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IIT-JEE | NEET | Foundation
NEET

Time: 200 Minute **M.M. 720**

ALL INDIA SKY TEST SERIES

Samarth Batch – Neet

Date : 17/09/2023

SYLLABUS

PHYSICS	CHEMISTRY	BOTANY	ZOOLOGY
Laws of Motion	**Periodic table + Atomic Structure**	**Previous + The living world, Biological Classification**	**Previous + Body fluid & Circulation**

Please read the instructions carefully. You are allotted **5** minutes specifically for this purpose.

INSTRUCTIONS:

1. This Question paper is divided in to four parts physics, chemistry, botany, zoology and each part is further divided into two sections.
   Section –A contains 35 Questions Section B contains 15 questions. Please ensure that the Questions paper you have received contains **ALL THE QUESTIONS** in each Part.
2. **In Section A all the 35 Questions are compulsory and in Section B Contain 15 Question, out of these 15 Questions**, candidates can choose to attempt any 10 Questions. Each Question has four choices (a), (b), (c), (d) out of which **only one is correct & Carry 4 marks each 1 mark** will be deducted for each wrong answer.

GENERAL INSTRUCTION

1. Use only **blue/black pen (avoid gel pen)** for darkening the bubble.
2. Indicate the correct answer for each question by filling appropriate bubble in your **OMR** answer sheet.
3. The answer sheet will be checked through computer hence, the answer of the question must be marked by –shading the circles against the question by dark **blue/black pen**
4. Blank papers, Clipboards, Log tables, Slide Rule, Calculator, Cellular Phones Papers and Electronic Gadgets in any form are **not** allowed to be carried inside the examination hall.

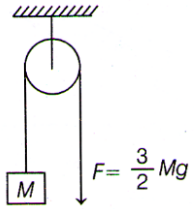
Name of the candidate:_____

Signature of the candidate: _____**Signature of the invigilator:**_____

PHYSICS

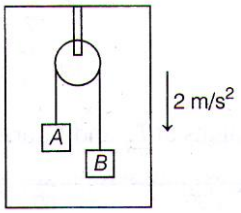
SECTION – A

1. In the arrangement shown in figure, acceleration of the block is.



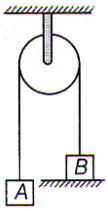
(a) zero (b) g/2 (c) 3g/2 (d) g

2. Block A and B of masses 2 kg and 4kg are suspended through a string using a pulley, inside an elevator moving downward with constant acceleration 2 m/s². The tension in the string which is joining the two blocks is:



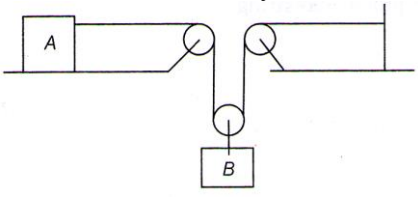
(a) $\frac{64}{3}N$ (b) $\frac{32}{3}N$ (c) $\frac{8}{3}N$ (d) $\frac{16}{3}N$

3. In the diagram shown, block A of mass 2 kg is hanging from the string passing over a smooth pulley and block B is placed on the top of a table. If the reaction of the table is 10 N, mass of block B is (Take, g = 10 m/s²)



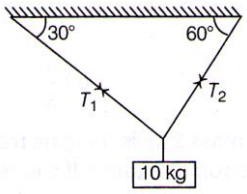
(a) 1 kg (b) 2 kg (c) 3 kg (d) 4 kg

4. The velocity of A, at an instant is 4 m/s rightwards. Then, the velocity of block B is.



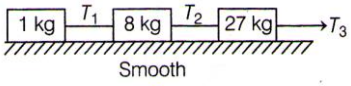
(a) 4 m/s downwards (b) 2 m/s upwards
(c) 2 m/s downwards (d) 1 m/s upwards

5. If the block is in equilibrium, then values of T_1 and T_2 are.



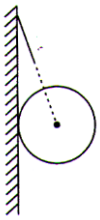
(a) 50 N, $50\sqrt{3}$ N (b) 80 N, 60 N
(c) 30 N, 40N (d) 100 N, 0 N

6. If T_3 = 36 N, then value of T_2 is.



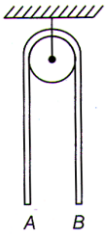
(a) 18 N (b) 9 N (c) 3.375 N (d) 1.75 N

7. A uniform disk of radius R and mass m is connected to a wall by string of length 2R. The string is connected at the centre of the disk. The normal reaction of the wall is.



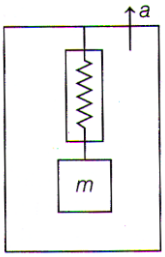
(a) mg (b) $\frac{mg}{2}$ (c) $\frac{mg}{\sqrt{3}}$ (d) 2 mg

8. A uniform chain of length 2L is hanging in equilibrium position. If end B is given a slightly downward displacement, the imbalance causes an acceleration. Here, pulley is small and smooth and string is inextensible. The acceleration of end B when it has been displaced by distance x, is.



(a) $\frac{x}{L}g$ (b) $\frac{2x}{L}g$ (c) $\frac{x}{2}g$ (d) g

9. A spring balance fastened to the roof of a lift accelerating upward indicates 120 N as the weight of a 80 N body. The acceleration of the lift is (Take, g = 10 m/s²)



(a) 5 m/s² (b) $\frac{20}{3} m/s^2$

(c) $\frac{10}{3} m/s^2$ (d) 4 m/s²

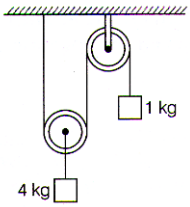
10. An elevator and its load have a total mass of 300 kg. If the elevator originally moving downward at 10 m/s is brought to rest with constant deceleration in a distance of 25m, the tension in the supporting cable will be (Take, g = 10 m/s²)

(a) 8000 N (b) 2400 N
(c) 11200 N (d) 3600 N

11. A monkey of mass 20 kg is holding a vertical rope. The rope will break, if the mass suspended from it exceed 25 kg. What is the maximum acceleration with which the monkey can climb up along the rope? (Take, g = 10 m/s²)

(a) 10 m/s² (b) 25 m/s²
(c) 2.5 m/s² (d) 5 m/s²

12. In the system shown in figure, the acceleration of the 1 kg mass is.



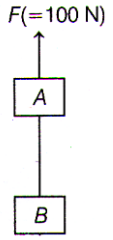
(a) $\frac{g}{4}$ downward (b) $\frac{g}{4}$ upward

(c) $\frac{g}{2}$ downward (d) $\frac{g}{2}$ upward

13. A rope of length 10 m and linear mass density 4kg/m is lying lengthwise on a horizontal smooth table. One end of the rope is pulled horizontally by a force of 40N. The tension in te rope at a point 4m from point of application of force will be.

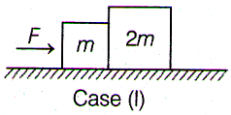
(a) 40 N (b) 24 N (c) 49 N (d) 15 N

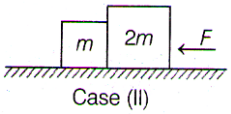
14. Consider the shown arrangement, where the blocks A and B connected by means of a uniform string is being moved vertically up by the force F. Each block weight 2 kg while the mass of string is 1000 g. The tension at bottom of the string equals



(a) 20 N (b) 40 N (c) 10 N (d) 270 N

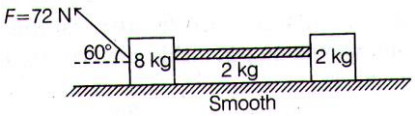
15. Two blocks are in contact on a frictionless table. One has mass m and the others 2m. Same force F is applied from left and right on m and 2m. The ratio of contact force between the blocks in the two cases will be.





