NEW STANDARD ACADEMY

PRE-MEDICAL :11ᵗʰ Undergoing Students

Read carefully the Instructions on the Back Cover of this Test Booklet.

Important Instructions :

1. On the answer sheet, fill in the particulars on Side-1 and Side -2 carefully with blue/black ball point pen only.
2. The test The test is of 3 hours 20 minutes duration and this Test Booklet contains 200 questions. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.
3. In this Test Paper, each subject will consist of two sections. Section A will consist of 35 questions (all questions are mandatory) and Section B will have15 questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use Blue/Black Ball Point Pen only for writing particulars on this page/marking responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
9. Use of white fluid for correction is not permissible on the Answer Sheet.

Name of the Candidate(In Capitals) _____

Date of Examintation _____

Candidate`s Signature:_____    Invigilator`s Signature: _____

SECTION - A (PHYSICS)

1. A particle is moving in a potential region given by $U = K(x^2 + y^2 + z^2)$. The force acting on the particle is given by :-

   (1) $-2K(x\hat{i} + y\hat{j} + z\hat{k})$ (2) $K(x\hat{i} + y\hat{j} + z\hat{k})$

   (3) $\dfrac{K}{2}(x\hat{i} + y\hat{j} + z\hat{k})$ (4) $K(x^2\hat{i} + y^2\hat{j} + z^2\hat{k})$

2. A person holds a bucket of weight 60N. He walks 7m along the horizontal and then climbs a vertical distance of 5m. The work done by the man on the bucket is :-

   (1) 300 J   (2) 420 J

   (3) 720 J   (4) 360 J

3. A particle is released from rest at origin. It moves under influence of potential field $U = x^2 - 3x$, Kinetic energy at $x = 2$ is:-

   (1) 2 J   (2) 1 J   (3) 1.5 J   (4) 0 J

4. A simple pendulam with a bob of mass m oscillates from A to C and back to A such that PB is H. If the acceleration due to gravity is g, then the velocity of the bob as it passes through B is :-
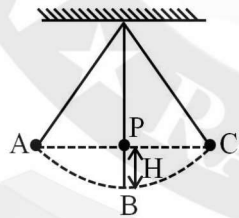
   (1) mgH   (2) $\sqrt{2gH}$

   (3) Zero   (4) 2gH

5. Water falls from a height of 60m at the rate of 15 kg/s to operate a turbine. The losses due to frictional forces are 10% of energy. How much power is generated by the turbine? ($g = 10$ m/s^2)

   (1) 7.0 kW   (2) 8.1 kW

   (3) 10.2 kW   (4) 12.3 kW

6. When a conservative force does positive work on a body, then the-

   (1) Potential energy of body increases.

   (2) Potential energy of body decreases.

   (3) Total mechanical energy of body increases.

   (4) Total mechanical energy of body decreases.

7. A spring of force constant K is first stretched by distance 'a' from its natural length and then further by distance b. The work done in stretching the part b is :-

   (1) $\dfrac{1}{2}Ka(a-b)$ (2) $\dfrac{1}{2}Ka(a+b)$

   (3) $\dfrac{1}{2}Kb(a-b)$ (4) $\dfrac{1}{2}Kb(2a+b)$

8. The variation of potential energy U of a system is shown in fig. The force acting on the system is best represented by-
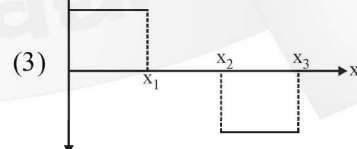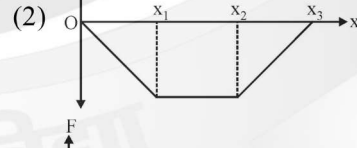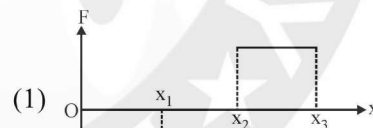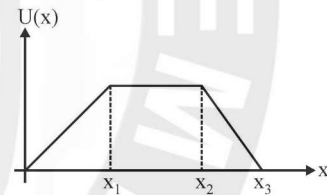

9. A particle of mass 0.1 Kg is subjected to a force which varies with distance as shown. If it starts its journey from rest at x = 0, then its velocity at x = 12 m is :-
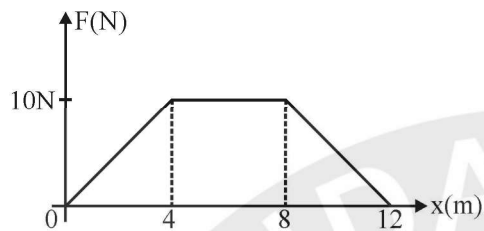

(1) 0

(2) $20\sqrt{2}$ m/s

(3) $20\sqrt{3}$ m/s

(4) 40 m/s

10. Under the action of a force a 2kg mass moves such that its position x as a function of time is given by $x = t^3/3$, where x is in meter and t in sec. The work done by the force in first 2 sec. is -

(1) 1600J

(2) 160J

(3) 16J

(4) 1.6J

11. The momentum of a body is increased by 50%. The K.E. of the body will be increased by :-

(1) 50%

(2) 125%

(3) 330%

(4) 400%

12. The work done in pushing a block of mass 10 kg from bottom to the top of a frictionless inclined plane 5m long and 3m high is (g = 9.8m/s^2) :-

(1) 392J

(2) 294J

(3) 98J

(4) 0.98J

13. A block is moved from rest through a distance of 4m along a horizontal straight line path. The mass of the block is 5kg. and the force acting on it is 20N. If the kinetic energy acquired by the block is 40 J, at what angle to the path the force is acting :-

