



Aakash

Medical | IIT-JEE | Foundations

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MM : 720

Fortnightly Test for NEET-2026_RM(P3)_FT-03C

Time : 180 Min.

Topics Covered:

Physics: Work, Energy & Power, System of Particles & Rotational Motion

Chemistry: Chemical Bonding and Molecular Structure, Thermodynamics

Botany: Biological Classification-II: (from Cyanobacteria to Lichens), Morphology of Flowering Plants

Zoology: Breathing & Exchange of Gases-II: (Upto disorders), Body Fluids & Circulation

General Instructions :

Duration of Test is 3 hrs.

The Test consists of 180 questions. The maximum marks are 720.

There are four parts in the question paper consisting of Physics, Chemistry, Botany and Zoology having 45 questions in each part of equal weightage.

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.

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

Mark should be dark and completely fill the circle.

Dark only one circle for each entry.

Dark the circle in the space provided only.

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

- A particle moves from point $(i - j)$ m to a point $(6i - 2j)$ m under the action of force $(10i - 2j)$ N. The work done by the force is

 - 8 J
 - 56 J
 - 64 J
 - Zero
- A : Internal forces on a system may increase kinetic energy of the system.
R : Internal forces on a system cannot change net linear momentum of the system.

 - Both Assertion & Reason are true and the reason is the correct explanation of the assertion
 - Both Assertion and Reason are false statements
 - Assertion is true statement but Reason is false
 - Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
- A block of mass m is suspended through a spring of spring constant k and is in equilibrium. A sharp blow gives the block an initial upward velocity v . How far from the equilibrium position, the block comes to an instantaneous rest?

 - $v\sqrt{\frac{m}{2k}}$
 - $v\sqrt{\frac{2m}{k}}$
 - $v\sqrt{\frac{m}{k}}$
 - $\frac{v}{2}\sqrt{\frac{m}{k}}$
- A force $\vec{F} = (x\hat{i} + 2y\hat{j})$ N is applied on an object of mass 10 kg. Force displaces the object from position A(1, 0) m to position B(3, 3) m then the work done by the force is (x and y are in meter)

 - 8 J
 - 5 J
 - 13 J
 - 16 J

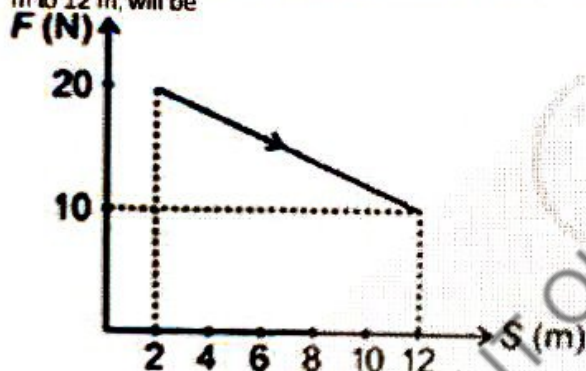
5. A : Work done by spring force is always positive.
R : Spring force always acts opposite to the displacement of particle from any position.

- (1) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
- (2) Both Assertion and Reason are false statements
- (3) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
- (4) Assertion is true statement but Reason is false

6. A bob of mass 'm' is rotated in a vertical circular path with the help of an ideal string attached to it. Work done by tension on bob is

- (1) Zero
- (2) Positive
- (3) Negative
- (4) May be positive, negative or zero

7. The force-displacement graph of a body is as shown in figure. The work done by force in displacing the body from 2 m to 12 m, will be



- (1) 200 J
- (2) 150 J
- (3) 100 J
- (4) 175 J

8. The kinetic energies of two similar cars A and B are 100 J and 225 J respectively. On applying breaks, car A stops after 1000 m and car B stops after 1500 m. If F_A and F_B are the forces applied by the breaks on cars A and B respectively, then the ratio of $\frac{F_A}{F_B}$ is

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

9. For a simple pendulum of length 1 m and mass of bob 2 kg has maximum angular displacement of $\frac{\pi}{3}$ rad, then its maximum kinetic energy is

- (1) 2 J
- (2) 5 J
- (3) 10 J
- (4) 25 J

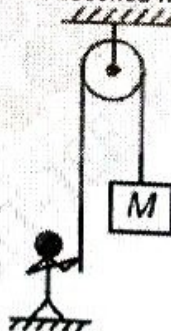
10. A force of 10 N is applied on a 5 kg mass at rest. The work done by the force in first two second will be

- (1) 20 J
- (2) 40 J
- (3) 30 J
- (4) Zero

11. A force acts on a 2 kg object such that its position is given as a function of time as x (m) = $3t^2 + 5$. What is the work done by this force in first 5 seconds?

- (1) 850 J
- (2) 900 J
- (3) 950 J
- (4) 875 J

12. If the man shown in the figure below starts pulling the string with a rate of 2 m/s^2 then work done by tension on the block in 2 seconds will be [Given $M = 5 \text{ kg}$]



- (1) 120 J
- (2) 240 J
- (3) 300 J
- (4) 20 J

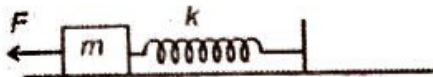
13. In a conservative field, the potential energy U as a function of position x is given as $U = x^2 + x + 3$, then the corresponding conservative force is given by

- (1) $2x + 1$
- (2) $-2x + 1$
- (3) $2x + 3$
- (4) $-2x - 1$

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

(1) 6 Nm
(2) 10 Nm
(3) 15 Nm
(4) 22 Nm

15. A block of mass m is connected to a spring of force constant k . Initially the block is at rest and spring is at its natural length. A constant force F is applied horizontally towards left. The maximum elongation in the spring is given by



(1) $\frac{F}{5k}$
(2) $\frac{F}{k}$
(3) $\frac{F}{6k}$
(4) $\frac{2F}{k}$

16. The average power required by the engine of car of mass 1000 kg to accelerate it from rest to a speed of 72 km/h in 20 s is

(1) 10 kW
(2) 1 kW
(3) 100 kW
(4) 1000 kW

17. Which among the following relations is correct?

(1) $1 \text{ kWh} = 3.6 \times 10^3 \text{ J}$
(2) $1 \text{ hp} = 746 \text{ W}$
(3) $1 \text{ kcal} = 4.2 \text{ J}$
(4) $1 \text{ J} = 4.2 \text{ cal}$

18. **Statement-I** : Work done by conservative force on a body is independent of path followed by the body.

Statement-II : Work done by a conservative force around a closed path is zero.