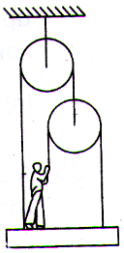
(a) 1 : 4 (b) 1 : 2 (c) 1 : 1 (d) 2 : 3

16. In the figure shown, if mass of the rope is 2 kg, then tension at the mid – point of the rope is



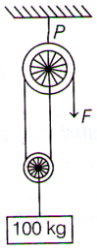
(a) 12 N (b) 9 N (c) 6 N (d) 18 N

17. In the given diagram with what force must the man pull the rope to hold the plank in position? Mass of the man is 80 kg, neglect the weight of rope, plank and pulley. (Take, g = 10 m/s²)



(a) 200 N (b) 300 N
(c) 600 N (d) 266.66 N

18. In the figure shown, 100 kg block is moving up with constant velocity, then tension at point P is (Take, g = 9.8 m/s²)



(a) 1330 N (b) 490 N (c) 1470 N (d) 980 N

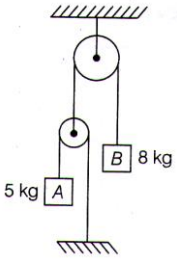
19. An empty plastic box of mass m is found to accelerate up at the rate of g/6 when placed deep inside water. How much sand should be put inside the box, so that it may accelerate down at the rate of g/6?

(a) $\frac{2m}{3}$ (b) $\frac{2m}{5}$ (c) $\frac{3m}{4}$ (d) $\frac{3m}{5}$

20. A 10 kg stone is suspended with a rope of breaking strength 30 kg – wt. The minimum time in which the stone can be raised through a height 10 m starting from rest is
(Take, g = 10 N/kg)

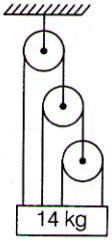
(a) 0.5 s (b) 1.0 s (c) $\sqrt{\frac{2}{3}}\ s$ (d) 2.0 s

21. Find the acceleration of block B.



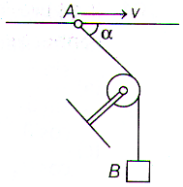
(a) 0 (b) $\frac{5}{2}$ m/s² (c) $\frac{5}{7}$ m/s² (d) $\frac{5}{14}$ m/s²

22. A 14 kg block is hanged using a system of pulley as shown in figure. Tension in string connecting celling and topmost pulley is.



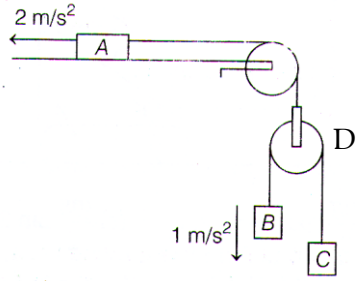
(a) 17.5 N (b) 70 N (c) 140 N (d) 280 N

23. A smooth ring A can slide on a fixed horizontal rod as shown. The pulley is fixed. If some instant velocity of ring is v, find the velocity of block at that instant.



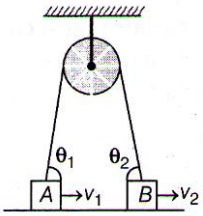
(a) $\frac{v}{\cos\alpha}$ (b) $v\cos\alpha$ (c) $v\sin\alpha$ (d) $\frac{v}{\sin\alpha}$

24. In the set up shown, find acceleration of the block C. Given $a_A = 2m/s^2$ and a_B with respect to pulley D is 1 m/s² downwards.



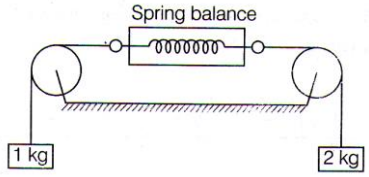
(a) 3 m/s² ↑ (b) 3 m/s² ↓
(c) 5 m/s² ↑ (d) 5 m/s² ↓

25. In figure blocks A and B move with velocities v_1 and v_2 along horizontal direction. Find the ratio of v_1 / v_2.



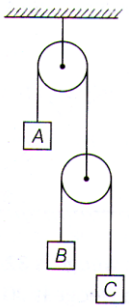
(a) $\frac{\sin\theta_1}{\sin\theta_2}$ (b) $\frac{\sin\theta_2}{\sin\theta_1}$ (c) $\frac{\cos\theta_2}{\cos\theta_1}$ (d) $\frac{\cos\theta_1}{\cos\theta_2}$

26. Reading of the spring balance as shown in figure, is (assume string and spring are ideal and neglect friction, g = 10 m/s²)



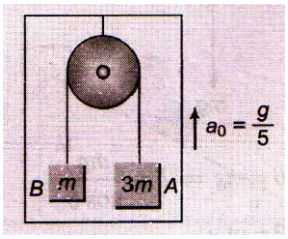
(a) 20 N (b) 10 N (c) $\frac{40}{3}$ N (d) zero

27. If acceleration of block B is 4 m/s² upward and that of C is 6 m/s² downward. Find acceleration of A.



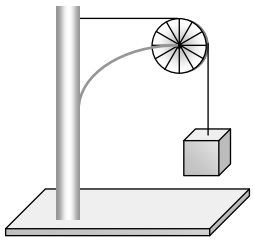
(a) 2 m/s² upward (b) 1 m/s² upward
(c) 1 m/s² downward (d) 2 m/s² downward

28. A pulley fixed to the ceiling of an elevator car carries a thread whose ends are attached to the loads of masses 3 m and m. The car starts going up with acceleration g/5. Assuming the masses of the pulley and the thread, as well as friction, to be negligible, find the force exerted by the pulley on the ceiling of car.



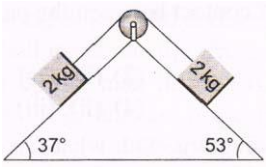
(a) $\frac{18mg}{5}$ (b) $\frac{17mg}{5}$
(c) $\frac{13mg}{5}$ (d) $\frac{19mg}{5}$

29. A string of negligible mass going over a clamped pulley of mass m supports a block of mass M as shown in the figure. The force on the pulley by the clamp is given by



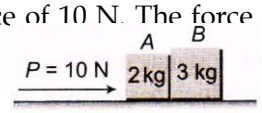
(a) $\sqrt{2}$Mg
(b) $\sqrt{2}$mg
(c) $\sqrt{(M+m)^2+m^2}\,g$
(d) $\sqrt{(M+m)^2+M^2}\,g$

30. The acceleration of system over the wedge as shown in the figure is.



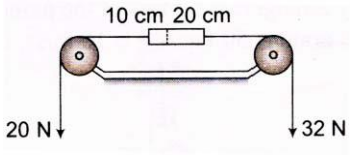
(a) 1 m/s² (b) 2 m/s² (c) 3 m/s² (d) 4 m/s²

31. Block A and B have masses of 2 kg and 3 kg, respectively. The ground is smooth P is an external force of 10 N. The force exerted by B on A is.



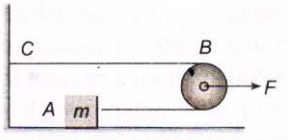
(a) 4N (b) 6 N (c) 8 N (d) 10 N

32. All the surfaces are smooth and the strings and pulleys are light. The force exerted by the 20 cm part of the rod on the 10 cm part is.



(a) 6 N (b) 12 N (c) 24 N (d) 36 N

33. The acceleration of light pulley is.



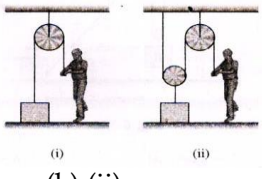
(a) F/m (b) F/2 m (c) F/4 m (d) F/8 m

34. A bird is sitting in a large closed cage which is placed on a spring balance. It records a weight of 25 N. The bird (mass m = 0.5 kg) flies upward in the cage with an acceleration of $2 m/s^2$. The spring balance will now record a weight of
(a) 24 N (b) 25 N (c) 26 N (d) 27 N

35. If the force of gravity suddenly disappears:
(a) The mass of all bodies will become zero
(b) The weight of all bodies will become zero
(c) Both mass and weight of all bodies will become zero
(d) Neither mass nor weight of all bodies will become zero

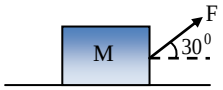
SECTION -B

36. In fig. a person wants to rise a block lying on the ground to a height h. In both the cases, if the time required is same, then in which case he has to exert more force? Assume pulley and string light.



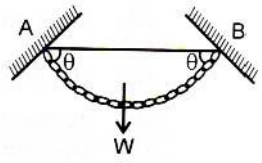
(a) (i) (b) (ii)
(c) Same in both (d) Cannot be determined

37. A block of mass 10 kg is kept on a horizontal surface. A force F is acted on the block as shown in figure. For what minimum value of F, the block will be lifted up?