(1) 30°

(2) 60°

(3) 45°

(4) 90°

14. In the figure shown, the net work done by the tension when the bigger block of mass M touches the ground is-
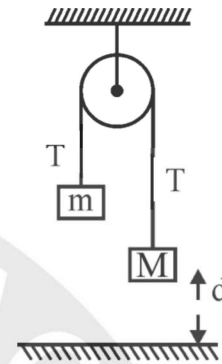

(1) +mgd

(2) −(M+m)gd

(3) −mgD

(4) Zero

15. Two particles whose masses are 10 kg and 30 kg and their position vectors are $\hat{i} + \hat{j} + \hat{k}$ and $-\hat{i} - \hat{j} - \hat{k}$ respectively would have the centre of mass at :-

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

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

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

(4) $\dfrac{(\hat{i} + \hat{j} + \hat{k})}{4}$

16. The velocity of centre of mass of the system remains constant if the total external force acting on the system is :

(1) Minimum

(2) Maximum

(3) Non-zero

(4) Zero

17. A bullet of mass 0.1 kg is fired with a speed of 100 m/s, the mass of gun is 50 kg. The velocity of recoil is :-

(1) 0.2 m/s

(2) 0.1 m/s

(3) 0.5 m/s

(4) 0.05 m/s

18. Two bodies of masses 15 kg and 5 kg are connected to the ends of a massless cord and allowed to move as shown in figure. The pulley is massless and frictionless calculate the acceleration of the centre of mass (Take upward direction as positive):-
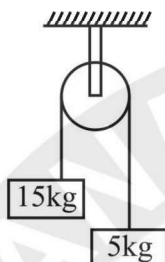
(1) 5 m/s^2 (2) -5 m/s^2

(3) $\dfrac{5}{2} \text{ m/s}^2$ (4) $-\dfrac{5}{2} \text{ m/s}^2$

19. The centre of mass of a body :-

(1) Lies always outside the body.

(2) May lie within, outside or on the surface of the body.

(3) Lies always inside the body.

(4) Lies always at surface of body

20. A bomb at rest explode into three fragments of equal masses. Two fly off at right angles to each other with velocity 9 m/s and 12 m/s. The speed of the third fragment will be :-

(1) 12 (2) 15

(3) 21 (4) 5

21. A semicircular ring of radius 0.5 m is given in diagram. The location of centre of mass on its line of symmetry above its base will be :-
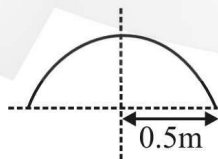
(1) $\dfrac{3}{2\pi} \text{m}$ (2) $\dfrac{2}{\pi} \text{m}$

(3) $\dfrac{1}{\pi} \text{m}$ (4) $\dfrac{3}{\pi} \text{m}$

22. Two blocks of masses 40 kg and 10 kg are placed on x-axis. The first block is moved on the axis by a distance of 2 cm. By what distance should the second block be moved to keep the position of centre of mass unchanged.

(1) 4 cm (2) 6 cm

(3) 8 cm (4) 1 cm

23. One projectile moving with velocity v in space, gets burst into 2 parts of masses in the ratio 1 : 3. The smaller part becomes stationary. What is the velocity of the other part ?

(1) 4v (2) v

(3) $\dfrac{4v}{3}$ (4) $\dfrac{3v}{4}$

24. A 6.0 kg mass is moving to right at 10 m/s. A 0.25 kg mass is thrown towards left as shown. What speed the smaller mass must have to completely stop both masses after collision:-
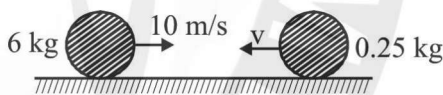
(1) 4.2 m/s (2) 15 m/s

(3) 150 m/s (4) 240 m/s

25. In an inelastic collision, what is conserved :-

(1) KE

(2) Momentum

(3) Both (1) and (2)

(4) Neither (1) nor (2)

26. A bullet is fired from the gun and the gun recoils. The kinetic energy of recoiled gun shall be-

(1) Equal to the kinetic energy of bullet

(2) No change

(3) More than the kinetic energy of bullet

(4) Less than the kinetic energy of bullet

27. An inelastic ball is dropped from a height of 100 m. Due to earth, 20% of its energy is lost. To what height the ball will rise.

(1) 80 m

(2) 40 m

(3) 60 m

(4) 20 m

28. A body of mass M_1 collides elastically with another mass M_2 at rest. There is maximum transfer of energy when :-

(1) $M_1 > M_2$

(2) $M_1 < M_2$

(3) $M_1 = M_2$

(4) Same for all values of M_1 & M_2

29. The bob A of a simple pendulum is released when the string makes an angle of 45º with the vertical. It hits another bob B of the same material and same mass kept at rest on the table. If the collision is elastic :-
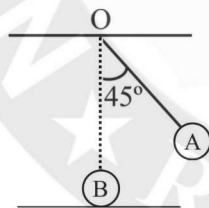
(1) Both A and B rise to the same height.

(2) Both A and B come to rest at B.

(3) Both A and B move with the same velocity of A.

(4) A comes to rest and B moves with the velocity of A.

30. A ball is dropped from a height h. If the coefficient of restitution be e, then to what height will it rise after jumping twice from the ground.

(1) eh/2   (2) 2eh

(3) eh   (4) $e^4 h$

31. Two bodies having same mass 40 kg are moving in opposite directions, one with a velocity of 10 m/s and the other with 7 m/s. If they collide and moves as one body, the velocity of the combination is :-

(1) 10 m/s   (2) 7 m/s

(3) 3 m/s   (4) 1.5 m/s

32. Two solid rubber balls A and B having masses 200 and 400 gm respectively are moving in opposite directions with velocity of A equal to 0.3 m/s. After collision the two balls come to rest, then the velocity of B is :-

(1) 0.15 m/s

(2) 1.5 m/s

(3) −0.15 m/s

(4) None of the above

33. A lead ball strikes a wall and falls down, a tennis ball having the same mass and velocity strikes the wall and bounces back. Check the correct statement.