(1) Both statements are correct
(2) Only statement A is correct
(3) Only statement B is correct
(4) Both statements are incorrect

19. Negative of work done by conservative forces is equal to change in

(1) Potential energy
(2) Kinetic energy
(3) Mechanical energy
(4) Both (2) and (3)

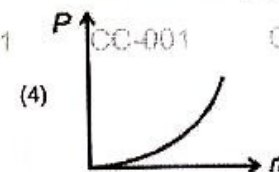
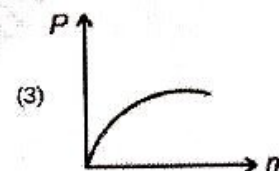
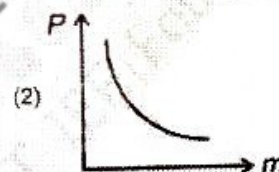
20. A constant torque of 300 N m turns a wheel. If angular velocity of wheel after 4 s starting from rest is 12 rad/s, then moment of inertia of the wheel will be

(1) 300 kg m^2
(2) 100 kg m^2
(3) 200 kg m^2
(4) 50 kg m^2

21. On a frictionless horizontal surface, a ball of mass m moving with speed v collides elastically with another ball of equal mass m which is initially at rest. After collision, the first ball moves at an angle of 30° to its initial direction. The kinetic energy of second ball after the collision is

(1) $\frac{1}{9}mv^2$
(2) $\frac{1}{4}mv^2$
(3) $\frac{1}{8}mv^2$
(4) $\frac{1}{2}mv^2$

22. If kinetic energy of a body remains constant, then momentum versus mass graph is



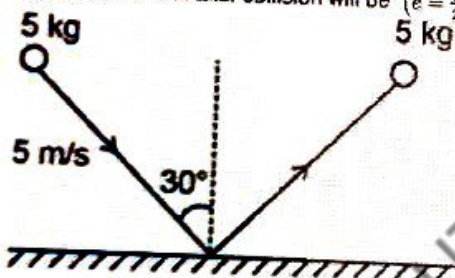
23. Two balls moving with speed 20 m/s and 10 m/s on a straight road in opposite direction collide head on. If coefficient of restitution is $\frac{1}{2}$, then relative velocity of separation between the ball will be

(1) 20 m/s
(2) 10 m/s
(3) 30 m/s
(4) 15 m/s

24. A ball of mass m_1 is moving with speed u towards another stationary ball of mass m_2 . After collision ball of mass m_1 comes to rest and ball of mass m_2 starts moving with speed v . The coefficient of restitution is

(1) $\frac{m_1}{m_2}$ CC-001 CC-001 CC-001
(2) $\frac{m_2}{m_1}$
(3) $\left(\frac{m_1}{m_2}\right)^2$
(4) $\left(\frac{m_2}{m_1}\right)^2$

25. A ball of mass 5 kg is projected at angle 30° with the vertical as shown in figure. The angle at which ball will go with respect to vertical after collision will be ($e = \frac{1}{2}$)



(1) $\tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$
(2) $\tan^{-1}(2)$
(3) $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$
(4) $\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$ CC-001 CC-001 CC-001

26. A : It is harder to open the door if we apply force near the hinge.

R : $\vec{\tau} = \vec{r} \times \vec{F}$, where symbols have their usual meaning.

(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Both Assertion and Reason are false statements

27. Two particles of masses 2 kg and 4 kg are approaching each other with an acceleration of 1 ms^{-2} and 2 ms^{-2} respectively, on smooth horizontal surface. The acceleration of centre of mass of system is

(1) 1 ms^{-2}
(2) Zero
(3) 2 ms^{-2}
(4) 1.5 ms^{-2}

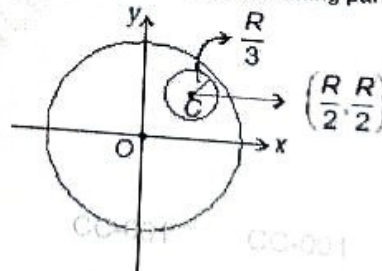
28. The linear density of a thin rod of length 1 m is given by expression $\lambda = (1 + 2x)$, where x is distance from its one end. What is the distance of centre of mass from this end?

(1) $\frac{5}{7} \text{ m}$ CC-001 CC-001
(2) $\frac{7}{12} \text{ m}$
(3) $\frac{1}{3} \text{ m}$
(4) $\frac{4}{5} \text{ m}$

29. Two objects of masses 2 kg and 4 kg are placed at positions $(3\hat{i} + 2\hat{j}) \text{ m}$ and $(2\hat{j}) \text{ m}$ respectively. The position of centre of mass is

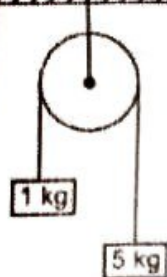
(1) $(3\hat{i} + 2\hat{j}) \text{ m}$
(2) $(\hat{i} + 2\hat{j}) \text{ m}$
(3) $(2\hat{i} + 2\hat{j}) \text{ m}$
(4) $(3\hat{i} + \hat{j}) \text{ m}$

30. A disc of mass $9m$ and radius R is placed in x - y plane as shown in figure. A small disc of radius $\frac{R}{3}$ is removed from it. The centre of mass for remaining part is



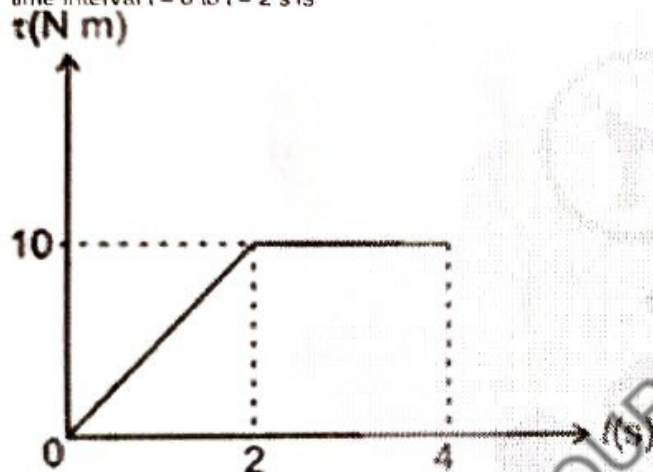
(1) $\left(-\frac{R}{10}, \frac{R}{10}\right)$
(2) $\left(\frac{R}{10}, -\frac{R}{10}\right)$
(3) $\left(\frac{R}{2}, -\frac{R}{2}\right)$
(4) $\left(-\frac{R}{2}, \frac{R}{2}\right)$

31. The acceleration of centre of mass of system shown in the figure is (Assume pulley and strings are ideal)



- (1) $\frac{2g}{9}$
 (2) Zero
 (3) $\frac{4g}{9}$
 (4) g

32. The torque (τ) acting on a flywheel varies with time (t) as shown in the figure. The change in angular momentum in time interval $t = 0$ to $t = 2$ s is



- (1) 5 N m s
 (2) 10 N m s
 (3) 20 N m s
 (4) 30 N m s

33. The radius of gyration of a uniform circular disc of radius a , rotating about an axis perpendicular to the plane and passing through its centre of mass, is

- (1) $\frac{a}{\sqrt{3}}$
 (2) $\frac{a}{2}$
 (3) $\frac{a}{\sqrt{2}}$
 (4) $\frac{a}{3}$

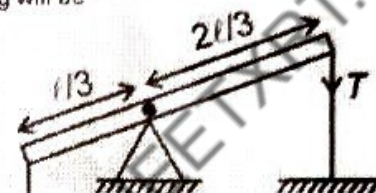
34. A particle of mass 5 kg is moving with uniform speed $3\sqrt{2}$ m/s in xy plane along the line $y = x$. The magnitude of its angular momentum about origin is

