporangiospores (4) Oospores

104. Dikaryophase occurs in
(1) Ascomycetes (2) Phycomycetes
(3) Basidiomycetes (4) Both (1) and (3)

105. Which fungi is used extensively in biochemical and genetic work?
(1) *Agaricus* (2) *Neurospora*
(3) Morels (4) *Trichoderma*

106. Viruses that infect bacteria usually have
(1) Single stranded RNA
(2) Double stranded RNA
(3) Double stranded DNA
(4) Single stranded DNA

107. Infectious agent that causes potato spindle tuber disease
(1) Is found to be a free DNA
(2) Lacks the protein coat
(3) Was discovered by D.J. Ivanovsky
(4) Is bigger than viruses

108. Viruses could be crystallised, it was first shown by
(1) Pasteur (2) T.O. Diener
(3) M.W. Beijerinck (4) W.M. Stanley

109. In roots, the region of meristematic activity
(1) Has cells which do not divide at all
(2) Has larger cells with thick wall and dense cytoplasm
(3) Is present few millimetres above the root cap
(4) Is responsible for the growth of the root in length

110. Root hairs arise from the epidermal cells of
(1) Region of maturation
(2) Region of elongation
(3) Root cap
(4) Region of meristem

111. The edible plant of Liliaceae family is
(1) Tulip (2) *Asparagus*
(3) Chilli (4) Soyabean

112. In mustard
(1) Placentation is free central type
(2) Placenta is axial in position
(3) Ovary has basal placentation
(4) Ovary becomes two-chambered due to formation of false septum

113. Pneumatophores
(1) Are modification of stem
(2) Help to get oxygen for respiration
(3) Are found in *Rhizopus*
(4) Are modification of root for support

114. Stems of *Euphorbia* are
(1) Flattened and carry out photosynthesis
(2) Cylindrical and non-photosynthetic
(3) Flattened and bear thorns
(4) Cylindrical and photosynthetic

115. In which of the following plants, the underground stem spreads to new niches and form new plants when older parts die?
(1) *Eichhornia* (2) *Pistia*
(3) Strawberry (4) Pea

116. Opposite phyllotaxy is found in
(1) *Alstonia* (2) China rose
(3) Mustard (4) *Calotropis*

117. In racemose type of inflorescences
(1) Main axis continues to grow
(2) Flowers are borne in a basipetal order
(3) Main axis terminates in a flower
(4) Growth of main axis is limited

118. Epigynous flowers are found in
(1) Rose
(2) Brinjal
(3) Ray florets of sunflower
(4) Peach

119. Flowers cannot be divided into two similar halves by any vertical plane passing through the centre in
(1) Canna (2) *Cassia*
(3) *Datura* (4) Chilli

120. Select the **correct** match w.r.t. five kingdom system of classification.

(1)	Fungi	Nuclear membrane absent in some
(2)	Protista	Cell wall present in some
(3)	Animalia	Loose tissue body organisation
(4)	Monera	Cellulosic cell wall

121. Main criteria for classification used by R.H. Whittaker includes

(a) Thallus organisation

(b) Mode of nutrition

(c) Phylogenetic relationship

(d) Simple morphological characters

(1) (a), (b) and (d) only

(2) (a) and (b) only

(3) (a), (b) and (c) only

(4) All (a), (b), (c) and (d)

122. On the basis of five kingdom, system of classification *Chlorella* and *Amoeba* belong to kingdom

(1) Monera

(2) Plantae and Animalia respectively

(3) Protista

(4) Plantae and Protista respectively

123. Which of the following statement is **incorrect** regarding Chrysophytes?

(1) They include both diatoms and desmids

(2) They are microscopic and float passively in water current

(3) They belong to kingdom Protista

(4) Most of them are heterotrophs

124. Slime moulds

(1) Are saprophytic protists

(2) Form plasmodium during unfavourable condition

(3) Lack true wall in their spores

(4) Are responsible for causing red tides

125. Read the following statements and select the **correct** option.

Statement A: All protozoans are heterotrophs.