(1) The momentum of the lead ball is greater than that of the tennis ball.

(2) The lead ball suffers a greater change in momentum compared with the tennis ball.

(3) The tennis ball suffers a greater change in momentum as compared with the lead ball.

(4) Both suffer an equal change in momentum.

34. **Assertion :** Power of the gravitational force on the body in a projectile motion is zero, once during its motion.

Reason : At the highest point only, the component of velocity along the gravitational force is zero.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

35. A ball of mass m moving with velocity V, makes a head on elastic collision with a ball of the same mass moving with velocity 2V towards it. Taking direction of V as positive, velocities of the two balls after collision are :-

(1) $-V$ and $2V$ (2) $2V$ and $-V$

(3) V and $-2V$ (4) $-2V$ and V

SECTION - B (PHYSICS)

36. The mechanical energy of a freely falling body is :-

(1) constant at all instants

(2) maximum in the begining

(3) minimum in the begining

(4) maximum in the middle

37. A body is moved along a straight line by a machine delivering a power proportional to time ($P \propto t$) then :-

	Column-I		Column-II
(a)	Velocity is proportional to	(p)	t
(b)	Displacement is proportional	(q)	t^2
(c)	Work done is proportional to	(r)	t^3

(1) (a−p), (b−q), (c−r)

(2) (a−q), (b−r), (c−p)

(3) (a−p), (b−q), (c−q)

(4) None of these

38. Which statements are not correct :

(a) A body can have momentum without K.E.

(b) The relative velocity of the two particles in head on collision is unchanged.

(c) P.E of an object can have a negative value.

(d) K.E. of an object can have a negative value.

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

(3) a, b, d (4) a, b, c, d

39. When a conservative force does positive work on a body, then :-

(1) Potential energy increases

(2) Potential energy decreases

(3) Total mechanical energy increases

(4) Kinetic energy decreases

40. A position dependent force $F = 7 - 2x + 3x^2$ N acts on a body of mass 2kg and displace it from x = 0 to x = 5m. The W.D. in joule is-

(1) 70 (2) 270 (3) 35 (4) 135

41. A mass M is lowered with the help of a string by a distance h at a constant acceleration g/2. The work done by the string will be :-

(1) $\dfrac{Mgh}{4}$ (2) $-\dfrac{Mgh}{2}$

(3) $\dfrac{3Mgh}{2}$ (4) $-\dfrac{3Mgh}{2}$

42. Kinetic energy of a particle moving in a straight line varies with time t as $K = 4t^2$. The force acting on the particle. :-

(1) Is constant

(2) Is increasing

(3) Is decreasing

(4) First increase and then decrease

43. There are two massless spring A and B of spring constant K_A and K_B respectively and $K_A > K_B$ then -

(1) If they are compressed to same distance, then work done on A > W.D on B.

(2) If they are compressed by same force W.D on A < W.D. on B.

(3) If they are compressed by same force W.D. on A > W.D. on B.

(4) Both Option 1 & 2 are correct.

**44.** Velocity time graph of a particle is shown in the diagram. Choose the **INCORRECT** option.
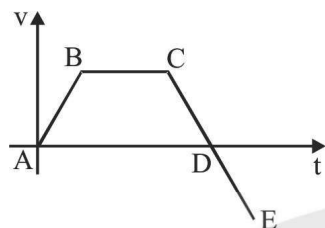
(1) Work done by net force for part AB is positive.

(2) Work done by net force for part BC is zero.

(3) Work done by net force for part DE is negative.

(4) Work done by net force for part CD is negative

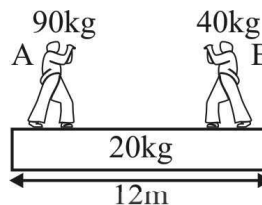**45.** The x, y coordinates of the centre of mass of a uniform L-shaped lamina of mass 3 kg is :-
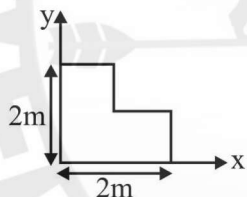
(1) $\left(\dfrac{5}{6}, \dfrac{5}{6}\right)$

(2) $(1, 1)$

(3) $\left(\dfrac{6}{5}, \dfrac{6}{5}\right)$

(4) $(2, 2)$

46. A uniform wire of length 2L is bent to form an angle of 60° as shown. Find the distance of centre of mass from the vertex O.
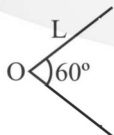
(1) $\dfrac{L}{2}$

(2) $\dfrac{L\sqrt{3}}{4}$

(3) $\dfrac{L}{4}$

(4) None

47. In the given diagram the distance travelled by the plank when A and B exchange their positions :-

(1) 2 m

(2) 4 m

(3) 4.8 m

(4) 5.4 m

48. If linear density of a rod of length 3m varies as $\lambda = 2 + x$, then the position of the centre of gravity of the rod is :-

(1) $\dfrac{7}{3}$ m

(2) $\dfrac{12}{7}$ m

(3) $\dfrac{10}{7}$ m

(4) $\dfrac{9}{7}$ m

49. A mass of 0.5 kg moving with a speed of 1.5 m/s on a horizontal smooth surface, collides with a nearly massless spring of force constant k=50N/m. The maximum compression of the spring would be :-