- (1) 40 units
 (2) 60 units
 (3) Zero
 (4) $40\sqrt{2}$ units

35. A couple acting on an isolated body produces

- (1) Rotational motion without translational motion
 (2) Translational motion without rotational motion
 (3) Both translational motion and rotational motion
 (4) Neither translational motion nor rotational motion

36. A light rod of length l is at rest about a smooth hinge using a 10 kg block and a light thread as shown. The tension in the string will be



$m = 10 \text{ kg}$

- (1) 100 N
 (2) 75 N
 (3) 50 N
 (4) 45 N

37. The instantaneous angular position of a point on a rotating wheel is given by the equation $\theta(t) = 2t^3 - 6t^2$. The torque on the wheel becomes zero at

- (1) $t = 2$ s
 (2) $t = 1$ s
 (3) $t = 0.2$ s
 (4) $t = 0.25$ s

38. The torque of force $\vec{F} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ acting at a point $\vec{r} = 3\hat{i} + 2\hat{j} + 3\hat{k}$, about the origin is

- (1) $6\hat{i} - 6\hat{j} + 12\hat{k}$
 (2) $-6\hat{i} + 6\hat{j} - 12\hat{k}$
 (3) $17\hat{i} - 6\hat{j} - 13\hat{k}$
 (4) $-17\hat{i} + 6\hat{j} + 13\hat{k}$

39. The value of $\frac{K^2}{R^2}$ for a solid sphere with radius R and radius of gyration K about an axis along its diameter is
- (1) 1
 - (2) $\frac{2}{5}$
 - (3) $\frac{2}{3}$
 - (4) $\frac{1}{2}$

40. Given below are two statements:
Statement I: Centre of mass of any object always coincide with centre of gravity.
Statement II: Centre of gravity is the point where total gravitational torque on the body is zero.
 In the light of the above statements, choose the most appropriate answer from the options given below.
- (1) Both statements I and II are correct
 - (2) Both statements I and II are incorrect
 - (3) Statement I is correct but II is incorrect
 - (4) Statement I is incorrect but II is correct

41. Match the Column I with Column II.

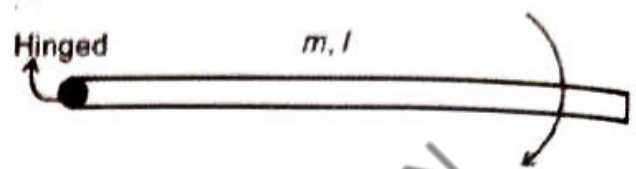
Column I	Column II
(A) Moment of inertia of rod (m, l) about its one end.	(P) $\frac{ml^2}{8}$
(B) Moment of inertia of hollow sphere (mass- m , Dia- f) about its diameter	(Q) $\frac{2}{3}ml^2$
(C) Moment inertia of square plate (mass m , side length l) about axis passing through its centre and perpendicular to its plane	(R) $\frac{ml^2}{6}$
(D) Moment of inertia of cylinder (mass- m , Dia- f) about its axis	(S) $\frac{ml^2}{3}$

- (1) A(P); B(Q); C(R); D(S)
- (2) A(S); B(Q); C(S); D(R)
- (3) A(S); B(R); C(Q); D(P)
- (4) A(S); B(R); C(R); D(P)

42. A uniform rod of mass m , length l rests on a smooth horizontal surface. Rod is given a sharp horizontal impulse p perpendicular to the rod at a distance $l/4$ from the center. The angular velocity of the rod will be

- (1) $\frac{3p}{ml}$
- (2) $\frac{p}{ml}$
- (3) $\frac{p}{2ml}$
- (4) $\frac{2p}{ml}$

43. A uniform rod of mass m and length l is fixed at one end and released from horizontal position as shown in the figure. The angular velocity of the rod when the rod makes an angle 60° with vertical is

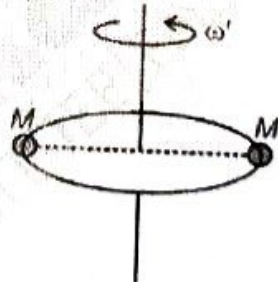


- (1) $\sqrt{\frac{3g}{2l}}$
- (2) $\sqrt{\frac{4g}{3l}}$
- (3) $\sqrt{\frac{2g}{l}}$
- (4) $\sqrt{\frac{3g}{l}}$

44. The principle used by a gymnast to increase the number of somersaults, is law of conservation of

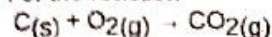
- (1) Linear momentum
- (2) Energy
- (3) Mass
- (4) Angular momentum

45. A disc of mass M and radius R rotates with an angular speed ω . If two point masses each of mass M are placed gently at a distance R from the centre. Then new angular speed is



- (1) 3ω
- (2) $\frac{\omega}{5}$
- (3) $\frac{\omega}{3}$
- (4) 5ω

46. For the reaction

at constant temperature, $\Delta H - \Delta U$ is

- (1) $+RT$
 (2) Zero
 (3) $-RT$
 (4) $\frac{RT}{2}$

47. What is not true about two species CN^- and N_2 ?

- (1) Both possess same bond order
 (2) Both are isoelectronic
 (3) Both are diamagnetic
 (4) Both are chemically inert

48. Match List I with List II

	List-I Molecule		List-II Shape
a.	XeO_3	(i)	Tetrahedral
b.	SiCl_4	(ii)	T-Shape
c.	ClF_3	(iii)	Square planar
d.	XeF_4	(iv)	Trigonal pyramidal

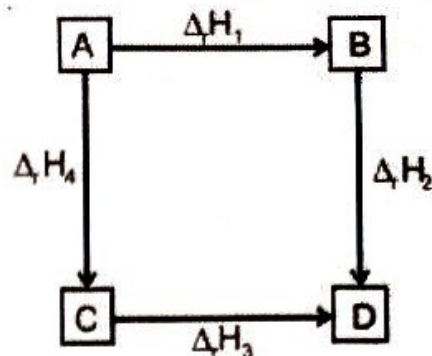
The correct match is

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

49. Intensive property among the following is

- (1) Volume
 (2) Number of mole
 (3) Pressure
 (4) Surface area

50. Based on the diagram shown below, the correct relation is



- (1) $\Delta_r H_1 = \Delta_r H_2 + \Delta_r H_3 + \Delta_r H_4$
 (2) $\Delta_r H_1 - \Delta_r H_4 = \Delta_r H_3 - \Delta_r H_2$
 (3) $\Delta_r H_3 - \Delta_r H_4 = \Delta_r H_1 - \Delta_r H_2$
 (4) $\Delta_r H_4 = \Delta_r H_1 = \Delta_r H_2 + \Delta_r H_3$

51. Consider the following statements about O_2^{2-} ion

- (a) Highest occupied molecular orbital is π^* orbital
 (b) Bond order is one
 (c) Diamagnetic in nature
 The correct statement(s) is/are

- (1) (a) only
 (2) (b) and (c) only
 (3) (a) and (c) only
 (4) (a), (b) and (c)

52. Hybridization of Xe in XeOF_4 is

- (1) sp^3
 (2) sp^3d^2
 (3) sp^3d^3
 (4) sp^3d

53. 2 mole of an ideal gas at 127°C undergoes expansion isothermally and reversibly from 1 litre to 10 litre. The entropy change in the process is