(a) 98 N (b) 49 N (c) 200 N (d) N.O.T.

38. A flexible chain of weight W hangs between two fixed points a and B at the same level. The inclination of the chain with the horizontal at the two points of support is θ. What is the tension of the chain at the end point.



(a) $\frac{W}{2}\cos ec\theta$ (b) $\frac{W}{2}\sec\theta$

(c) $W\cos\theta$ (d) $\frac{W}{3}\sin\theta$

39. A light string passing over a smooth light pulley connects two blocks of masses m_1 and m_2 (vertically). If the acceleration of the system is $g/8$ then the ratio of the masses is
(a) 8 : 1 (b) 9 : 7 (c) 4 : 3 (d) 5 : 3

40. Two persons are holding a rope of negligible weight tightly at its ends so that it is horizontal. A 15 kg weight is attached to the rope at the mid point whichnow no longer ramins horizontal. The minimum tension required to completely straighten the top is
(a) 15 kg (b) 15/2 kg
(c) 3 kg (d) Infinitely large

41. During a projectile motion, if the maximum height equals the horizontal range, then the angle of projection with the horizontal is
(a) $\tan^{-1}(1)$ (b) $\tan^{-1}(2)$
(c) $\tan^{-1}(3)$ (d) $\tan^{-1}(4)$

42. A projectile has a time of flight T and range R. If the time of flight is doubled, keeping the angle of projectin same, what happens to the range?
(a) R/4 (b) R/2 (c) 2 R (d) 4 R

43. A ball is thrown at different angles with the same speed u and frm the same point and it has the same range in both the cases. If y_1 and y_2 are the heights attained in the two cases, then $y_1 + y_2$ is equal to
(a) $\frac{u^2}{g}$ (b) $\frac{2u^2}{g}$ (c) $\frac{u^2}{2g}$ (d) $\frac{u^2}{4g}$

44. At what angle with the horizontal should a ball be thrown so that the range R is related to the time of flight as $R = 5T^2$?
(Take g = 10 ms^{-2})
(a) 30° (b) 45° (c) 60° (d) 90°

45. A ball thrown by one player reaches the other in 2s. The maximum height attained by the ball above the point of projection will be about
(a) 2.5 m (b) 5 m (c) 7.5 m (d) 10 m

46. If vectors $\vec{a} = 2\hat{i} + 4\hat{j} - \hat{k}$ and $\vec{b} = 3\hat{i} - 2\hat{j} + x\hat{k}$ are to be perpendicular to each other, the value of x should be
(a) 2 (b) –2 (c) 3 (d) –3

47. $\left|\vec{A}\times\vec{B}\right|^2 + \left|\vec{A}.\vec{B}\right|^2$ is equal to
(a) $\left(\vec{A}\times\vec{B}\right)^2$ (b) $\left(\vec{A}-\vec{B}\right)^2$
(c) $A^2 + B^2$ (d) A^2B^2

48. In equation $\vec{F} = q\left(\vec{v}\times\vec{B}\right)$, the quantity $\vec{F}$
(a) is perpendicular to $\vec{v}$ only
(b) is perpendicular to $\vec{B}$ only
(c) is perpendicular to both $\vec{v}$ and $\vec{B}$
(d) is perpendicular to q and $\vec{B}$

49. A particle moves from point (1, 0, 2.5) to the point $(-2,3,4)$m when a force $\vec{F} = (\hat{i} + 4\hat{k})$N acts on it. The work done on it is
(a) 6J (b) 30 J (c) 3 J (d) 9 J

50. The sum of the magnitude of two vectors is 18 and the magnitude of their resultant is 12. If the resultant is perpendicular to one of the vectors, then what are the magnitudes of the two vectors?
(a) 5, 13 (b) 6, 12 (c) 7, 11 (d) 8, 10

CHEMISTRY
SECTION – A

51. Which block of the periodic table contains elements with the general electronic configuration $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$?
(a) s – block (b) p – block
(c) d – block (d) *f* – block

52. To which group, an element with atomic number 88 will belong?
(a) Group 12 (b) Group 17
(c) Group 10 (d) Group 2

53. An element has the electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$
What will be its position in the periodic table?
(a) Period 4, Group 10
(b) Period 2, Group 2
(c) Period 4, Group 2
(d) Period 2, Group 8

54. In the long form of periodic table, the non – metal are placed in
(a) s – block (b) p – block
(c) d – block (d) *f* – block

55. An element X has atomic number 19. What will be the formula of its oxide?
(a) X_2O (b) XO (c) XO_2 (d) X_2O_2

56. Which of the following transitions will involve maximum amount of energy?
(a) $M \rightarrow M^+ + e^-$ (b) $M^- \rightarrow M^+ + 2e^-$
(c) $M^{2+} \rightarrow M^{3+} + e^-$ (d) $M^+ \rightarrow M^{2+} + e^-$

57. What is the order of successive ionization enthalpies?
(a) $IE_{III} > IE_{II} > IE_I$ (b) $IE_I > IE_{II} > IE_{III}$
(c) $IE_{II} > IE_I > IE_{III}$ (d) $IE_{III} > IE_I > IE_{III}$

58. Which is the most non – metallic element among the following?
(a) $1s^2 2s^2 2p^6 3s^1$ (b) $1s^2 2s^2 2p^5$
(c) $1s^2 2s^2 2p^6 3s^2$ (d) $1s^2 2s^2 2p^3$

59. The first ionization enthalpy of the elements are in the order of.
(a) C < N < Si < P (b) N < Si < C < P
(c) Si < P < C < N (d) P< Si < N < C

60. Ionization enthalpy of nitrogen is more than oxygen because of.
(a) Extra stability of half filled orbital
(b) More number of energy levels
(c) Less number of valence electrons
(d) Smaller size

61. Which of the following arrangements represents the correct order of electron gain enthalpy ?
(a) O < S < F < Cl (b) Cl < F < S < O
(c) S < O < Cl < F (d) F < Cl < O < S

62. Which of the following can most easily form unipositive gaseous ion ?
(a) $1s^2 2s^2 2p^6 3s^2$ (b) $1s^2 2s^2 2p^6 3s^2 3p^1$
(c) $1s^2 2s^2 2p^6 3s^2 3p^2$ (d) $1s^2 2s^2 2p^6 3s^2 3p^3$

63. What is the decreasing order of basicity of hydroxides of the alkaline earth metals ?
(a) $Be(OH)_2 > Mg(OH)_2 > Sr(OH)_2 > Ba(OH)_2$
(b) $Mg(OH)_2 > Be(OH)_2 > Ba(OH)_2 > Sr(OH)_2$
(c) $Ba(OH)_2 > Sr(OH)_2 > Mg(OH)_2 > Be(OH)_2$
(d) $Sr(OH)_2 > Be(OH)_2 > Mg(OH)_2 > Ba(OH)_2$

64. What is the common property of the oxides CO, NO and N_2O?
(a) All are acidic oxides.
(b) All are basic oxides.
(c) All are neutral oxides.
(d) All are amphoteric oxides.

65. What is common between given cations and anions, $O^{2-}, F^-, Na^+, Mg^{2+}, Al^{3+}$?
(a) All have same ionic radii.
(b) All are isoelectronic species having 10 electrons.
(c) All of them belong to the third period.
(d) The nature of oxides of all the ions is basic.

66. Which is the most electropositive element
(a) Na (b) Cu (c) Cs (d) Ca

67. How many number of electrons are involved in the formation of a nitrogen molecule ?
(a) Three (b) Four
(c) Eight (d) Six

68. In which of the following species the bond is non-directional ?
(a) NCl_3 (b) RbCl
(c) $BeCl_2$ (d) BCl_3

69. Which of the following is non-polar?
(a) SO_2 (b) CO_2
(c) H_2O (d) NH_3

70. Sodium chloride has a crystalline structure made up of Na^+ and Cl^- ions. Why does NaCl not conduct electricity in solid state?
(a) Solids do not conduct electricity.
(b) The ions of NaCl become mobile only in molten state and are not free to move in solid state.
(c) The crystalline structure does not have ions.
(d) When a bond is formed between ions they lose their charge.