Statement B: Protozoans are believed to be primitive relatives of animals.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both statements are incorrect

(4) Both statements are correct

126. Match the following columns and select the **correct** option.

	Column I		**Column II**
a.	Amoeboid protozoa	(i)	*Plasmodium*
b.	Ciliated protozoa	(ii)	*Trypanosoma*
c.	Sporozoa	(iii)	*Entamoeba*
d.	Flagellated protozoa	(iv)	*Paramoecium*

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

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

127. Which of the following statement is **not** related to sac-fungi?

(1) They can be both multicellular and unicellular

(2) They are saprophytic, decomposers, parasitic or coprophilous

(3) Mycelium is aseptate and coenocytic

(4) Sexual spores are produced endogenously

128. Wheat rust-causing fungi belongs to the class

(1) Phycomycetes (2) Basidiomycetes

(3) Deuteromycetes (4) Ascomycetes

129. Lichens

(1) Are very good pollution indicators

(2) Grow well in air polluted area

(3) Are mutually useful association between roots of plants and fungi

(4) Have mycobiont partner which is autotrophic

130. Capsomeres

(1) Are subunits of nucleic acid

(2) Surrounds the protein coat

(3) Are never arranged in helical form

(4) Protects the nucleic acid

131. Two kingdom system of classification distinguishes between
(1) Eukaroytes and prokaryotes
(2) Unicellular and multicellular organisms
(3) Plants and animals
(4) Photosynthetic and non-photosynthetic organisms

132. Which among the following is **not** related to modification of leaves?
(1) Leaves are converted into tendrils for climbing in grapevines
(2) Petioles become green and photosynthetic in Australian *Acacia*
(3) Fleshy leaves in garlic store food
(4) Spines of cacti are modified leaves

133. Valvate aestivation is seen in petals of
(1) China rose (2) Lady's finger
(3) *Calotropis* (4) Gulmohur

134. Select the **correct** match.
(1) Axile placentation – *Primrose*
(2) Epiphyllous stamen – Lily
(3) Free central placentation – Lemon
(4) Hypogynous flower – Plum

135. Papilionaceous corolla is found in members of family
(1) Solanaceae (2) Liliaceae
(3) Brassicaceae (4) Fabaceae

SECTION-B

136. Select the **odd** one for corolla.
(1) They are of various shapes tubular, funnel or wheel-shaped
(2) They are brightly coloured in insect pollinated flowers
(3) They may be united with each other called gamotepalous
(4) Their number varies among plant species

137. Margins of petals overlap one another but not in a particular direction as in
(1) Pea (2) Cotton
(3) Tomato (4) *Cassia*

138. Stamens are united into two bundles in
(1) China rose (2) Pea
(3) Citrus (4) *Solanum*

139. Syncarpous gynoecium is found in
a. Rose and China rose
b. Mustard and Tomato
c. Potato and Tulip
d. Lotus and Brinjal
Choose the **correct** one(s).
(1) b and c (2) a, c and d
(3) a and b (4) b only

140. Mango
(1) Is parthenocarpic fruit
(2) Has fibrous mesocarp
(3) Develops from monocarpellary ovary
(4) Has stony epicarp

141. Choose the **odd** one w.r.t. castor seed.
(1) Endosperm (2) Radicle
(3) Cotyledon (4) Coleoptile

142. Lupin is used as ornamental plant. Which of following feature will **not** be seen in lupin?
(1) Presence of both male and female sex organs
(2) Superior ovary
(3) Racemose inflorescence
(4) Epipetalous stamens

143. By looking into a floral formula of a plant one can not conclude that flower
(1) Is actinomorphic or zygomorphic
(2) Has how many ovules or locules
(3) Has how many number of floral whorls
(4) Is bisexual or unisexual

144. Select the kingdom in which all members are heterotrophic.
(1) Plantae (2) Monera
(3) Fungi (4) Protista

145. The most abundant microorganisms, bacteria
(1) Are very simple in behaviour
(2) As a group show most extensive metabolic diversity than many other organisms
(3) Are majorly photosynthetic autotrophic
(4) Are grouped under seven categories based on their shape