- (1) 38.29 J/K
 (2) 32.94 J/K
 (3) 46.34 J/K
 (4) 44.44 J/K

54. The species in which resonance does not take place is

- (1) NO_3^-
 (2) CO_3^{2-}
 (3) CH_3O^-
 (4) SO_4^{2-}

55. If $\Delta_f H^\circ(\text{NaCl(s)})$, $\Delta_{\text{sub}} H^\circ(\text{Na(s)})$, $\Delta_{\text{bond}} H^\circ(\text{Cl}_2(\text{g}))$, $\Delta_i H^\circ(\text{Na})$ and $\Delta_{\text{eg}} H^\circ(\text{Cl}(\text{g}))$ are -411.2 , 108.4 , 242 , 496 and -348.6 kJ mol^{-1} then $\Delta_{\text{lattice}} H^\circ(\text{NaCl(s)})$ will be

- (1) 788 kJ mol^{-1}
- (2) 540 kJ mol^{-1}
- (3) 684 kJ mol^{-1}
- (4) 820 kJ mol^{-1}

56. The energy required to raise the temperature of 50 g of Cu from 35°C to 80°C (specific heat of copper is $0.39 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$)

- (1) 877.5 J
- (2) 438.75 J
- (3) 219.375 J
- (4) 785.6 J

57. Given below are two statements

Statement I: Magnitude of work done during isothermal expansion of an ideal gas is lesser than work done during adiabatic expansion of an ideal gas.

Statement II: Initial temperature is higher than final temperature during adiabatic expansion of an ideal gas.

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

- (1) Both statements I and II are incorrect
- (2) Both statements I and II are correct
- (3) Statement I is incorrect but statement II is correct
- (4) Statement I is correct but statement II is incorrect

58. Consider the following statements

- (a) Standard molar enthalpies of formation of 'S'(rhombic) and $\text{H}_2(\text{g})$ are zero
- (b) Heat is a path function
- (c) For spontaneous process ΔS_{total} is greater than zero.

The correct statement(s) is/are

- (1) (a) and (c) only
- (2) (a), (b) and (c)
- (3) (c) only
- (4) (a) and (b) only

59. The compound which contains coordinate bond is

- (1) MgCl_2
- (2) H_2O_2
- (3) NaNO_3
- (4) CaCl_2

60. The correct sequence of increasing covalent character is represented by

- (1) $\text{LiCl} < \text{NaCl} < \text{BeCl}_2$
- (2) $\text{BeCl}_2 < \text{LiCl} < \text{NaCl}$
- (3) $\text{NaCl} < \text{LiCl} < \text{BeCl}_2$
- (4) $\text{BeCl}_2 < \text{NaCl} < \text{LiCl}$

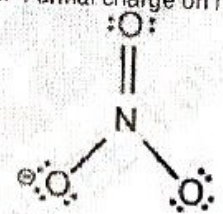
61. $\Delta_f H^\circ$ of H_2O is -68 kcal , then heat of formation of OH^- is

- (1) $+54.3 \text{ kcal mol}^{-1}$
- (2) $-54.3 \text{ kcal mol}^{-1}$
- (3) $-34 \text{ kcal mol}^{-1}$
- (4) $+68 \text{ kcal mol}^{-1}$

62. Heat of neutralisation of a weak dibasic acid is found to be $-25.2 \text{ kcal mol}^{-1}$. The enthalpy of ionisation of weak acid will be

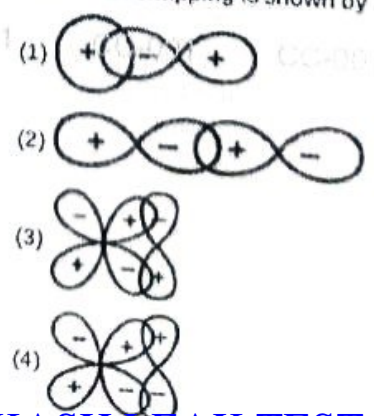
- (1) $2.2 \text{ kcal mol}^{-1}$
- (2) $13.3 \text{ kcal mol}^{-1}$
- (3) $6.2 \text{ kcal mol}^{-1}$
- (4) $1.5 \text{ kcal mol}^{-1}$

63. Formal charge on nitrogen in the given species is



- (1) Zero
- (2) -1
- (3) $+1$
- (4) $+2$

64. Positive overlapping is shown by



65. Which of the following compound is not an exception to octet rule?
- PCl_3
 - SF_6
 - AlCl_3
 - H_2SO_4
66. Two moles of an ideal gas expanded spontaneously into vacuum. The work done will be
- Zero
 - 4 J
 - 9 J
 - 10 J
67. Given below are the two statements.
Statement I: A polyatomic molecule can have zero dipole moment.
Statement II: It is necessary for a polyatomic molecule to have linear geometry to have dipole moment zero
 In light of above statements, choose the correct answer from the options given below.
- Statement I is correct but statement II is incorrect
 - Statement I is incorrect but statement II is correct
 - Both statement I and statement II are correct
 - Both statement I and statement II are incorrect
68. For monoatomic ideal gas the value of the ratio of C_p and C_v is
- $\frac{5}{3}$
 - $\frac{5}{2}$
 - $\frac{4}{3}$
 - $\frac{7}{5}$
69. If bond dissociation enthalpies of H_2 , Br_2 and HBr respectively are 435 kJ mol^{-1} , 192 kJ mol^{-1} and 368 kJ mol^{-1} , then the enthalpy change during the reaction $\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \rightarrow 2\text{HBr}(\text{g})$, is
- 137 kJ
 - 109 kJ
 - 259 kJ
 - 259 kJ
70. Which of the following is correct for a cyclic process?
- $\Delta H = 0$
 - $W = 0$
 - $\Delta S = 0$
 - $\Delta U = 0$
- Only (a) and (d)
 - Only (b)
 - Only (a), (c) and (d)
 - Only (c)
71. Third law of thermodynamics states that
- The entropy of any pure crystalline substance approaches zero at absolute zero temperature
 - For an isolated system, entropy will increase in the direction of spontaneity
 - If a reaction takes place in several steps then its standard reaction enthalpy is the sum of the standard enthalpies of the intermediate steps
 - The energy of an isolated system is constant
72. Number of 90° bond angle(s) in PCl_5 is
- Zero
 - 3
 - 5
 - 6
73. If the equilibrium constant of a reaction is 2×10^3 at 25°C then the standard Gibbs free energy change for the reaction will be nearly
- $-2.5R \times 298$
 - $-7.6R \times 298$
 - $-7.6R$
 - $-5.1R \times 298$
74. Maximum heat will be released in which of the following acid-base neutralisation reactions?
- $\text{CH}_3\text{COOH} + \text{NH}_4\text{OH}$
 - $\text{HF} + \text{NaOH}$
 - $\text{HCl} + \text{NH}_4\text{OH}$
 - $\text{HCl} + \text{NaOH}$
75. When 6 moles of He gas at 27°C undergoes reversible isothermal expansion from 30 L to 60 L, then work done will be
- 4.5 kJ
 - 4.5 kJ
 - 10.4 kJ
 - 10.3 kJ

76. Given below are the two statements one is labelled as assertion (A) the other is labelled as reason (R).

Assertion (A): Boiling point of HF is higher than HCl.