71. Arrange the following in order of increasing dipole moment : H_2O, H_2S, BF_3
(a) $BF_3 < H_2S < H_2O$ (b) $H_2S < BF_3 < H_2O$
(c) $H_2O < H_2S < BF_3$ (d) $BF_3 < H_2O < H_2S$

72. The correct order of decreasing bond lengths of CO, CO_2 and CO_3^{2-} is
(a) $CO > CO_2 > CO_3^{2-}$ (b) $CO_3^{2-} > CO_2 > CO$
(c) $CO_2 > CO > CO_3^{2-}$ (d) $CO_2 > CO_3^{2-} > CO$

73. Which of the following molecules does not show any resonating structures?
(a) NH_3 (b) CO_3^{2-} (c) O_3 (d) SO_3

74. Which of the following are arranged in the decreasing order of dipole moment ?
(a) CH_3Cl, CH_3Br, CH_3F
(b) CH_3Cl, CH_3F, CH_3Br
(c) CH_3Br, CH_3Cl, CH_3F
(d) CH_3Br, CH_3F, CH_3Cl

75. What is common between the following molecules : SO_3, CO_3^{2-}, NO_3^- ?
(a) All have linear shape.
(b) All have trigonal planar shape.
(c) All have tetrahedral shape.
(d) All have trigonal pyramidal shape.

76. The total number of atomic orbitals in fourth energy level of an atom is
(a) 4 (b) 8 (c) 16 (d) 32

77. If n = 6, the correct sequence for filling of electrons will be
(a) $ns \to np \to (n-1)d \to (n-2)f$
(b) $ns \to (n-2)f \to (n-1)d \to np$
(c) $ns \to (n-1)d \to (n-2)f \to np$
(d) $ns \to (n-2)f \to np \to (n-1)d$

78. The energies E_1 and E_2 of two radiations are 25 eV and 50 eV respectively. The relation between their wavelengths, i.e., λ_1 and λ_2 will be
(a) $\lambda = \lambda_2$ (b) $\lambda_1 = 2\lambda_2$
(c) $\lambda_1 = \frac{1}{2}\lambda_2$ (d) $\lambda_1 = 4\lambda_2$

79. Maximum number of electrons in a sub-shell with l = 3 and n = 4 is
(a) 10 (b) 12 (c) 14 (d) 16

80. The correct set of four quantum numbers for the valence electron of rubidium atom (Z = 37) is
(a) $5, 0, 0, +\frac{1}{2}$ (b) $5, 1, 0, +\frac{1}{2}$
(c) $5, 1, 1, +\frac{1}{2}$ (d) $6, 0, 0, +\frac{1}{2}$

81. The orbital angular momentum of a *p*-electron is given as
(a) $\sqrt{6}, \frac{h}{2\pi}$ (b) $\sqrt{3}\frac{h}{2\pi}$
(c) $\sqrt{\frac{3}{2}}\frac{h}{\pi}$ (d) $\frac{h}{\sqrt{2}\pi}$

82. What is the maximum number of orbitals that can be identified with the following quantum numbers?
n = 3, l = 1, m_l = 0
(a) 1 (b) 2 (c) 3 (d) 4

83. Which one is the wrong statement?
(a) The uncertainty principle is $\Delta E \times \Delta t \geq h / 4\pi$
(b) Half filled and fully filled orbitals have greater stability due to greater exchange energy, greater symmetry and more balanced arrangement.
(c) The energy of 2s orbital is less than the energy of 2p orbital in case of Hydrogen like atoms
(d) de-Broglie's wavelength is given by $\lambda = \frac{h}{mv}$, where m = mass of the particle, v = group velocity of the particle

84. For the energy levels in an atom, which one of the following statements is correct?
(a) There are seven principle electron energy levels
(b) The second principle energy level can have four sub energy levels and contains a maximum of eight electrons
(c) The M energy level can have maximum of 32 electrons
(d) The 4s sub-energy level is at a higher energy than the 3*d* sub-energy level

85. The statements
(i) In filling a group of orbitals of equal energy, it is energetically preferable to assign electrons to empty orbitals rather than pair them into a particular orbital.
(ii) When two electrons are placed in two different orbitals, energy is lower if the spins are parallel, are valid for
(a) Aufbau principle
(b) Hund's rule
(c) Pauli's exclusion principle
(d) Uncertainty principle

SECTION – B

86. The total number of electrons in one molecule of carbon dioxide is
(a) 22 (b) 44 (c) 66 (d) 88

87. 7.5 grams of a gas occupy 5.8 litres of volume at STP the gas is
(a) NO (b) N_2O (c) CO (d) CO_2

88. If N_A is Avogadro's number then number of valence electrons is 4.2 g of nitride ions (N^{3-})
(a) 2.4 N_A (b) 4.2 N_A
(c) 1.6 N_A (d) 3.2 N_A

89. Caffeine has a molecular weight of 194. If it contains 28.9% by mass of nitrogen, number of atoms of nitrogen in one molecule of caffeine is
(a) 4 (b) 6 (c) 2 (d) 3

90. The numbers of moles of $BaCO_3$ which contain 1.5 moles of oxygen atoms is
(a) 0.5 (b) 1
(c) 3 (d) 6.02×10^{23}

91. Calculate the weight of lime (CaO) obtained by heating 200 kg of 95% pure lime stone ($CaCO_3$).
(a) 104.4 kg (b) 105.4 kg
(c) 212.8 kg (d) 106.4 kg

92. What weight of SO_2 can be made by burning sulphur in 5.0 moles of oxygen?
(a) 640 grams (b) 160 grams
(c) 80 grams (d) 320 grams

93. What is the molarity of H_2SO_4 solution that has a density 1.84 g/cc at 35^0 C and contains 98% by weight?
(a) 4.18 M (b) 8.14 M
(c) 18.4 M (d) 18 M

94. The mole fraction of a given sample of I_2 in C_6H_6 is 0.2. The molality of I_2 in C_6H_6 is
(a) 0.32 (b) 3.2 (c) 0.032 (d) 0.48

95. The energy of the electron in the first orbit of He^+ is- 871.6×10^{-20} J. The energy of the electron in the first orbit of hydrogen would be
(a) -871.6×10^{-20} J (b) -435.8×10^{-20} J
(c) -217.9×10^{-20} J (d) -108.9×10^{-20} J

96. Which of the following is isoelectronic?
(a) CO_2, NO_2 (b) NO_2^-, CO_2
(c) CN^-, CO (d) SO_2, CO_2

97. According to Heisenberg's uncertainty principle
(a) $E = mc^2$ (b) $\Delta x\times\Delta p \geq \frac{h}{4\pi}$
(c) $\lambda = \frac{h}{p}$ (d) $\Delta x\times\Delta p = \frac{h}{6\pi}$

98. The mass of electron is 9.11×10^{-31} kg, Planck constant is 6.626×10^{-34} Js, the uncertainty involved in the measurement of velocity within a distance of $0.1\overset{0}{A}$ is
(a) 5.79×10^{8} m/s^{-1} (b) 5.79×10^{5} m/s^{-1}
(c) 5.79×10^{6} m/s^{-1} (d) 5.79×10^{7} m/s^{-1}

99. The energy absorbed by each molecule (A_2) of a substance is 4.4×10^{-19} J and bond energy per molecule is 4.0×10^{-19} J. The kinetic energy of the molecule per atom will be
(a) 2.0×10^{-20} J (b) 2.2×10^{-19} J
(c) 2.0×10^{-19} J (d) 4.0×10^{-20} J

100. Oxidation can be defined as the terms
(I) gain of electron and hydrogen
(II) gain of oxygen and loss of electron
(III) increase in oxidation number
(IV) decrease in oxidation number
Select the correct terms
(a) I and II (b) I and IV
(c) I and III (d) II and III

BOTANY

SECTION – A

101. Consciousness is considered a defining property of living organisms because
(a) Except plants, all eukaryotes can sense their surroundings
(b) Most complex organisms are unable to respond environmental stimuli
(c) All organisms are aware of their surroundings and respond to external environmental stimuli
(d) Except microbes, all organisms show consciousness

102. Select the organisms which show metabolism.
A. Plants B. Fungi
C. Animals D. Microbes
(a) Only A (b) Only B and C
(c) Only C (d) All A, B, C and D

103. Select the correctly written scientific name of mango.
(a) *Mangifera Indica Linn*.
(b) *Mangifera indica* Linn.
(c) Mangifera Indica linn.
(d) Mangifera indica L.