146. Member of kingdom Monera responsible for the production of biogas from the dung of ruminant animals are known as

(1) Thermoacidophiles (2) Halophiles

(3) Eubacteria (4) Methanogens

147. Select the **incorrect** statement w.r.t. eubacteria.

(1) They often form blooms in non-polluted water bodies

(2) They are characterised by the presence of a rigid cell wall

(3) Have chlorophyll a similar to green plants

(4) Colonies are generally surrounded by gelatinous sheath

148. Mycoplasma

(1) Completely lack a cell membrane

(2) Cannot survive without oxygen

(3) Possess cell wall

(4) Are smallest living cell known

149. _____ are the chief 'produces' in the oceans

(1) Cyanobacteria (2) Dinoflagellates

(3) Diatoms (4) Euglenoids

150. Mark True (T) or False (F) for the statements given below.

I. Only the sexual phases of imperfect fungi are known.

II. The mycelium is septate and branched in Deuteromycetes.

III. Members of Deuteromycetes help in mineral cycling.

	I	II	III
(1)	T	T	F
(2)	F	T	T
(3)	F	F	T
(4)	T	F	F

ZOOLOGY

SECTION-A

151. How much oxygen is delivered to the tissues by 100 mL of oxygenated blood under normal physiological conditions?

(1) 0.5 mL (2) 5 mL

(3) 15 mL (4) 10 mL

152. Read the given statements w.r.t. blood plasma.

(A) 50-55 percent of plasma is water.

(B) Albumin helps in defense mechanism of the body.

(C) Plasma without clotting factors is called serum.

(D) Clotting factors are present in an inactive form in plasma.

How many of the given statements are correct?

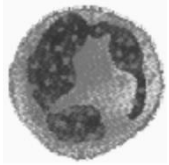
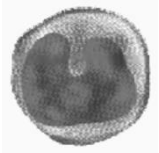
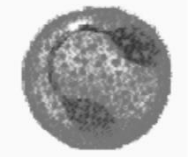
(1) One

(2) Two

(3) Three

(4) Four

153. Match the formed elements in column I with their percentage of total WBC count listed in column II.

	Column I		Column II
a.		(i)	6-8%
b.		(ii)	20-25%
c.		(iii)	60-65%
d.		(iv)	2-3%

Select the correct option.

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

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

154. The thread-like bands of fibrous tissue which attaches edges of tricuspid and mitral valves of the heart to ventricular wall with the special muscles are called

(1) Bundle of His (2) *Chordae tendinae*

(3) AV bundle (4) Purkinje fibres

155. Select the correct option to complete the analogy.

Between right atrium and right ventricle : Tricuspid valve : : Between left ventricle and aorta : _____

(1) Mitral valve (2) Bicuspid valve

(3) Semilunar valve (4) Pulmonary valve

156. Which of the following is not true for the effect of sympathetic nervous system on heart?

(1) Increased rate of heartbeat

(2) Decreased speed of conduction of action potential

(3) Increased strength of ventricular contraction

(4) Increased cardiac output

157. Read the statements A and B and select the correct option.

Statement A: In ECG, P-wave represents the electrical excitation of the atria.

Statement B: The end of T-wave marks the end of ventricular systole.

(1) Both the statements A and B are correct

(2) Both the statements A and B are incorrect

(3) Only statement A is correct

(4) Only statement B is correct

158. Select the **incorrect** match w.r.t. disorders of circulatory system.

(1)	Heart failure	Heart is not pumping blood effectively
(2)	Cardiac arrest	Heart stops beating
(3)	Heart attack	Heart muscle is suddenly damaged by an inadequate blood supply
(4)	Atherosclerosis	Acute chest pain when inadequate oxygen is reaching the heart muscle

159. Read the statements given below and select the **incorrect** one.

(1) Ammonia is the most toxic excretory form and least soluble in water

(2) Reptiles, birds and land snails excrete nitrogenous wastes in the form of pellet or paste

(3) Aquatic insects and many bony fishes are ammonotelic in nature

(4) Protonephridia are primarily concerned with ionic and fluid volume regulation

160. All of the given options are functions of the part of renal tubule which is lined by simple cuboidal brush border epithelium, except

(A) Minimum reabsorption

(B) Impermeability to water

(C) Reabsorption of 70-80% of electrolytes

(D) Selective secretion of hydrogen and potassium ions

Select the correct option.

(1) (A) and (B) (2) (B) and (C)

(3) (B) and (D) (4) (A), (C) and (D)

161. JGA is a special sensitive region formed by cellular modification in the _____A_____ and the _____B_____ at the location of their contact. Choose the correct option to fill the blanks A and B respectively.