Reason (R): HF forms intermolecular hydrogen bond with each other.

In the light of above statements, choose the correct answer.

- (1) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (2) (A) is true but (R) is false
- (3) (A) is false but (R) is true
- (4) Both (A) and (R) are true, (R) is the correct explanation of (A)

77. Given below are two statement, one is Assertion (A) other is Reason (R).

Assertion (A): Enthalpy is an extensive property.

Reason (R): An extensive property is a property whose value depends on the quantity of matter present in the system.

In the light of above statements choose the correct answer.

- (1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
- (2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
- (3) Assertion is true but Reason is false
- (4) Both Assertion and Reason are false

78. For the reaction, $3A(g) + 3B(s) \rightarrow 3C(g)$, If $\Delta U^\circ = -20 \text{ kJ}$ and $\Delta S^\circ = -80 \text{ JK}^{-1}$, then value of ΔG° at 298 K will be

- (1) 2.87 kJ
- (2) 3.84 kJ
- (3) 5.67 kJ
- (4) 1.28 kJ

79. According to molecular orbital theory, both σ -bond and π -bond are present in

- (1) B_2
- (2) H_2
- (3) N_2
- (4) C_2

80. Which among the following has maximum bond angle?

- (1) CO_3^{2-}
- (2) CO_2
- (3) CH_4
- (4) CCl_4

81. The correct order of covalent bond length is

- (1) $C-H > C-O > O-H > N-O$
- (2) $C-O > N-O > C-H > O-H$
- (3) $C-H > O-H > N-O > C-O$
- (4) $O-H > C-H > C-O > N-O$

82. Which of the following will result in zero overlap if molecular axis is z-axis?

- (1) $2s - 2s$
- (2) $2p_x - 2p_x$
- (3) $2p_x - 2p_y$
- (4) $2p_z - 2p_z$

83. Given below are the two statements

Statement I: PCl_5 contains two axial bonds and three equatorial bonds.

Statement II: In PCl_5 , equatorial bonds are slightly longer than axial bonds.

In light of the above statements, choose the correct answer

- (1) Both statement I and statement II are correct
- (2) Both statement I and statement II are incorrect
- (3) Statement I is correct but statement II is incorrect
- (4) Statement I is incorrect but statement II is correct

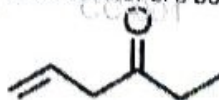
84. For which of the following processes, entropy change is negative?

- (1) Evaporation of water
- (2) Sublimation of camphor
- (3) Condensation of iodine vapours
- (4) Melting of ice

85. In SO_4^{2-} ion, bond order of S - O bond is

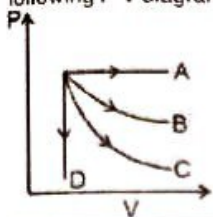
- (1) 1.33
- (2) 1.5
- (3) 1.25
- (4) 1.75

86. Total number of σ bonds in the following compound is



- (1) 16
- (2) 15
- (3) 14
- (4) 18

87. Match graphs in List-1 with process in list-2 according to following P-V diagram.



List-1	List-2
(a) A	(i) Isothermal
(b) B	(ii) Isochoric
(c) C	(iii) Adiabatic
(d) D	(iv) Isobaric

The correct match is

- (1) (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)
 (2) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)
 (3) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
 (4) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)
88. Match molecules in List-I with hybridisation of central atom in List-II, and choose the correct match.

List-I	List-II
a. BCl_3	(i) sp^2
b. SiCl_4	(ii) sp^3d
c. SF_4	(iii) sp^3d^2
d. BrF_5	(iv) sp^3

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

BOTANY

91. *Paramoecium* and *Plasmodium*

- (1) Both belong to the same kingdom as that of *Penicillium*
 (2) Both have cilia as locomotory organs
 (3) Both are endoparasites
 (4) Both are unicellular protozoans

92. Protozoan group which possess definite region of ingestion and egestion is

- (1) Flagellates
 (2) Ciliates
 (3) Sporozoans
 (4) Amoeboids

89. If the enthalpy of hydrogenation of cyclohexene is $-x \text{ kJmol}^{-1}$ and resonance energy of benzene is $-y \text{ kJmol}^{-1}$ then enthalpy of hydrogenation of benzene in kJmol^{-1} will be

- (1) $(-x - y)$
 (2) $(-3x - y)$
 (3) $(-3x + y)$
 (4) $(x + y)$

90. A diatomic molecule has net dipole moment 1.92 D and bond length 2.0 Å. The percentage ionic character of the molecule is ($1\text{D} = 3.33 \times 10^{-30} \text{ C-m}$)

- (1) 15%
 (2) 20%
 (3) 25%
 (4) 30%

93. *Rhizopus*, commonly called bread mould

- (1) Has aseptate mycelium
 (2) Does not produce zygospores
 (3) Produces edible fruiting bodies
 (4) Is a sac fungus

94. Loose tissue body organisation is characteristic feature of

- (1) Monera
 (2) Protista
 (3) Fungi
 (4) Plantae

95. The common field mushroom and morels both are edible fungi. They both differ from each other as former
- Has cell wall
 - Has septate mycelium
 - Has intervening dikaryotic stage
 - Produce exogenous meiospores
96. Sexual reproduction is absent in
- Puffballs
 - Colletotrichum*
 - Albugo*
 - Yeast
97. In which of the following protists, their overlapping shells fit together as in soap box?
- Diatoms
 - Desmids
 - Slime moulds
 - Sporozoans
98. Fungi can be differentiated from plants in
- Being eukaryotes
 - Mode of nutrition
 - Having cell wall
 - Having nuclear membrane
99. The causative agents of mumps are usually characterised by
- The presence of nucleic acid protected by protein coat
 - Absence of proteins
 - Presence of a well defined nucleus
 - Having a cell wall composed of chitin
100. Bovine spongiform encephalopathy is caused by
- An agent which is abnormally folded protein
 - An RNA virus
 - A bacteriophage
 - An agent that contains RNA of low molecular weight
101. Under suitable conditions, slime moulds form
- Fruiting bodies
 - Plasmodium
 - Haploid spores
 - Sporangium filled with spores
102. Which of the following is wrong feature w.r.t. *Mycoplasma*?
- They completely lack a cell wall
 - They are the smallest living cells
 - They can survive without oxygen
 - They are pathogenic in animals only
103. Read the following statements and select the option that is true for them.
- Statement A:** Amongst all eukaryotic chlorophyll-containing organism, a few members are partially heterotrophic.
- Statement B:** Viruses are characterised by having an inert crystalline structure outside the living cell.
- Only statement A is correct
 - Only statement B is correct
 - Both statements A and B are correct
 - Both statements A and B are incorrect
104. Amoeboid protozoans differ from all the other protozoan because they
- Use cilia for locomotion
 - Have two types of nuclei
 - Use flagella for movement
 - Use pseudopodia for capturing prey
105. Identify the following figure and select the option which has correct set of features regarding the organism.
- 
- Called *Drosophila* of plant kingdom
 - Chitinous cell wall
 - Thin walled, non-motile mitospores produced on sterigmata
 - Long dikaryophase
 - Exogenous meiospores
 - Sex organs present
- a, b, c, e & f
 - Only a, b, c & f
 - b, c, d, e & f
 - Only b, c & f