104. *pardus*, *leo* and *melongena*
(a) Represent the different ranks of different catagories
(b) Belong to the same genus
(c) Share same morphological characters
(d) Represent the different taxa at same level

105. Scientific name of leopard and cats are based on agreed principles and criteria which are provided in
(a) ICBN (b) ICZN
(c) ICNB (d) ICVCN

106. Select the incorrect statement.
(a) Zoological parks have wild animals kept in protected environment.
(b) Herbarium carries a label which has name of plant specimen.
(c) A monograph has description of only one taxon.
(d) A museum has a collection of conserved plant and animal specimens

107. Cat belongs to the genus
(a) *Panthera* (b) *Canis*
(c) *Felis* (d) Mammalia

108. Mark the **incorrect** statement.
(a) There are seven broad categories from species to kingdom.
(b) Order Primata comprising monkey, gorilla and gibbon is placed in the class Mammalia
(c) Each category represents a rank
(d) Each genus has one specific epithet only

109. Which of the following bacteria synthesize their own food by oxidation of inorganic substances and lack photosynthetic pigments?
(a) Chemoautotrophs (b) Photoautotrophs
(c) Heterotrophs (d) Parasitic

110. Mark the **incorrect** statement.
(a) Protista includes all unicellular eukaryotes.
(b) Mycoplasma is a wall less moneran
(c) Bacteria asexually reproduce by binary fission.
(d) Autotrophic bacteria help in the production of antibiotics

111. Read the following statements and select the **correct** option.
Statement-A: Rod shaped bacteria are *Bacillus*.
Statement-B: Some heterotrophic bacteria help in fixing nitrogen in legumes.
(a) Only statement A is correct
(b) Only statement B is correct
(c) Both the statements A and B are correct
(d) Both the statements A and B are incorrect

112. Archaebacteria found in saline conditions are
(a) Thermoacidophiles
(b) Halophiles
(c) Methanogens
(d) Cyanobacteria

113. Chrysophytes
(a) Are multicellular
(b) Include desmids and diatoms
(c) Are dependent on other organisms to take food.
(d) Are mostly parasitic.

114. Red tide causing organisms
(a) Are unicellular
(b) Are protozoans
(c) Multiply at very slow rate
(d) Lack chlorophyll and are dependent on other organisms for food

115. Select the **incorrect** statement.
(a) *Albugo* is parasitic on mustard.
(b) Fungi cause disease in plants and animals.
(c) Toadstools are poisonous fungi.
(d) The cell wall of fungi is mainly composed of cellulose and polysaccharides.

116. Select the **incorrect** match

(a)	*Puccinia*	-	Parasitic fungus
(b)	*Trichoderma*	-	An imperfect fungus
(c)	*Mushroom*	-	Edible sac fungi
(d)	*Neurospora*	-	Used in genetic work

117. Members of Deuteromycetes
(a) Help in mineral recycling
(b) Has sex organs but do not reproduce sexually
(c) Has coenocytic mycelium
(d) Produce edible fruiting bodies.

118. The basidiospores
(a) Are endogenously produced spores
(b) Are produced on the basidium
(c) Are asexual spores
(d) Are diploid in nature

119. W. M. Stanley showed that viruses
(a) Are inert outside the host cell
(b) Are infectious living fluid
(c) Could be crystallised
(d) Are larger than bacteria

120. Viroids
(a) Have protein coat same as found in viruses
(b) Cause disease in animals only
(c) Are abnormally folded proteins
(d) Are smaller than viruses

121. All of the following easily multiply by fragmentation, except
(a) Protonema of mosses
(b) Filamentous algae
(c) Filamentous fungi
(d) Unicellular organisms

122. Select the incorrect statement.
(a) No non-living object is capable of replicating by itself
(b) All microbes exhibit metabolism
(c) Only most complex eukaryotes can sense and respond to environmental cues
(d) Properties of tissues are not present in their constituent cells but arise as a result of interaction of constituent cells

123. Mark the incorrect option regarding the scientific name of mango.
(a) *Mangifera* represents the genus while *indica* is a particular species
(b) It is in Latin language
(c) It is binomial name
(d) It should be underlined whether handwritten or printed

124. Taxonomy does not include
(a) Nomenclature
(b) Classification
(c) Identification
(d) Evolutionary relationships among organisms

125. Select the incorrect statement.
(a) Botanical gardens have collection of living plants
(b) Herbarium has dried and pressed plant specimens mounted on sheets
(c) A museum has collection of live plant and animal specimens
(d) Key is a taxonomical aid for identification of specimens

126. In case of plants, classes with a few similar characters are assigned to a higher category called
(a) Family (b) Phylum
(c) Order (d) Division

127. Select the correct option for A and B.

Biological name	**Order**	**Class**
Musca domestica	A	Insecta
Homo sapiens	Primata	B

	A	B
(a)	Muscidae	Mammalia
(b)	Diptera	Chordata
(c)	Diptera	Mammalia
(d)	Muscidae	Chordata

128. How many of the following kingdoms possess members with cell wall?
A. Kingdom Monera
B. Kingdom Fungi
C. Kingdom Plantae
D. Kingdom Animalia
(a) Only one (b) Only two
(c) Only three (d) All four

129. Mark the incorrect statement.
(a) Animals are multicellular eukaryotic organisms
(b) Mycoplasma is insensitive to penicillin
(c) Bacteria reproduce mainly by fission
(d) Typhoid is a viral disease

130. Read the following statements and select the correct option.
Statement-A: Bacteria are helpful in production of antibiotics.
Statement-B: The comma shaped bacteria are vibrio.
(a) Only statement A is correct
(b) Only statement B is correct
(c) Both statements A and B are correct
(d) Both statements A and B are incorrect

131. Read the following features and identify the organism on these basis.
A. Flagellum is absent
B. Has chlorophyll a
C. Possess rigid cell wall
D. Fixes atmospheric nitrogen as well as carbon dioxide
(a) *E. coli* (b) Methanogens
(c) *Nostoc* (d) Halophiles

132. Diatoms
(a) Are multicellular
(b) Lack chlorophyll
(c) Are chief producers in ocean
(d) Are wall-less microorganisms

133. Instead of a cell wall, a protein rich layer called pellicle is present in
(a) Euglenoids (b) Dinoflagellates
(c) Fungi (d) Chrysophytes

134. Mark the correct statement about red tide.
(a) It is caused by terrestrial microorganisms
(b) Red dinoflagellates such as *Gonyaulax* are responsible for this
(c) It is due to rapid multiplication of red algae
(d) Red tide causing organism do not kill other marine fishes

135. Select the incorrect statement.
(a) *Puccinia* causes red rot of sugarcane
(b) *Albugo* is parasitic fungus on mustard
(c) *Penicillium* is a good source of Penicillin
(d) Yeast is used to make bread and beer

SECTION - B

136. Which of the following is commonly called sac fungi?
(a) *Mucor* (b) *Claviceps*
(c) *Rhizopus* (d) *Agaricus*

137. _____ is used extensively in biochemical and genetic work.
Select the correct option to fill in the blank.
(a) *Ustilago* (b) *Neurospora*
(c) *Aspergillus* (d) *Penicillium*

138. Select the correct match.
(a) *Trichoderma* – Aseptate mycelium
(b) *Colletotrichum* – Has perfect stage
(c) *Ustilago* – Is smut fungus
(d) *Saccharomyces* – Multicellular

139. Members of Basidiomycetes
(a) Have sex organs but lack sexual reproduction
(b) Generally do not produce asexual spores
(c) Are puffballs, morels and bracket fungi
(d) Do not produce fruiting bodies

140. Select the odd one w.r.t. insectivorous plant.
(a) Bladderwort (b) Venus fly trap
(c) Pitcher plant (d) *Cuscuta*

141. Double membranous cell organelle is
(a) Lysosome
(b) Chloroplast
(c) Endoplasmic reticulum
(d) Ribosome

142. Select the incorrect statement w.r.t plasma membrane
(a) It is composed of lipids that are arranged in a bilayer
(b) Tails of membrane lipids are hydrophobic
(c) Non-polar heads of membrane lipids are found in interior side only
(d) It allows the transport of molecules across it

143. Which of the following plastid is a store house for oil and lipids?
(a) Amyloplast (b) Aleuroplast
(c) Elaioplast (d) Chromoplast

144. Terminalisation of chiasmata occurs in
(a) Prophase II
(b) Diakinesis of prophase I
(c) Metaphase II
(d) Pachytene of prophase I

145. Pairs of homologous chromosomes separate during
(a) Telophase I (b) Anaphase I
(c) Metaphase I (d) Anaphase II

146. If a meiocyte has 36 chromosomes in G_2 phase, what will be the number of chromosomes in the each of meiosis-I products?
(a) 18 (b) 36 (c) 54 (d) 96

147. Select the option which is not true to the biomolecule forming exoskeleton of arthropods?
(a) It is a polysaccharide
(b) Its monomer units are N-acetylglucosamine
(c) It is a branched molecule
(d) It is a homopolymer

148. Sucrose and inulin both contain
(a) Glucose (b) Fructose
(c) Galactose (d) Mannose

149. In the given reaction, what will be the impact on the magnitude of K_m and V_{max} in presence of reversible competitive inhibitor?