(1) 0.12 m

(2) 1.5 m

(3) 0.5 m

(4) 0.15 m

50. A ball of mass m is released from rest from some height. The graph showing the variation of work done by gravity (w) with speed (v) of ball is :-
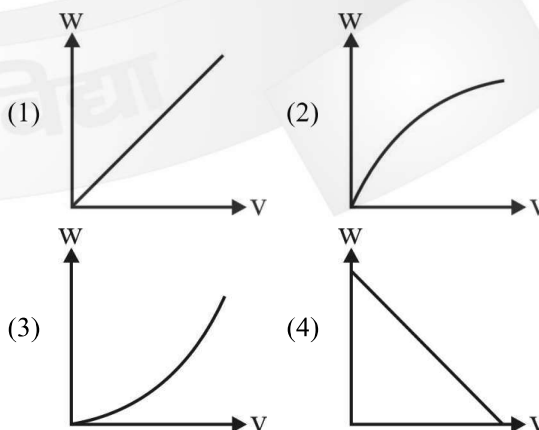
SECTION-A (CHEMISTRY)

51. Irreversible process is ?

(1) Very slow process

(2) P_{ext} is variable

(3) P_{ext} is constant

(4) None of these

52. Correct option of thermodynamic parameter for isothermal expansion of an ideal gas ?

(1) $\Delta E = 0$

(2) $\Delta H \neq 0$

(3) $\Delta T = 0$

(4) Both (1) & (3)

53. Which one of the following chemical reaction has $\Delta H = \Delta E$:

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

(2) $N_2O_4(g) \longrightarrow 2\,NO_2(g)$

(3) $PCl_3(g) + Cl_2(g) \longrightarrow PCl_5(g)$

(4) $C(s) + O_2(g) \longrightarrow CO_2(g)$

54. For a reaction $2X(s) + 2Y(s) \longrightarrow 2C(\ell) + D(g)$

The q_p at 27°C is − 28 K Cal. mol^{-1} then the value of q_v in K. Cal. mol^{-1} will be :-

(1) − 27.4 (2) + 27.4 (3) − 28.6 (4) 28.6

55. $q = -w$ is not true for :-

(1) Isothermal process (2) Adiabatic process

(3) Cyclic process (4) 1 and 3 both

56. Which one of the following is an extensive property ?

(1) Temperature (2) Internal energy

(3) Boiling point (4) Density

57. The work done by a system is 8 J, when 40 J heat is supplied to it. The change in internal energy of the system during the process is :

(1) 32 J (2) 40 J (3) 36 J (4) 44 J

58. An ideal gas expands its volume from 5L to 10L at 300 K against a constant external pressure of 2 atm. Then the work done is ?

(1) − 10 J

(2) + 10 J

(3) 1013 J

(4) − 1013 J

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

	Column-I		Column-II
(A)	$H_{2(g)} + Br_{2(g)} \longrightarrow 2HBr_{(g)}$	(i)	$\Delta H = \Delta U - 2RT$
(B)	$PCl_{5(g)} \longrightarrow PCl_{3(g)} + Cl_{2(g)}$	(ii)	$\Delta H = \Delta U + 3RT$
(C)	$N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3(g)}$	(iii)	$\Delta H = \Delta U$
(D)	$2N_2O_{5(g)} \longrightarrow 4NO_{2(g)} + O_{2(g)}$	(iv)	$\Delta H = \Delta U + RT$

(1) (A)−(iii), (B)−(i), (C)−(ii), (D)−(iv)

(2) (A)−(iii), (B)−(iv), (C)−(i), (D)−(ii)

(3) (A)−(ii), (B)−(i), (C)−(iv), (D)−(iii)

(4) (A)−(iv), (B)−(ii), (C)−(i), (D)−(iii)

60. Predict the sign of heat & work if heat is absorbed by the system & work is done by the system :-

(1) +q, −w

(2) −q, −w

(3) +q, +w

(4) −q, + w

61. If expansion is carried out freely for an ideal gas then work is :-

(1) zero

(2) infinite

(3) maximum

(4) None of these

62. Which is incorrect for reversible process :-

(1) Work in expansion is more than irreversible process

(2) Driving force is slightly greater than opposing force

(3) System and surrounding are always in thermal equilibrium with each other

(4) Total entropy change is positive

63. An ideal gas is expanded from $1 \times 10^{-3}\,m^3$ to $1 \times 10^{-2}\,m^3$ against constant pressure of $1 \times 10^5\,N/m^2$ at 300 K. The work done is :-

(1) 900 KJ

(2) -900 KJ

(3) 270 KJ

(4) -900 J

64. In which of the following reactions ΔS is positive.

(1) $H_2O(\ell) \longrightarrow H_2O(s)$

(2) $H_2O(\ell) \longrightarrow H_2O(g)$

(3) $N_2(g, 1\ atm) \longrightarrow N_2(g, 10\ atm)$

(4) $Fe(s),\ 400K \longrightarrow Fe(s),\ 300\,K$

65. ΔS for the following reaction will be

$MgCO_3(s) \longrightarrow MgO(s) + CO_2(g)$

(1) 0

(2) $-ve$

(3) $+ve$

(4) ∞

66. For the precipitation of AgCl by Ag^+ ion and HCl :-

(1) $\Delta H = 0$

(2) $\Delta G = 0$

(3) $\Delta G = -ve$

(4) $\Delta H = \Delta G$

67. Consider the following statements :

(A) Entropy of the universe is continuously increasing and tends to a maximum.

(B) Total entropy change for a reversible isothermal cycle is zero.