(1) DCT and efferent arteriole

(2) DCT and afferent arteriole

(3) PCT and afferent arteriole

(4) PCT and efferent arteriole

162. How many of the substances given below in the box are reabsorbed by active transport in the renal tubules?

Glucose, Water, Urea, Na^+

(1) One (2) Two

(3) Three (4) Four

163. Which of the following is not the function of ADH?

(1) It facilitates water and sodium reabsorption from proximal parts of renal tubule

(2) Prevents diuresis

(3) Constrictory effect on blood vessels

(4) Synthesized by hypothalamus

164. The RAAS mechanism becomes active in response to

(1) Excessive loss of body fluid

(2) Increase in amount of body fluid

(3) Increase in GFR

(4) Increase in glomerular blood pressure

165. In interstitial fluid of kidney, there is increasing osmolarity from cortex to inner medulla. This gradient is mainly caused by

(1) Na^+ and K^+ (2) Urea and HCO_3^-

(3) NaCl and Urea (4) Na^+ and HCO_3^-

166. Urine formed by nephrons is ultimately carried to the urinary bladder where it is stored till 'X' signals are given by 'Y'.

Select the option that correctly identifies 'X' and 'Y' respectively.

(1) Involuntary, PNS (2) Voluntary, PNS

(3) Involuntary, CNS (4) Voluntary, CNS

167. Which of the following is not eliminated by sebaceous glands?

(1) Sterols (2) Urea

(3) Hydrocarbons (4) Waxes

168. Which one of the given statements is incorrect w.r.t. dialysing unit of haemodialysis?

(1) Blood is drained from a convenient vein and is pumped into dialysing unit

(2) Anticoagulant like heparin is added to it

(3) It contains a coiled cellophane tube

(4) The tube within the unit is surrounded by dialysing fluid which has same composition as that of plasma except nitrogenous wastes

169. Analysis of urine helps in clinical diagnosis of many metabolic disorders as well as malfunctioning of the kidney.

Given are some abnormalities, select the one associated with diabetes mellitus.

(1) Ketonuria (2) Uremia

(3) Proteinuria (4) Glycemia

170. Which of the following is not secreted by basophils?

(1) Histamine (2) Serotonin

(3) Globulin (4) Heparin

171. The effect on pregnancy if a Rh^{+ve} male marries a Rh^{-ve} female is that

(A) No pregnancy will occur.

(B) Death of first child.

(C) Their first child will survive.

(D) Rh antibodies from the mother can leak into blood of second Rh^{+ve} child and destroy its RBCs.

Select the correct option.

(1) (A) and (B) (2) (B) and (D)

(3) (C) and (D) (4) (D) only

172. The organism in which mixing of oxygenated and deoxygenated blood takes place in the ventricle of heart is

(1) Frog (2) Crocodile

(3) Whale (4) Sea horse

173. **Assertion (A):** ANF mechanism acts as a check on the renin-angiotensin mechanism.

Reason (R): ANF is secreted by the atria of the heart.

(1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(2) Both (A) and (R) are correct and (R) is the correct explanation of (A)

(3) (A) is true but (R) is false

(4) (A) is false but (R) is true

174. The condition affecting the vessels that supply blood to the heart muscle due to deposition of calcium, fat, cholesterol and fibrous tissue is called

(1) CAD (2) Rheumatoid arthritis

(3) Heart failure (4) Angina

175. Select the incorrect match w.r.t. animals and their respiratory structures.

(1) Frogs – Moist skin

(2) Prawns – Gills

(3) Snakes – Lungs

(4) Cockroach – Moist cuticle

176. The total volume of air a person can expire after a normal inspiration is

(1) TLC – FRC

(2) VC – IRV

(3) FRC – RV

(4) VC – ERV

177. Match the column I with column II w.r.t. circulatory pathways.

	Column I		**Column II**
a.	Cockroach	(i)	Incomplete double circulation
b.	Rohu	(ii)	Double circulation
c.	*Pavo*	(iii)	Open circulation
d.	*Naja*	(iv)	Single circulation

Select the **correct** option.