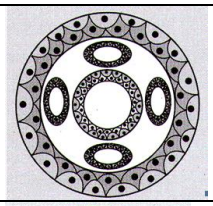
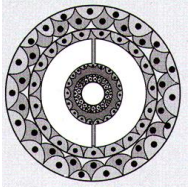
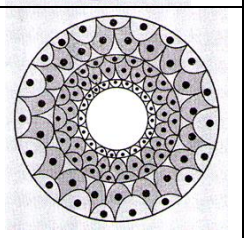
$$\text{Succinate} \xrightarrow{\text{Succinic dehydrogenase}} \text{Fumarate} + 2H^- + 2e^-$$

K_m	V_{max}
(a) Increases	Remains same
(b) Increases	Increases
(c) Decreases	Decreases
(d) Decreases	Remains same

150. Which of the following amino acid posses R-group as hydroxymethyl?
(a) Alanine (b) Tryptophan
(c) Serine (d) Valine

ZOOLOGY
SECTION - A
Section - A

151. Match the column – I and II, and choose the correct combination from the option given.

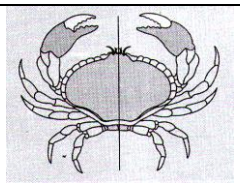
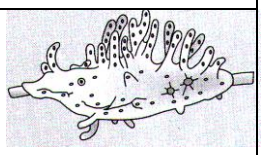
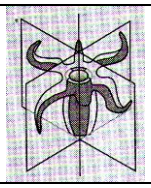
	Column – I		Column – II
A.	The body cavity is lined by mesoderm	1.	
B.	Body cavity is absent	2.	
C.	Body cavity is not lined by mesoderm, instead, the mesoderm is present as scattered pouches in between ectoderm and endoderm	3.	

(a) a – 1, b – 3, c – 2 (b) a – 3, b – 2, c – 1
(c) a – 2, b – 1, c – 3 (d) a – 2, b – 3 , c – 1

152. Read the statement carefully:
Notochord is a mesodermally derived rod – like structure formed on the ventral side during embryonic development in some animals (chordates). Point out, if any misprinting is observed in this statement.
(a) Origin is not mesodermal
(b) Structure is not rod like
(c) Dorsal side instead of ventral side
(d) No misprinting is observed in this statement

153. Animals which regulate their body temperature are called
(a) Warm blooded (b) Homoiothermic
(c) Endothermic (d) All of the above

154. Match the column – I and II, and choose the correct combination from the options given.

	Column – I		Column - II
A.	Any plane passing through central axis of body divides the organism into two identical halves	1.	
B.	Body can be divided into identical left and right halves in only one plane	2.	
C.	Any plane that passes through the centre does not divide them into equal halves	3.	

(a) A – 1, B – 2, C – 3 (b) A – 3, B – 2, C – 1
(c) A – 3, B – 1, C – 2 (d) A – 2, B – 3, C – 1

155. True segmentation or metamerism means.
(a) body is externally and internally divided into segments
(b) Each segment of body has serial repetition of at least some organs
(c) Both (a) and (b)
(d) There is no repetition of any organ in successive segments

156. Match the column – I and II, and choose the correct combination from the options given.

	Column – I (Organisms)		Column – II (Respiratory Organs
A.	Sponges	1.	Gills
B.	Flatworms	2.	Lungs
C.	Earthworms	3.	Entire body surface
D.	Insects	4.	Moist cuticle
E.	Aquatic arthropods	5.	Tracheal tubes

(a) A – 3, B – 1, C – 4, D – 5, E – 2
(b) A – 1, B – 3, C – 1, D – 4, E – 2
(c) A – 3, B – 3, C – 4, D – 5, E – 1
(d) A – 3, B – 2, C – 4, D – 5, E – 1

157. What are the function of the conducting part the respiratory system?
A. Transportation of the atmospheric air to the alveoli
B. Clears atmospheric air from foreign particles
C. Humidifies atmospheric air
D. Brings the atmospheric air to body temperature
E. Diffusion of O_2 and CO_2 between blood and atmospheric air
(a) A, B and C (b) A, B, C and D
(c) A, B, C, D and E (d) A, B, C and E

158. The contraction of ……muscles lifts up the ribs and the sternum causing an increase in the volume of the thoracic chamber in the dorso – ventral axis.
(a) External intercostal muscles
(b) Internal intercostal muscles
(c) Diaphragm
(d) Both (a) and (b)

159. Match the columns I and II, and choose the correct combination from the options given.

	Column – I		Column – II
A.	IC	1.	EC + IRV
B.	EC	2.	RV + VC
C.	FRC	3.	VC – ERV
D.	VC	4.	ERV + RV
E.	TLC	5.	TV + ERV

(a) A – 3, B – 5, C – 4, D – 1, E – 2
(b) A – 5, B – 2, C – 3, D – 5, E – 4
(c) A – 4, B – 3, C – 1, D – 5, E – 2
(d) A – 3, B – 5, C – 2, D – 4, E – 1

160. During inspiration
(a) Diaphragm and external intercostal muscles relax
(b) Diaphragm and internal intercostal muscles relax
(c) Diaphragm and external intercostal muscles contract
(d) Diaphragm and internal intercostal muscles contract

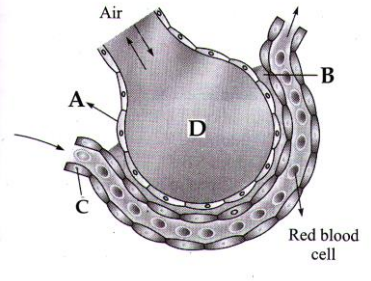
161. Find out correct match.

	pO_2 (in mm Hg)	pCO_2 (in mm Hg)
Atmospheric air	……..A….	….B….
Alveoli	…C…..	40
Deoxygenated blood	40	…….D….
Oxygenated blood	……E…	40
Tissues	….F…	45

(a) A – 104, B – 40, C – 95, D – 45, E – 45, F – 40
(b) A – 159, B – 40, C – 104, D – 45, E – 95, F – 40
(c) A – 159, B – 45, C – 104, D – 95, E – 40, F – 45
(d) A – 159, B – 0.3, C – 104, D – 45, E – 95, F – 40

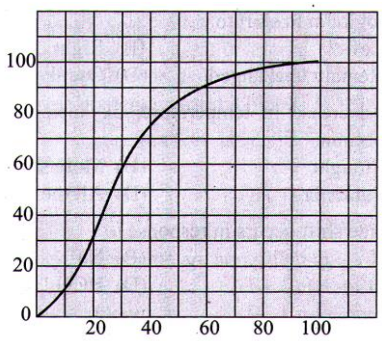
162. In lungs there is definite exchange of ions between RBC and plasma. Removal of CO_2 from blood involves
(a) Influx of Cl^- into RBC
(b) Efflux of Cl^- from RBC
(c) Influx of HCO_3^- ions in RBC
(d) Efflux of HCO_3^- ions from RBC

163. Recognise the figure and find out the correct matching.



(a) A – endothelium, B – basement membrane, C – alveolar wall, D – pulmonary cavity
(b) A – mesothelium, B – basement substance, C – alveolar wall, D – alveolar cavity
(c) A – alveolar wall, B – basement membrane, C – blood capillary, D – alveolar cavity
(d) A – alveolar wall, B – basement substance, C – blood capillary, D – alveolar cavity