(C) In any irreversible cyclic process, there is a decrease in entropy.

correct from these statements is :-

(1) A, B and C are correct

(2) B and C are correct

(3) A and B are correct

(4) Only A is correct

68. Standard entropies of X_2, Y_2 and XY_3 are 60, 40 and 50 $JK^{-1}\,mol^{-1}$ respectively. For the reaction $\dfrac{1}{2}X_2 + \dfrac{3}{2}Y_2 \rightleftharpoons XY_3$, $\Delta H = -30$ kJ to be at equilibrium, the temperature should be :-

(1) 500 K   (2) 750 K

(3) 1000 K   (4) 1250 K

69. For the process $H_2O(\ell)$ (1 bar , 373K) $\longrightarrow H_2O(g)$ (1 bar , 373K), the correct set of thermodynamic parameters is :

(1) $\Delta G = 0,\ \Delta S = +ve$

(2) $\Delta G = 0,\ \Delta S = -ve$

(3) $\Delta G = +ve,\ \Delta S = 0$

(4) $\Delta G = -ve,\ \Delta S = +ve$

70. If $\Delta H > 0$ and $\Delta S > 0$, then the reaction proceeds spontaneously when :-

(1) $\Delta H > 0$ (2) $\Delta H < T\Delta S$

(3) $\Delta H = T\Delta S$ (4) None of these

71. The standard Gibbs free energy change ($\Delta G°$) at 25ºC for the dissociation of $N_2O_4(g)$ to $NO_2(g)$ is (given, equilibrium constant = 0.15,

$R = 8.314\ JK^{-1}\ mol^{-1}$, $\ln(0.15) = -1.9$) :-

(1) 1.1 KJ   (2) 4.7 KJ

(3) 8.1 KJ   (4) 38.2 KJ

72. Which of the following is an endothermic reaction :-

(1) $2H_2(g) + O_2(g) \rightarrow 2H_2O(\ell)$

(2) $N_2(g) + O_2(g) \rightarrow 2NO(g)$

(3) $NaOH(aq.) + HCl(aq) \rightarrow NaCl(aq.) + H_2O(\ell)$

(4) $C_2H_5OH(aq.) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(\ell)$

73. What will be the heat change during the reaction of 24 g C and 128 g S as $C + 2S \rightarrow CS_2$; $\Delta H = 22\,kCcal$

(1) 22 kCal   (2) 11 kCal

(3) 44 kCal   (4) 32 kCal

74. The values of heat of formation of SO_2 and SO_3 are -298.2 kJ and -98.2 kJ. The heat of reaction of the following reaction will be :

$SO_{2(g)} + \dfrac{1}{2}O_{2(g)} \rightarrow SO_{3(g)}$
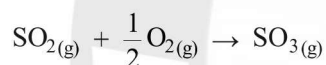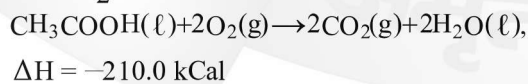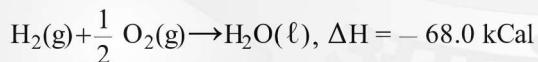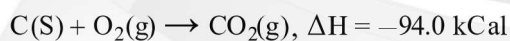
(1) -200 kJ   (2) -356.2 kJ

(3) $+200$ kJ   (4) -396.2 kJ

75. Which of the following reaction is showing formation as well as combustion ?

(1) $2CO_{(g)} + O_{2(g)} \rightarrow 2CO_{2(g)}$

(2) $2N_2O_{(g)} + 2O_{2(g)} \rightarrow 2N_2O_{4(g)}$

(3) $2NO_{(g)} \rightarrow N_2O_{4(g)}$

(4) $C_{(graphite)} + O_{2(g)} \rightarrow CO_{2(g)}$

76. Using the following thermochemical data:

$C(S) + O_2(g) \rightarrow CO_2(g)$, $\Delta H = -94.0$ kCal

$H_2(g) + \dfrac{1}{2}O_2(g) \rightarrow H_2O(\ell)$, $\Delta H = -68.0$ kCal

$CH_3COOH(\ell) + 2O_2(g) \rightarrow 2CO_2(g) + 2H_2O(\ell)$,

$\Delta H = -210.0$ kCal

The heat of formation of acetic acid is :-

(1) 116.0 kCal

(2) - 116.0 kCal

(3) - 114.0 kCal

(4) + 114.0 kCal

77. Heat of combustion of CH_4, C_2H_4, C_2H_6 are -890, -1411 and -1560 kJ/mol respectively. Which has the lowest calorific value :-

(1) CH_4

(2) C_2H_4

(3) C_2H_6

(4) All of have same value

78. The heat of neutralization of HCl by NaOH is -55.9 KJ/ mol. If the heat of neutralization of HCN by NaOH is -12.1 KJ/mol. The energy of dissociation of HCN is

(1) -43.8 KJ   (2) 43.8 KJ

(3) 68 KJ   (4) -68 KJ

79. If enthalpy of neutralisation of HCl with NaOH is -50 kJ/eq then under the similar conditions, enthalpy of neutralisation of H_2SO_4 with NaOH would be :-

(1) -50 kJ/eq

(2) -25 kJ/eq

(3) -12.5 kJ/eq

(4) -100 kJ/eq

80. The heat of combustion of C_2H_4, C_2H_6 and H_2 are -1409.5 kJ, -1558.3 kJ and -285.6 kJ. The heat of hydrogenation of ethene (C_2H_4) is :-

(1) -136.8 kJ   (2) -13.68 kJ

(3) 273.6 kJ   (4) 1.368 kJ

81. $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)} + 94.2\,kcal$

$H_{2(g)} + \tfrac{1}{2}O_{2(g)} \rightarrow H_2O_{(\ell)} + 68.3\,kcal$

$CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(\ell)} + 210.8\,kcal$
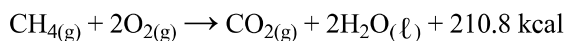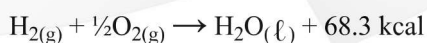
The heat of formation of methane in kcal will be.