106. Find the correct match.

- (1) Euglenoids – Cellulosic cell wall
- (2) Chrysophytes – Mostly photosynthetic
- (3) Slime moulds – Autotrophic
- (4) Protozoans – Only parasites

107. Sleeping sickness is caused by

- (1) *Paramoecium*
- (2) *Amoeba*
- (3) *Entamoeba*
- (4) *Trypanosoma*

108. Which of the following statements is incorrect regarding fungi?

- (1) It is a unique kingdom of heterotrophic organisms
- (2) They are mostly terrestrial
- (3) They prefer to grow in warm & humid places
- (4) They are always diploid with thalloid body

109. Choose the wrong statement.

- (1) All members of ascomycetes are multicellular
- (2) *Neurospora* is used extensively in biochemical and genetic work
- (3) A large number of deuteromycetes are decomposers of litter and help in mineral recycling
- (4) The cell wall of fungi is composed of chitin and polysaccharides

110. Which one is incorrect w.r.t. lichen?

- (1) Lichens are the symbiotic association between algae and fungi
- (2) Algal component is known as phycobiont
- (3) Algae prepare food and fungi in return provide shelter, absorb mineral nutrients and water for its partner
- (4) Lichens are very good pollution indicators as they can grow well in polluted areas

111. Read the following statements and choose the correct option.

- A. *Gonyaulax* is a red dinoflagellate.
- B. In *Claviceps*, plasmogamy is immediately followed by karyogamy.
- C. *Alternaria* asexually reproduces through conidia.

- (1) Only A
- (2) A and B only
- (3) A and C only
- (4) Only B

112. State true (T) or false (F) for the given statements and select the correct option.

- (A) Fungi are heterotrophic and absorb soluble organic matter from dead substrate.
- (B) Bladderwort and Venus fly trap are insectivorous plants and *Cuscuta* is a parasite.
- (C) In *Agaricus* and *Puccinia*, mycelium is generally aseptate and coenocytic.
- (D) Fusion of protoplasm between two motile or non-motile gametes is called plasmogamy.

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

113. Endospermous seeds are seen in

- (1) Maize
- (2) Pea
- (3) Groundnut
- (4) Bean

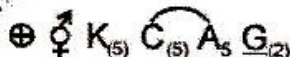
114. The largest posterior petal in pea flowers is called

- (1) Standard
- (2) Wings
- (3) Keel
- (4) Stipule

115. The mode of arrangement of sepals or petals in floral bud w.r.t. other members of same whorl is known as

- (1) Aestivation
- (2) Inflorescence
- (3) Placentation
- (4) Phyllotaxy

116.



is the floral formula of a plant family whose one of the members is

- (1) *Petunia*
- (2) *Gloriosa*
- (3) *Indigofera*
- (4) *Trifolium*

117. A small pore above the scar found on seed coat is

- (1) Micropyle
- (2) Hilum
- (3) Plumule
- (4) Tegmen

118. In pinnately compound leaf

- (1) Lamina is not incised
- (2) Leaflets are attached to common axis called rachis
- (3) Axil of each leaflet has bud
- (4) Leaflets are attached to the tip of petiole

119. Select the statements which are incorrect.

- (I) A flower is a modified leaf.
- (II) Different floral appendages are produced at successive nodes.
- (III) When a shoot tip is transformed into a flower, it is always solitary.
- (IV) Apical meristem changes to lateral meristem to form flower.

- (1) (I), (II) and (IV)
- (2) (II) and (III)
- (3) (III) and (IV)
- (4) (I) and (IV)

120. In maize seed, the outer covering of endosperm separates the embryo by a proteinaceous layer called

- (1) Scutellum
- (2) Pericarp
- (3) Aleurone layer
- (4) Coleoptile

121. Nucellus remains persistent in the seeds of

- (1) Gram
- (2) Pea
- (3) *Piper nigrum*
- (4) Maize

122. Identify the statement which is not correct w.r.t coconut

- (1) They develop from monocarpellary superior ovaries
- (2) The type of fruit is known as drupe
- (3) They have an inner stony hard endocarp
- (4) The mesocarp is fleshy and edible

123. Persistent calyx with valvate aestivation is observed in

- (1) Onion
- (2) Tulip
- (3) Brinjal
- (4) Aloe

124. Read the following statements and select the correct option.

Assertion (A): In cymose inflorescence the main axis is limited in growth.

Reason (R): In cymose inflorescence the flowers are borne in a basipetal order.

- (1) Only (A) is true
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (4) Both (A) and (R) are false

125. Select the incorrect match from the following.

- (1) Sunflower – Alternate phyllotaxy
- (2) *Alstonia* – Palmately compound leaf
- (3) Guava – Opposite phyllotaxy
- (4) Australian acacia – Expanded petiole

- (1) (1)
- (2) (2)
- (3) (3)
- (4) (4)

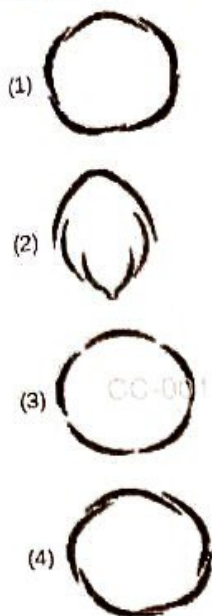
126. Which of the following is usually **not** the function of root?

- (1) Synthesis of plant growth regulators
- (2) Absorption of water and minerals from soil
- (3) Storage of reserve food materials
- (4) Manufacturing of food and its transportation to aerial parts of plant

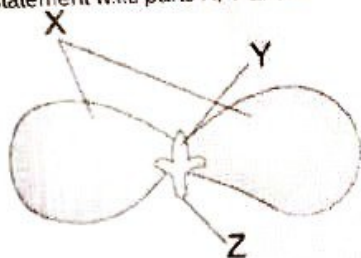
127. Select the incorrect one for china rose.

- (1) Monoadelphous stamens
- (2) Alternate phyllotaxy of leaves
- (3) Epigynous flowers
- (4) Twisted aestivation of petals

128. Which of the following aestivation is present in petals of *Calotropis*?



129. Refer the below given diagram and select the correct statement w.r.t. parts X, Y and Z.



- (1) 'Z' represents the structure that develops into shoot system on germination of seed
- (2) 'Y' represents the structure that is enclosed in coleorhiza
- (3) In grasses, the structure 'X' is called as coleoptile
- (4) 'X' represents the structures that are often fleshy and full of reserve materials

130. Read the following statements (A-D).

- (A) In *Dianthus* and *Primrose*, ovules are borne on central axis and septa are absent.
- (B) Variation in the length of filaments of stamens in flower is seen in *Salvia* and mustard.
- (C) In sunflower and marigold, the placenta forms a ridge along the ventral suture of the ovary and ovules are borne on this ridge.
- (D) In mustard, ovary is one-chambered but it becomes two chambered due to the formation of false septum.