164. In oxygen dissociation curve x – axis and y – axis represents



(a) x –axis – partial pressure of oxygen
y – axis - percentage saturation of Hb with oxygen
(b) x – axis – partial pressure of oxygen
y – axis – partial pressure of oxygen
(c) x – axis – partial pressure of CO_2
y–axis–percentage saturation of oxyhaemoglobin with oxygen
(d) x –axis – partial pressure of CO_2
y – axis – partial pressure of oxygen

165. About 97% of oxygen is transported by RBC. The remaining 3% is.
(a) Retained in lungs
(b) Dissolved in plasma and transported
(c) Attached to cell membrane
(d) Inside mitochondria

166. Haemoglobin has maximum affinity for
(a) CO (b) CO_2 (c) O_2 (d) NH_3

167. During cardiac cycle, each ventricle pump out blood which is called
(a) Stroke volume (b) Cardiac output
(c) Beat volume (d) Both (a) and (c)

168. Match the column – I and II, and choose the correct combination from the options given.

	Column – I		Column - II
A.	Respiratory rhythm centre	1.	Pons
B.	Pneumotaxic centre	2.	Cerebellum
C.	Apneustic centre	3.	Medulla
D.	Chemosensitive area	4.	Cerebrum

(a) A – 2, B – 3, C – 4, D – 1
(b) A – 3, B – 1, C – 2, D – 3
(c) A – 1, B – 3, C – 1, D – 2
(d) A – 3, B – 1, C – 1, D – 3

169. Neural signal from which centre can reduce the duration of inspiration is.
(a) Chemosensitive area
(b) Respiratory rhythm centre
(c) Pneumotaxic centre
(d) Receptors associated with aortic arch and carotid artery

170. Arrange the following in increasing order w.r.t. volume
1. Tidal volume
2. Residual volume
3. Expiratory reserve volume
4. Vital capacity
(a) 1 < 2 < 3 < 4 (b) 1 < 4 < 3 < 2
(c) 1 < 3 < 2 < 4 (d) 1 < 4 < 2 < 3

171. In human beings, duration of cardiac cycle is
(a) 0.08 second (b) 0.8 second
(c) 0.5 second (d) 8.0 second

172. Match the column – I with column – II, and choose the correct combination from the options given below.

	Column – I		Column – II
A.	Inflammation of bronchi and bronchioles	1.	Emphysema
B.	Alveolar walls are damaged	2.	Occupational respiratory disorder
C.	Fibrosis (proliferation of fibrous tissues)	3.	Sigmoid
D.	Oxygen dissociation curve	4.	Asthma

	A	B	C	D
(a)	4	1	2	3
(b)	1	4	2	3
(c)	4	2	3	1
(d)	4	1	3	2

173. Match the column – I and II, and choose the correct combination from the options given.

	Column – I		Column – II
A.	Eosinophils	1.	Involved in inflammatory reactions
B.	Basophils	2.	Allergic reactions
C.	Neutrophils	3.	Responsible for immune response
D.	Lymphocytes	4.	Phagocytic cells
E.	Monocytes	5.	Gas transport

(a) A – 4, B – 5, C – 1, D – 2, E – 3
(b) A – 2, B – 1, C – 4, D – 3, E – 5
(c) A – 1, B – 2, C – 3, D – 4, E – 3
(d) A – 2, B – 1, C – 4, D – 3, E – 4

174. Which among the following statements are correct and which are wrong?
1. Plasma constitutes 45% of blood.
2. Albumin is plasma protein involved in osmotic balance
3. Blood clotting factors are present in blood
4. Plasma without clotting factors is serum
5. Minerals are not found in blood

(a) 1 – 4 correct, 5 wrong
(b) 1 – 2 correct, 3, 4, 5 wrong
(c) 2, 3, 4 correct, 1 and 5 wrong
(d) 2 and 4 correct, 1, 3, 5 wrong

175. Match the column – I and II, and choose the correct combination from the options given.

	Column – I (Formed elements)		Column – II (Number)
A.	Erythrocytes	1.	5 – 5.5 millions mm^{-3}
B.	Leucocytes	2.	6000 – 8000 mm^{-3}
C.	Platelets	3.	1,50,000 – 3,50,000 mm^{-3}

(a) A – 1, B – 2, C – 3 (b) A – 2, B – 1, c – 3
(c) A – 3, B – 2, C – 1 (d) A – 1, B – 3, C – 2

176. Fill in the blanks:

Blood groups	Antigens on RBCs	Antibodies in plasma
A	A	……1….
B	B	….2….
AB	….1….	….4….
O	…..5…..	Anti – A, B

(a) 1 – anti-A, 2 - anti- B, 3- nil, 4 – anti- B, 5- A, B
(b) 1 – anti-A, 2 – anti- B, 3 -A,B, 4-nil, 5 – nil
(c) 1 – anti-B, 2 - anti- A, 3 -A,B, 4 – nil, 5 – nil
(d) 1 – anti-B, 2 – anti -A, 3 – nil, 4 – anti-B, 5-A, B

177. Erythroblastosis foetalis can be avoided by administering ……A…..to the ….B…. immediately after the delivery of the …..C…. child
(a) A – Rh antibodies, B – child, C - first
(b) A – Rh antibodies, B – mother, C – second
(c) A – anti – Rh antibodies, B – mother, C – second
(d) A – anti – Rh antibodies, B – mother, C – first

178. Prothrombin $\xrightarrow{A}$ Thrombin
Fibrinogen $\xrightarrow{B}$ Fibrin
Recognise A and B
(a) A – thrombokinase, B - thrombin
(b) A – fibrin, B – thrombokinase
(c) A – thrombokinase, B – thrombinase
(d) A – thrombinase, B – thrombokinase

179. Important function of lymph is
(a) Transport oxygen to brain
(b) Transport CO_2 to lungs
(c) Return RBCs to lymph nodes
(d) Return interstitial fluid to blood

180. Read the following statements and find out the incorrect statements.
A. Heart is situated in the thoracic cavity, is between the two lungs, slightly tilted to the right
B. Heart has the size of a clenched fist
C. Heart is protected by double walled membranous bag, pericardium, enclosed the pericardial fluid
D. Human heart has four chambers, two relatively larger upper chambers called atria and two smaller lower chambers called ventricles
E. A thick muscular wall called the inter – atrial septum separates the left and right ventricles.

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

181. Match the column – I and II, and choose the correct combination from the options given.

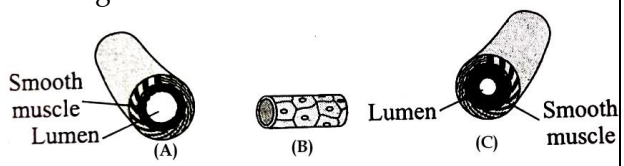
	Column – I (Organisms)		Column – II (Heart)
A.	Fishes	1.	Two – chambered
B.	Amphibians	2.	Three – chambered
C.	Reptiles	3.	Four – chambered
D.	Birds		
E.	Mammals		

(a) A – 1, B – 1, C – 2, D – 2, E – 3
(b) A – 1, B – 1, C – 2, D – 3, E – 3
(c) A – 1, B – 2, C – 2, D – 3, E – 3
(d) A – 1, B – 2, C – 3, D – 2, E – 2

182. How many cardiac cycles performed per minute?
(a) 72 (b) 12 – 16 (c) 80 – 120 (d) 30

183. Read the following statements and find out the incorrect statement.
(a) For a detailed evaluation of the heart's function, multiple leads are attached to the chest region
(b) The end of the P – wave marks the end of systole
(c) The ventricular contraction starts shortly after Q and marks the beginning of the systole
(d) By counting the number of QRS complexes that occur in a given time period, one can determine the heart beat rate of an individual.