(1) -45.9 (2) -47.8

(3) -20.0 (4) -47.3

82. The following reaction are given,

$$M + \frac{1}{2}O_2 \rightarrow MO + 351.4\,kJ$$

$$X + \frac{1}{2}O_2 \rightarrow XO + 90.8\,kJ$$
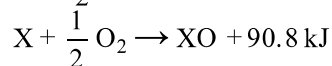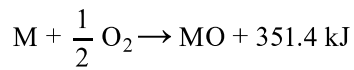
Calculate the heat of reaction of following reaction?

$$M + XO \rightarrow MO + X$$
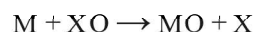
(1) $+422.2\,kJ$ (2) $+260.6\,kJ$

(3) $-422.2\,kJ$ (4) $-260.6\,kJ$

83. Calculate the average Bond energy of O–F bond in the following reaction :-

$$OF_{2(g)} \rightarrow O_{(g)} + 2F_{(g)}$$

given:

$$OF_{2(g)} \rightarrow OF_{(g)} + F_{(g)}\,;\, \Delta H = 201\,kJ$$

$$OF_{(g)} \rightarrow O_{(g)} + F_{(g)};\, \Delta H = 199\,kJ$$
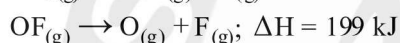
(1) $201\,kJ$ (2) $199\,kJ$

(3) $200\,kJ$ (4) $200.9\,kJ$

84. Heat evolved in the reaction $H_2 + Cl_2 \rightarrow 2HCl$ is $-182\,kJ$. Bond energies of H–H, Cl–Cl are 430 & 242 kJ mol^{-1} respectively. The bond energy for HCl is :-

(1) $245\,kJ\,mol^{-1}$ (2) $427\,kJ\,mol^{-1}$

(3) $336\,kJ\,mol^{-1}$ (4) $154\,kJ\,mol^{-1}$

85. Following bond energies are given :

H–H bond energy $= 420\,KJ\,mol^{-1}$

C≡C bond energy $= 601\,KJ\,mol^{-1}$

C–C bond energy $= 340\,KJ\,mol^{-1}$

C–H bond energy $= 425\,KJ\,mol^{-1}$

then enthalpy change for the reaction

$$C_2H_2 + 2H_2 \rightarrow C_2H_6 \text{ is :-}$$
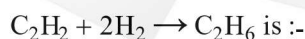
(1) $-599\,KJ\,mol^{-1}$

(2) $-580\,KJ\,mol^{-1}$

(3) $-625\,KJ\,mol^{-1}$

(4) $-325\,KJ\,mol^{-1}$

SECTION-B (CHEMISTRY)

86. For the combustion of $C_2H_5OH(g)$ at 120ºC, $\Delta U° = -x$ kJ/mol, then $\Delta H°$ will be :

(1) $-x + 2RT$ (2) $-x - RT$

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

87. For an adiabatic process which of the following relations is correct :

(1) $\Delta E = 0$ (2) $P\Delta V = 0$

(3) $q = 0$ (4) $q = +W$

88. What amount of ice will remain when 52g ice at 0ºC is added to 100g of water at 40°C, specific heat of water is 1cal/g/K and latent heat of fusion of ice is 80 cal/g :-

(1) 10g   (2) 2g   (3) 4g   (4) 8g

89. For an isothermal reversible expansion process the value of q can be calculated by the expression :

(1) $q = 2.303nRT \log \frac{V_2}{V_1}$

(2) $q = -2.303nRT \log \frac{V_2}{V_1}$

(3) $q = -nRT \log \frac{V_1}{V_2}$

(4) $q = -P_{ext}\, nRT \log \frac{V_1}{V_2}$

90. When 1 mole of gas is heated at constant volume. Temperature is raised from 298 K to 308 K. Heat supplied to the gas is 500 J. Then which statement is correct ?

(1) $q = -W = 500\,J$, $\Delta U = 0$

(2) $q = \Delta U = 500\,J$, $W = 0$

(3) $q = W = 500\,J$, $\Delta U = 0$

(4) $\Delta U = 0$, $q = W = -500\,J$

91. On stretching of rubber band, entropy :-

(1) Increases   (2) Decreases

(3) Remain same   (4) All of the above

92. If 373 J/g of heat is exchanged at boiling point of water then what is the increase in entropy:

(1) 43.4 J/k-mol

(2) 1 J/k-mol

(3) 18 J/k-mol

(4) Zero

93. $2A(g) + B(g) \xrightarrow{\text{T=300K}} C(g);$

$\Delta U = -2000 \ \text{Cal/mole}$

$\Delta S = -40 \ \text{Cal/K}$

Find the value of ΔG

(1) −3200Cal   (2) +8800Cal

(3) −2000Cal   (4) +2000Cal

94. Which of the following reaction is expected never to be spontaneous :–

(1) $2O_3 \longrightarrow 3O_2$
   $\Delta H = -ve, \ \Delta S = +ve$

(2) $Mg + H_2 \longrightarrow MgH_2$
   $\Delta H = -ve, \ \Delta S = -ve$

(3) $Br_{2(\ell)} \longrightarrow Br_{2(g)}$
   $\Delta H = +ve, \ \Delta S = +ve$

(4) $2Ag + 3N_2 \longrightarrow 2AgN_3$
   $\Delta H = +ve, \ \Delta S = -ve$

95. $S + \dfrac{3}{2}O_2 \longrightarrow SO_3 + 2x \ \text{kcal}$ ....(i)

$SO_2 + \dfrac{1}{2}O_2 \longrightarrow SO_3 + y \ \text{kcal}$ ...(ii)