The correct statements are

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

131. The flowers are zygomorphic in:

- (a) Mustard
- (b) Gulmohar
- (c) Cassia
- (d) *Datura*
- (e) Chilly

Choose the correct answer from the options given below:

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

132. Read the following statements and choose the correct option.

- Statement (A): Leaves originate from shoot apical meristem and arranged in an acropetal order of the stem.
- Statement (B): In some leguminous plants, the leaf base may become swollen, which is called the pulvinus.

- (1) Only statement A is incorrect
- (2) Only statement B is incorrect
- (3) Both statements A and B are correct
- (4) Both statements A and B are incorrect

133. Which of the given plants have superior ovary with axile placentation?

- a. Tomato
- b. Gram
- c. Mustard
- d. Tulip
- e. *Petunia*

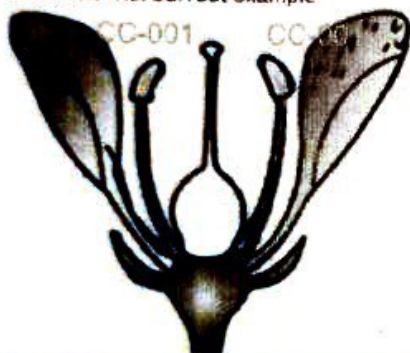
- (1) a and e only
- (2) a, b, c and d only
- (3) a, c, d and e only
- (4) a, d and e only

134. Which of the following statements are correct w.r.t. pneumatophores?

- They grow parallel to the earth surface.
- They help to get oxygen for respiration.
- They are generally found in those plants which grow in swampy areas.
- Their cells contain chlorophyll to perform photosynthesis.

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

135. Identify the figure w.r.t. the position of floral parts on thalamus with correct example



	Position of floral parts on thalamus w.r.t. the ovary	Example
(1)	Epigynous	- Plum
(2)	Perigynous	- Rose
(3)	Hypogynous	- Mustard
(4)	Perigynous	- Brinjal

- (1) (1)
- (2) (2)
- (3) (3)
- (4) (4)

ZOOLOGY

136. Diffusion membrane in lungs comprises:

- (1) Thin columnar epithelium of alveoli, endothelium of pulmonary capillaries and basement membrane
Ciliated squamous epithelium of alveoli, endothelium of pulmonary capillaries and basement substance between them
- (2) pulmonary capillaries and basement substance between them
Thin squamous epithelium of alveoli, endothelium of alveolar capillaries and basement substance between them
- (3) alveolar capillaries and basement substance between them
Ciliated columnar epithelium of alveoli, endothelium of alveolar capillaries and basement membrane between them
- (4) alveolar capillaries and basement membrane between them

137. Complete the analogy w.r.t. percentage of gases transported by RBCs and select the correct option.

$O_2 : 97\% :: CO_2 : \underline{\hspace{2cm}}$

- (1) 3%
- (2) 70%
- (3) 20-25%
- (4) 7%

143. Which of the following signals from the pneumotaxic centre can

- (1) Reduce the duration of inspiration
- (2) Increase the duration of inspiration
- (3) Reduce the duration of only forceful expiration
- (4) Increase the duration of expiration while reduce the duration of inspiration

139. Which of the following is a chronic disorder in which alveolar walls are damaged and due to which respiratory surface is decreased?

- (1) Asthma
- (2) Emphysema
- (3) Silicosis
- (4) Asbestosis

140. Which of the following representations is false w.r.t. partial pressure of O_2 and CO_2 under normal physiological conditions in human?

- (1) In alveoli, $pCO_2 < pO_2$
- (2) In deoxygenated blood, $pCO_2 > pO_2$
- (3) In tissues, $pCO_2 > pO_2$
- (4) In atmospheric air, $pO_2 < pCO_2$

141. Body of a person contains 5 L blood. What amount of O_2 can be delivered by 5 L of blood to tissues under normal physiological conditions?

- (1) 750 mL
- (2) 500 mL
- (3) 250 mL
- (4) 150 mL

142. Which of the following factors favours the formation of oxyhaemoglobin?

- (1) Low pO_2
- (2) High temperature
- (3) High H^+ concentration
- (4) High pH

143. Solubility of CO_2 in the blood is _____ times higher than O_2 . Fill the blank with a suitable option.

- (1) 120-125
- (2) 80-100
- (3) 20-25
- (4) 40-70

144. Assertion (A): Oxygenated blood has high pH as compared to deoxygenated blood.

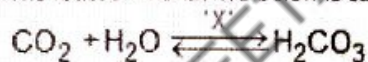
Reason (R): Oxygenated blood has less CO_2 content as compared to deoxygenated blood. In the light of above statements, choose the correct option.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) Both (A) and (R) are false
- (4) (A) is true but (R) is false

145. Which of the following factors primarily cannot affect the rate of diffusion of gases at alveoli?

- (1) The reactivity of gases
- (2) Solubility of the gases
- (3) Thickness of the membranes involved in diffusion
- (4) Concentration gradient of gases

146. The reaction mentioned below is catalysed by enzyme 'X'.



Select the correct option w.r.t. 'X'.

- (1) Catalase
- (2) Peroxidase
- (3) Carbonic anhydrase
- (4) Peptidase

147. Process responsible for movement of oxygen from the alveoli into blood in the pulmonary capillaries is

- (1) Facilitated diffusion
- (2) Simple diffusion
- (3) Active transport
- (4) Filtration

148. Under normal physiological condition, during the formation of oxyhaemoglobin, about 90% saturation of Hb with O_2 occurs when the pO_2 is about