184. Recognise the figure and find out the correct matching.

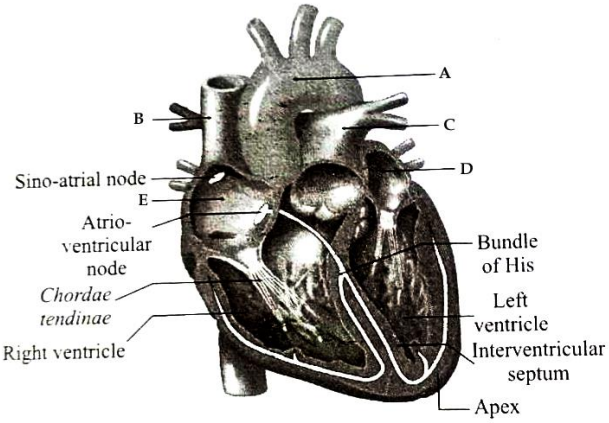


(a) A – artery, B – vein, C – capillary
(b) A – artery, A – vein, B – capillary
(c) B – artery, C – vein, A – capillary
(d) A – artery, C – vein, B – capillary

185. Read the following statements and find out the incorrect statements.
A. All vertebrates and a few invertebrates have a closed circulatory system
B. Hypertension leads to heart disease and also affects vital organs like brain and lungs
C. CAD affects the vessels that supply blood to the skeletal muscles.
D. In angina, a symptom of chronic chest pain appears when no enough oxygen is reaching the heart muscle
E. Heart attack means the state of heart when it is not pumping blood effectively enough to meet the needs of the body.
(a) A and B (b) B, C and E
(c) B, C and D (d) B, C, D and E

Section - B

186. Recognise the figure and find out the correct matching.



(a) B – pulmonary vein, A – vena cava, C – aorta, D – right atrium, E – left atrium
(b) C – pulmonary artery, B – vena cava, A – aorta, E – right atrium, D – left atrium
(c) A – pulmonary vein, C – vena cava, B – aorta, D – right atrium, E – left atrium
(d) C – pulmonary artery, A – vena cava, B – aorta, E – right atrium, D – left atrium

187. Match the column – I with column – II and choose the correct combination from the options given below.

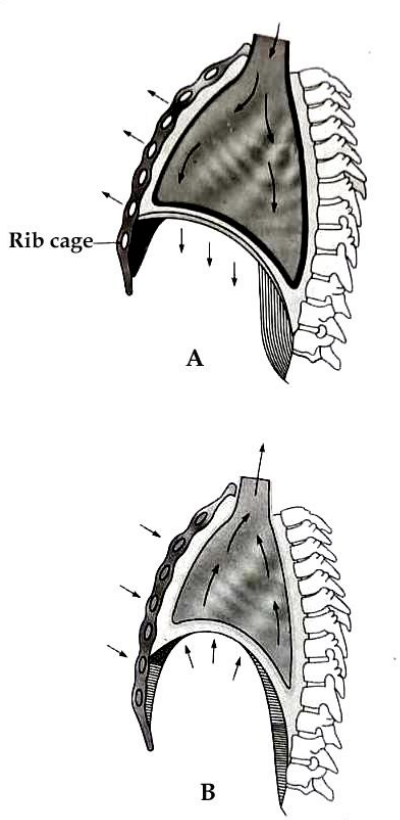
	Column – I		Column – II
A.	Cardiac output	1.	70 ml
B.	Stroke volume	2.	5 liters
C.	First heart sound	3.	Dub
D.	Second heart sound	4.	Lub

	A	B	C	D
(a)	1	2	3	4
(b)	2	1	3	4
(c)	1	2	3	4
(d)	2	1	4	3

188. Respiratory system is derived by
(a) Endoderm (b) Mesoderm
(c) Ectoderm (d) None of the above

189. Which one of the following is a correct matching pair?
(a) Lub – Sharp closure of AV valves at the beginning of ventricular systole
(b) Dub – Sudden opening of semilunar valves at the beginning of ventricular diastole
(c) Pulsation of the radial artery valves in the blood vessels
(d) Purkinje fibers – Initiation of the heart beat

190. Recognise the figure and find out the correct matching.



(a) A – inspiration, B – expiration
(b) A – expiration, B – inspiration
(c) A – breathing, B – diffusion
(d) A – diffusion, B – breathing

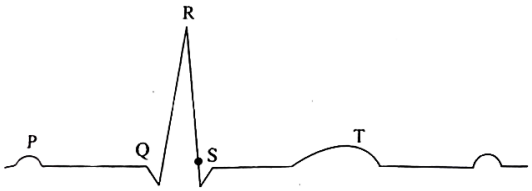
Assertion and Reason type questions

(a) If both assertion and reason are true and the reason is a correct explanation of the assertion
(b) If both assertion and reason re true but reason is not a correct explanation of the assertion
(c) If the assertion is true but reason is false
(d) If the assertion is false but the reason is true

191. **Assertion:** When there is a fall in the blood pressure due to loss of blood volume, this is compensated by vasoconstriction of veins.
Reason: Veins hold the extra amount of blood which can be shifted to the arteries as required
(a) (b) (c) (d)

192. **Assertion:** Blood is colourless in the insects
Reason: Insect blood has no role in O_2 transport
(a) (b) (c) (d)

193. Given here is an ECO of a normal human. Which one of its components is correctly interpreted?



(a) QRS completes – one completes pulse
(b) Peak T – initiation of total cardiac contraction
(c) Peaks P and R – systole and diastole blood pressure
(d) Peak T – initiation of left atrial contraction only

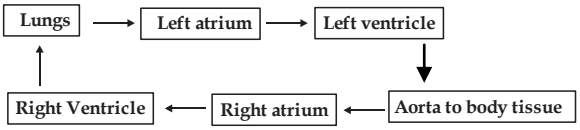
194. What is the correct regarding blood pressure?
(a) 105/50 mm Hg makes one very active
(b) 100/50 mm Hg is considered an ideal blood pressure
(c) 190/110 mm Hg may harm vital organs like brain and kidneys
(d) 130/90 mm Hg is considered as high and requires treatment.

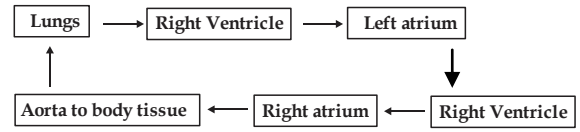
195. Foramen ovale
(a) Connects the two atria in the foetal heart
(b) Connects pulmonary trunk and aorta in foetus
(c) Is conditions in which heart valves do not completely close
(d) Is a shallow depression in the inter – ventricular septum

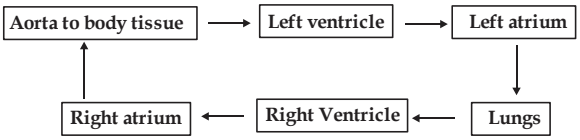
196. Hiccups can be best described as.
(a) Forceful sudden expiration
(b) Forceful contraction of intercostal muscles during deep breathing
(c) Vibration of the soft plate during breathing while sleeping
(d) Jerky incomplete inspiration

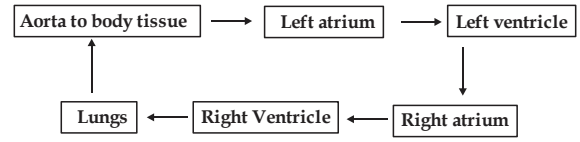
197. The cardiac pacemaker in Aditya fails to function normally. Dr. Ram finds that an artificial pacemaker is to be grafted in him. It is likely that it will be grafted at the site of
(a) Atrioventricular bundle
(b) Purkinje fibres
(c) Sino – atrial node
(d) Atrio – ventricular node

198. Find the correct sequence that depicts the flow of blood in human circulatory system.

(a)


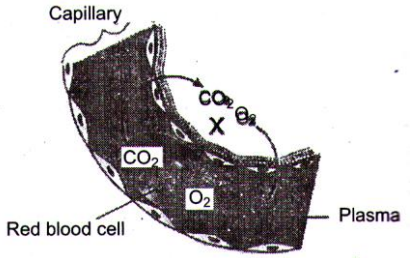
(b)


(c)


(d)


199. Lungs have a large number of alveoli of
(a) Having spongy texture and proper shape 3
(b) More surface area for diffusion of gases
(c) More space for increasing volume of inspired air
(d) More nerve supply

200. The diagram below represents part of a capillary in a specific region of the human body. The region labeled X represents part of



(a) a glomerulus (b) an alveolus
(c) a villus (d) the liver