Find out the heat of formation of SO_2 :–

(1) y − 2x   (2) 2x + y

(3) x + y   (4) 2x/y

96. The heat change for a reaction:

$CO(g) + \dfrac{1}{2}O_{2(g)} \longrightarrow CO_2(g)$ refers to

(1) enthalpy of formation of carbon dioxide

(2) enthalpy of combustion of carbon dioxide

(3) enthalpy of vapourisation

(4) enthalpy of combustion of carbon monoxide

97. The enthalpy change at 298 K for the reaction $H_2O_{2(\ell)} \longrightarrow H_2O_{(\ell)} + \dfrac{1}{2}O_{2(g)}$ is −23.5 Kcal mol^{-1} and the enthalpy of formation of $H_2O_{2(\ell)}$ is − 44.8 kcal mol^{-1}. The enthalpy of formation of $H_2O_{(\ell)}$ is :

(1) − 68.3 Kcal mol^{-1}

(2) 68.3 Kcal mol^{-1}

(3) 21.3 Kcal mol^{-1}

(4) −21.3 Kcal mol^{-1}

98. Given that -

$2C(s) + 2O_2(g) \longrightarrow 2CO_2(g) \quad \Delta H = -787 \ \text{kJ}$

$H_2(g) + \dfrac{1}{2}O_2(g) \longrightarrow H_2O(\ell) \quad \Delta H = -286 \ \text{kJ}$

$C_2H_2(g) + \dfrac{5}{2}O_2(g) \longrightarrow 2CO_2(g) + H_2O(\ell)$

$\Delta H = -1310 \ \text{kJ}$

Heat of formation of acetylene is :–

(1) +1802 kJ

(2) −1802 kJ

(3) − 800 kJ

(4) +237 kJ

99. If enthalpy of atomization of $CH_{4(g)}$ is +680 kJ/mol, then the bond energy of C−H bond is:–

(1) +680 kJ/mol

(2) +170 kJ/mol

(3) +165 kJ/mol

(4) +145 kJ/mol

100. Bond enthalpies for N − H, Cl − Cl, N ≡ N and H − Cl are 100 kJ/mol, 150 kJ/mol, 300 kJ/mol and 200 kJ/mol respectively than enthalpy change for reaction :–

$2NH_3(g) + 3Cl_2(g) \longrightarrow N_2(g) + 6HCl(g)$ is

(1) + 450 kJ   (2) − 450 kJ

(3) − 250 kJ   (4) + 250 kJ

SECTION - A (BOTANY)

101. Which of the following statement is not correct :

(1) All the tissue exterior to vascular cambium is called bark

(2) Bark that is formed early in the season called soft bark

(3) Lenticels are formed by the help of sclerenchymatous cell

(4) In dicot root vascular cambium is completely secondary in origin

102. Bark includes :

(1) Living tissue

(2) Dead tissue

(3) Both (1) & (2)

(4) Only lignified tissue

103. **Statement-I :** At certain regions the Phellogen cuts off closely arranged parenchymatous cells on the outer side instead of cork cells.

Statement-II : These parenchymatous cells soon rupture the epidermis forming lenticels.

(1) Both statement I & II is incorrect

(2) Both statement I & II is correct

(3) Statement I is correct & II is incorrect

(4) Statement I is incorrect & II is correct

104. The peripheral region of secondary xylem is :

(i) Light in colour

(ii) Dark in colour

(iii) Sap wood

(iv) Heart wood

(1) Both (i) & (ii) is correct

(2) Only (ii) is correct

(3) Only (iii) is correct

(4) (i) & (iii) is correct

105. **Statement-I :** The cells of cambium cut off towards pith mature into secondary xylem.

Statement-II : The cells of cambium cut off towards periphery mature into secondary phloem.

Choose the correct statement for secondary growth in stem :

(1) Both statement I & II are correct

(2) Both statement I & II are incorrect

(3) Statement I is correct

(4) Statement II is incorrect

106. Dicotyledonous plant exhibit an increase in girth called :

(1) Primary growth   (2) Secondary growth

(3) Both (1) & (2)   (4) Apical growth

107. Bulliform cells are characteristic feature of :

(1) Monocot leaf

(2) Monocot stem

(3) Dicot leaf

(4) Both (1) & (3)

108. Which of the following statement is correct for Dicot root :

(1) Root hairs are multicellular

(2) The inner most layer of cortex is called endodermis

(3) The outer most layer of cortex is called epiblema

(4) Root hairs are absent in most of the plant

109. **Statement-I :** In dicot root inner most layer of cortex is called endodermis.

Statement-II : In dicot root endodermis is devoid of casparian strip.

(1) Statement I & II both are correct

(2) Statement I & II both are incorrect

(3) Statement I is correct II is incorrect

(4) Statement II is correct I is incorrect

110.

(1) a-Epidermis
b-Hypodermis
c-Ground tissue
d-Vascular bundle
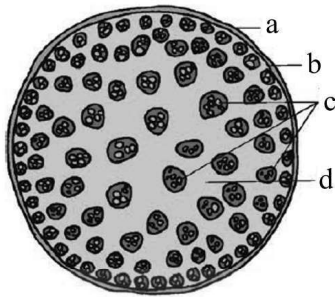
(2) a-Epidermis
b-Hypodermis
c-Vascular bundle
d-Ground tissue

(3) a-Hypodermis
b-Epidermis
c-Vascular bundle
d-Ground tissue

(4) a-Epidermis
b-Ground tissue
c-Hypodermis
d-Vascular bundle

111. If stem is girdled :

(1) Root dies first

(2) Stem dies first

(3) Both die at same time

(4) Physiology is not disturbed

112. Each annual ring consist of two strip of :

(1) Autumn wood & spring wood

(2) Heart wood & sap wood

(3) Xylem & phloem

(4) Cork & cortex

113. Polyarch vascular bundles are characteristic of :

(1) Dicot stem

(2) Dicot root

(3) Monocot stem

(4) Monocot root

114. Commercial cork is obtained from :

(1) Xylem

(2) Vascular cambium

(3) Phellogen

(4) Phellem

115. Stomata in grassy monocot are :

(1) Dumbell shaped

(2) Kidney shaped

(3) Bean shaped

(4) Barrel shaped

116. Vascular bundle with cambium is called :

(1) Open

(2) Close

(3) Endarch

(4) Exarch

117. Which of the following statement is/are correct :

(a) Stomata regulate the process of transpiration and gaseous exchange.