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

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

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

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

178. All of the following factors are favourable for dissociation of oxyhaemoglobin at tissues level, except

(1) High pCO_2

(2) Low pO_2

(3) Lower temperature

(4) Higher H^+ concentration

179. In the pons region of hind-brain, pneumotaxic centre is located which moderates the functions of specialised centre in medulla region. Strong signals from this centre result in

(1) Complete filling of lungs

(2) Decrease in rate of breathing

(3) Decrease in duration of expiration

(4) Deep breathing

180. How much carbon dioxide is delivered by 2 L of deoxygenated blood to the alveoli?

(1) 80 mL (2) 100 mL

(3) 20 mL (4) 30 mL

181. Value of pCO_2 in oxygenated blood is equal to the value of pO_2 in

(1) Systemic arteries (2) Systemic veins

(3) Pulmonary vein (4) Atmosphere

182. Select the correct statement among the following given statements.

(1) In human lungs, the diffusion membrane is made up of three cellular layers

(2) Conducting part of the respiratory system is involved in the regulation of diffusion of O_2 and CO_2 between blood and atmospheric air

(3) The role of oxygen in the regulation of respiratory rhythm is quite insignificant

(4) The rate of diffusion of gases depends only upon the cooperative diffusion of gases w.r.t. each other

183. What is the volume of air inspired or expired per minute during a normal breathing by a healthy adult man if he breaths 16 times per minute?

(1) 500 mL (2) 6000 mL

(3) 8000 mL (4) 4500 mL

184. For efficient working of lungs, respiratory surface should have following features, except

(1) Moist

(2) Thick membrane

(3) Permeable to gases

(4) Large diffusion area

185. The enzyme which catalyses the given reaction is present in

$CO_2 + H_2O \quad H_2CO_3 \quad HCO_3^- + H^+$

(A) RBCs (B) Thrombocytes

(C) WBCs (D) Plasma

Select the correct option.

(1) (A) only

(2) (B) and (C)

(3) (A) and (D)

(4) (A) and (C)

SECTION-B

186. Rh incompatibility during pregnancy can cause disease 'X' in subsequent pregnancies which is fatal to the foetus or could cause 'Y' and 'Z' to the baby.

Select the option that correctly identifies 'X', 'Y' and 'Z'.

	X	Y	Z
(1)	*Erythroblastosis foetalis*	Severe anaemia	Jaundice
(2)	Haemophilia	Severe anaemia	Typhoid
(3)	Stroke	Excessive bleeding	Brain damage
(4)	*Erythroblastosis foetalis*	Haemophilia	Jaundice

187. If the volume of blood pumped by each ventricle per minute is 8 litres and the number of heart beat is 80 beats/min, then what would be the volume of blood pumped by each ventricle in a cardiac cycle?

(1) 1 litre (2) 100 mL

(3) 10 L (4) 10 mL

188. The amount of haemoglobin in 1L of blood of a healthy human adult is

(1) 12 – 16 g (2) 120 – 160 g

(3) 12 – 16 mg (4) 1200 – 1600 mg

189. Read the statements given below w.r.t. wall of blood vessels and select the correct option.

(A) Tunica intima is the inner lining of squamous epithelium.

(B) Tunica media is the middle layer of smooth muscles with inelastic fibres.

(C) Tunica externa is the external layer of fibrous connective tissue with collagen fibres.

(1) Only statements (A) and (B) are correct

(2) Only statements (A) and (C) are correct

(3) Both (B) and (C) are incorrect

(4) Both (A) and (C) are incorrect

190. Choose the incorrect option w.r.t. the amount of blood filtered by kidneys.

(1) 1100-1200 mL of blood per minute

(2) $1/5^{th}$ of the blood pumped by each ventricle of the heart in a minute

(3) 5 × (stroke volume × heart rate)

(4) 20% of cardiac output

191. Match the column-I with column-II w.r.t. components of renal tubule and their functions.

	Column I		Column II
a.	Proximal convoluted tubule	(i)	Permeable to solutes only
b.	Distal convoluted tubule	(ii)	Conditional reabsorption of Na^+
c.	Descending limb of Henle's loop	(iii)	Permeable to water and almost impermeable to electrolytes
d.	Ascending limb of Henle's loop	(iv)	Selective secretion of K^+

Select the **correct** option.