- (1) 40 mm Hg
- (2) 60 mm Hg
- (3) 55 mm Hg
- (4) 45 mm Hg

149. What is the location of primary respiratory rhythm centre in human brain?

- (1) Pons
- (2) Medulla oblongata
- (3) Cerebellum
- (4) Cerebrum

150. In grinding or stone breaking industries, long exposure to dust can cause serious lung damage due to
- Proliferation of fibrous tissue
 - Thickening of muscles
 - Accumulation of blood in alveoli
 - Dilation of air pathway
151. Read the following statements w.r.t. humans.
Statement A: Role of oxygen in the regulation of respiratory rhythm is quite insignificant.
Statement B: A chemosensitive area which is present adjacent to the respiratory rhythm centre is highly sensitive to CO_2 and hydrogen ions.
 Choose the correct option.
- Both statements A and B are correct
 - Both statements A and B are incorrect
 - Only statement A is correct
 - Only statement B is correct
152. $\text{Hb} + \text{O}_2 \xrightleftharpoons[(2)]{(1)} \text{HbO}_2$
- Select (1) and (2) from the given options w.r.t. breathing in humans.
- (1) is tissues and (2) is lungs
 - (1) is lungs and (2) is air present in trachea
 - (1) is blood and (2) is lungs
 - (1) is lungs and (2) is tissues
153. A specialized mass of tissue located in the lower left corner of the right atrium, close to the atrio-ventricular septum is called
- AV bundle
 - Atrio-ventricular node
 - Bundle of His
 - Pacemaker
154. The end of T-wave in standard ECG of a normal person represents the
- Contraction of both the atria
 - End of ventricular systole
 - Beginning of the ventricular systole
 - Initiation of the atrial contraction
155. Which of the following is often referred to as atherosclerosis?
- Angina
 - High blood pressure
 - Heart failure
 - Coronary artery disease
156. Under normal physiological conditions, stroke volume of human heart in a non-athletic adult is
- 70 mL
 - 140 mL
 - 5040 mL
 - 180 mL
157. Read the following reactions and identify A and B respectively
- $$\text{Prothrombin} \xrightarrow[\text{Ca}^{2+}]{A} \text{Thrombin}$$
- $$\text{Fibrinogen} \xrightarrow[\text{Ca}^{2+}]{B} \text{Fibrin}$$
- Choose the correct option
- Thrombokinase, Thrombin
 - Thromboplastin, Thrombokinase
 - Thrombin, Thrombokinase
 - Thrombokinase, Thromboplastin
158. Neutrophils and monocytes differ from each other in all of the following, except
- The shape of their nuclei in mature form
 - Their contribution to total WBC content of blood
 - Phagocytosis of foreign organisms
 - Their cytoplasmic contents
159. Select the incorrect statement w.r.t. lymph.
- It is a colourless fluid containing lymphocytes.
 - It is an important carrier for nutrients, hormones, etc.
 - It has different mineral distribution as that present in plasma.
 - Fats are absorbed through lymph in the lacteals present in the intestinal villi.
160. Proteins contribute 6-8 per cent of plasma which is numerically equal to the per cent of _____ out of the total WBCs that is present in blood. Choose the option to fill the blank correctly.
- Neutrophils
 - Eosinophils
 - Monocytes
 - Lymphocytes

161. Read the following statements and select the correct option.

Statement (A): Damage to chordae tendinae of semilunar valves in aorta causes back flow of blood in left ventricle.

Statement (B): Closure of atrio-ventricular valves during ventricular systole generates first heart sound.

- (1) Both statements (A) and (B) are correct
- (2) Only statement (A) is correct
- (3) Only statement (B) is correct
- (4) Both statements (A) and (B) are incorrect

162. Read the following statement w.r.t erythroblastosis foetalis. To prevent erythroblastosis foetalis, the Rh-ve mother is administered A antibodies, immediately after the delivery of B Rh+ve child.

Choose the option that correctly fills the blanks A and B.

A	B
(1) Anti-A and Anti-B	Last
(2) Anti-A	First
(3) Anti-Rh	First
(4) Anti-B	Second

- (1) (1)
- (2) (2)
- (3) (3)
- (4) (4)

163. Read the following statements carefully.

- (a) Blood is considered as a fluid connective tissue and it does not have fibres.
 - (b) A healthy individual has 400-600 gms of haemoglobin in every 500 mL of blood.
 - (c) Spleen is the reservoir and graveyard of erythrocytes.
- Choose the correct option.

- (1) (a) and (c) are correct
- (2) (b) and (c) are incorrect
- (3) (a) and (b) are correct
- (4) (b) and (c) are correct

164. Read the following statements w.r.t human heart

- (i) Endodermally derived organ situated in the thoracic cavity.
 - (ii) In an adult, it is of the size of a clenched fist.
 - (iii) It is protected by a double walled membranous bag called the pericardium.
 - (iv) The small upper chambers of the heart are called atria and lower large chambers are called ventricles.
- How many statements is/are correct?

- (1) One
- (2) Two
- (3) Three
- (4) Four

165. The maximum number of action potentials generated by SAN in human heart under normal physiological conditions, is

- (1) 70-75/second
- (2) 70-75/minute
- (3) 60-65/minute
- (4) 60-65/second

166. If 'anti-A' antibodies are present in the blood plasma of a patient, he can receive blood from

- (1) An individual whose RBCs contain 'A' antigens
- (2) An individual with 'A' and 'B' antigens on his RBCs
- (3) An individual whose plasma contains anti-A and anti-B antibodies
- (4) An individual with no antibodies in his plasma

167. Select the incorrect statement w.r.t humans.

- (1) The wall of left ventricle is much thicker than that of atria.
- (2) A thin muscular wall called the inter-atrial septum separates the right and left atria.
- (3) A thin non-cellular muscular septum, called the atrio-ventricular septum, separates atrium and ventricle of the same side.
- (4) The opening between the right atrium and the right ventricle is guarded by tricuspid valve.

168. A person met with an accident and needed immediate blood transfusion but his blood group was unknown to his family members. In this case, which of the following blood groups can be used, so that no mismatching occurs?

- (1) AB -ve
- (2) O +ve
- (3) O -ve
- (4) AB +ve

169. _____ is mainly helpful for maintaining osmotic balance in human body.

Select the option that fills the blank correctly.

- (1) Fibrinogen
- (2) Globulin
- (3) Thrombin
- (4) Albumin

170. What would be the heart rate of a person if the cardiac output is 7 L, blood volume in the left ventricle at the end of diastole is 200 mL and at the end of ventricular systole is 100 mL?

- (1) 50 beats per minute
- (2) 75 beats per minute
- (3) 70 beats per minute
- (4) 100 beats per minute

171. Read the following statements w.r.t. humans.

- (a) The blood isn't circulated through a closed network of blood vessels.
- (b) The walls of arteries and veins consist of three layers.
- (c) Dorsal aorta has a narrow lumen as compared to vena cava.

Choose the option that represents only correct statement(s).

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

172. Adrenal medullary hormones

- (1) Decrease the heart rate
- (2) Increase the cardiac output
- (3) Decrease the cardiac output
- (4) Do not affect the functioning of heart

173. Choose the correct value of systolic and diastolic blood pressure of a normal healthy person in mm Hg.

- (1) $\frac{80}{100}$
- (2) $\frac{100}{80}$
- (3) $\frac{120}{80}$
- (4) $\frac{90}{70}$

174. High blood pressure can potentially harm the vital organs like

- A. Heart
- B. Brain
- C. Kidneys
- D. Lungs

Choose the correct option.

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

175. Blood from intestine is carried to the liver via _____ before it is returned to systemic circulation. The correct option which fills the blank is

- (1) Hepatic vein
- (2) Hepatic portal vein
- (3) Hepatic artery
- (4) Inferior mesenteric artery

176. Match column I and column II w.r.t. formed elements and choose the correct match.

Column I	Column II
a. Neutrophil	(i) Granulated phagocyte
b. Basophil	(ii) Contains haemoglobin
c. Monocyte	(iii) Largest leucocyte
d. Erythrocyte	(iv) Secretes inflammatory mediators

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

177. Semilunar valves of heart open during

- (1) Joint diastole
- (2) Atrial systole
- (3) Ventricular systole
- (4) Ventricular diastole

178. Which of the following does not involve in the systemic circulation?

- (1) Right atrium
- (2) Left ventricle
- (3) Pulmonary vein
- (4) Vena cava

179. Megakaryocytes are precursors for

- (1) Lymphocytes
- (2) Leukocytes
- (3) Erythrocytes
- (4) Thrombocytes

180. Bundle of nodal fibres from the AV node branch off into right and left bundle that further branch out as minute fibres throughout the ventricular musculature. These minute fibres are

- (1) Chordae tendineae
- (2) Columnae carneae
- (3) Purkinje fibres
- (4) Trabeculae carneae