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

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

192. If the amount filtrate formed by the kidneys of an individual is 252 litres per day, then calculate the GFR per minute and select the correct option.

(1) 125 mL/min (2) 175 mL/min

(3) 252 mL/min (4) 25.2 mL/min

193. Kidneys are reddish brown, bean-shaped structures situated between __X__ vertebra and the combined weight of both kidneys is around __Y__.

Select the correct option to fill the blanks X and Y.

	X	Y
(1)	$T_{12} – L_1$	120 – 170 gm
(2)	$L_1 – L_4$	120 – 240 gm
(3)	$T_{12} – L_3$	240 – 340 gm
(4)	$T_{10} – L_2$	120 – 170 gm

194. Choose the odd one from the options given below w.r.t. the excretory structures present in given animals.

(1) *Fasciola*

(2) Rotifers

(3) *Amphioxus*

(4) Prawns

195. All of the given statements are correct for kidney and nephron, except

(1) In cortical nephrons, the loop of Henle's is too short

(2) Vasa recta is absent in all cortical nephrons

(3) Renal cortex extends in between the medullary pyramids as renal columns called columns of Bertini

(4) Each kidney has nearly one million nephrons

196. If pulmonary volumes/capacities of a person are as given below:

Vital capacity	= 4200 mL
IRV	= 2900 mL
Total lung capacity	= 6200 mL
Tidal volume	= 500 mL
Expiratory capacity	= 1300 mL

Find the functional residual capacity (FRC) of the person.

(1) 2000 mL

(2) 2800 mL

(3) 1800 mL

(4) 1500 mL

197. Recombinant human protein α-1-antitrypsin is used primarily to treat the disorder in which

(1) Alveolar walls are damaged leading to decrease in respiratory surface owing to chronic cigarette smoking

(2) The patient suffers difficulty in breathing causing wheezing due to inflammation of bronchi

(3) Long exposure gives rise to inflammation to upper part of lungs

(4) Long exposure gives rise to proliferation of fibrous tissue

198. All of the given options are true for movement of air from atmosphere to lungs, except

(1) Contraction of diaphragm

(2) Volume of thoracic cavity increases

(3) Contraction of internal intercostal muscles

(4) Pressure within the pulmonary cavity decreases

199. Approximately what percent of CO_2 is transported by the medium which also transports about 97% of O_2?

(1) 3 (2) 20–25

(3) 70 (4) 7

200. How many of the given structures of the human respiratory system from the box below are supported by incomplete cartilaginous rings?

Trachea, Tertiary bronchi, Terminal bronchioles, Initial bronchioles

(1) Three (2) Two

(3) Four (4) One

❑ ❑ ❑

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4. (2)	44. (3)	84. (2)	124. (1)	164. (1)
5. (3)	45. (2)	85. (2)	125. (4)	165. (3)
6. (3)	46. (3)	86. (3)	126. (3)	166. (4)
7. (4)	47. (1)	87. (4)	127. (3)	167. (2)
8. (2)	48. (1)	88. (1)	128. (2)	168. (1)
9. (2)	49. (2)	89. (1)	129. (1)	169. (1)
10. (3)	50. (3)	90. (4)	130. (4)	170. (3)
11. (1)	51. (3)	91. (4)	131. (3)	171. (3)
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14. (4)	54. (1)	94. (2)	134. (2)	174. (1)
15. (2)	55. (3)	95. (3)	135. (4)	175. (4)
16. (4)	56. (4)	96. (1)	136. (3)	176. (2)
17. (3)	57. (3)	97. (3)	137. (4)	177. (2)
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32. (3)	72. (4)	112. (4)	152. (2)	192. (2)
33. (4)	73. (4)	113. (2)	153. (3)	193. (3)
34. (2)	74. (2)	114. (4)	154. (2)	194. (4)
35. (1)	75. (3)	115. (3)	155. (3)	195. (2)
36. (4)	76. (3)	116. (4)	156. (2)	196. (2)
37. (1)	77. (3)	117. (1)	157. (1)	197. (1)
38. (1)	78. (1)	118. (3)	158. (4)	198. (3)
39. (4)	79. (2)	119. (1)	159. (1)	199. (2)
40. (3)	80. (1)	120. (2)	160. (1)	200. (1)

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