(b) Subsidiary cells are modification of guard cells.

(c) Root hairs are modification of epidermis.

(d) Stomatal aperture, guard cells & subsidiary cells are collectively called stomatal pore.

(e) Stem epidermal hairs are called trichome.

(1) a, b & d

(2) a, c & e

(3) a, b, c & d

(4) a, c, d & e

118.

(1) a-Phloem
b-Cambium
c-Xylem
d-Conjoint open
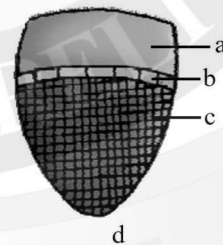
(2) a-Cambium
b-Phloem
c-Xylem
d-Conjoint open

(3) a-Phloem
b-Cambium
c-Xylem
d-Conjoint close

(4) a-Xylem
b-Cambium
c-Phloem
d-Conjoint open

119. All of the following are lateral meristem except :-

   (1) Intercalary meristem

   (2) Fascicular vascular cambium

   (3) Inter fascicular cambium

   (4) Cork cambium

120. Meristem is not characterized by -

   (1) Isodiametric cells with cellulosic thin wall

   (2) Absence of vacuole and intercellular space

   (3) Absence of plastids and reserve food material

   (4) Absence of dividing ability

121. Parenchymatous structure with intercellular spaces is :-

   (1) Epidermis   (2) Endodermis

   (3) Cortex   (4) Pericycle

122. Which among the following are absent in the collenchyma ?

   (1) Chloroplast

   (2) Vacuoles

   (3) Intercellular spaces

   (4) Pectin deposition

123. The intrafascicular cambium

   (1) Is a simple permanent tissue

   (2) Is a meristematic tissue

   (3) Is a complex permanent tissue

   (4) Is secondary meristem

124. The central lumen are obliterated in :-

   (1) Xylem fibres

   (2) Phloem parenchyma

   (3) Xylem parenchyma

   (4) Sieve tubes

125. Root hairs are the -

   (1) Multicellular elongations of epidermal cells

   (2) Acellular elongation of epidermal cells

   (3) Unicellular elongation of epidermal cells

   (4) Multicellular elongations of endodermal cells

126. Diarch xylem bundles are found in :-

   (1) Monocot root   (2) Dicot root

   (3) Monocot stem   (4) Dicot stem

127. The size of vascular bundles in a dorsiventral leaf is dependent on :-

   (1) Size of lamina   (2) Size of veins

   (3) Number of stomata   (4) Number of veins

128. Vascular bundles surrounded by a sclerenchymatous bundle sheath is a feature of :-

   (1) Dicot root   (2) Monocot root

   (3) Dicot stem   (4) Monocot stem

129. Which of the following is the function of heartwood ?

   (1) Mechanical support

   (2) Radial conduction of water and minerals

   (3) Lateral conduction of food

   (4) Minimise water loss in water stress

130. **Assertion (A) :-** Bast fibres are collenchymatous fibres.

   Reason (R) :- Fibres are present in secondary phloem.

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

   (2) **(A)** is correct but **(R)** is not correct.

   (3) **(A)** is incorrect but **(R)** is correct.

   (4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)** .

131. Which of the following statements is correct ?

   (1) Angiosperms lack vessels in their xylem.

   (2) The presence of vessels is a characteristic feature of angiosperms.

   (3) The cells of vessels are living.

   (4) Vessel is a long cylindrical tube-like structure made up of only one cell.

132. Choose correct option w.r.t. spongy mesophyll in dicot leaf.

   (1) Numerous large spaces and air cavities between its cells.

   (2) A large number of chloroplasts.

   (3) Present on adaxial surface

   (4) Vertical and parallel arrangement of cells.

133. **Statement-I :-** The epidermis in a dicot leaf is not covered by cuticle.
   Statement-II :- Dicot leaf have more stomata towards upper side.

   (1) Statement-I is correct but statement-II is incorrect.

   (2) Statement-I is incorrect but statement-II is correct.

   (3) Statement-I and II both are correct.

   (4) Both statement-I and II are incorrect.

134. Match the following :-

	Column-I		Column-II
(a)	Secretion of sticky substance	(i)	Stomata
(b)	Gaseous exchange	(ii)	Protection from water loss
(c)	Cuticle	(iii)	Root hairs
(d)	Mineral absorption	(iv)	Trichomes

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

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

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

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

135. Choose the correct match -

   (1) Differentiated tissue - Intrafascicular cambium

   (2) Dedifferentiated tissue - Cork cambium

   (3) Redifferentiated tissue - Primary xylem

   (4) Undifferentiated tissue - Secondary phloem

SECTION - B (BOTANY)

136. Match the column I with column II :

	Column-I		Column-II
(i)	Early wood	(a)	Spring wood
(ii)	Late wood	(b)	Autumn wood
(iii)	Heart wood	(c)	Duramen
(iv)	Sap wood	(d)	Alburnum

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

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

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

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

137. Which of the following statement is true :

   (1) Cork cambium is also called phellem

   (2) Cork is also called phelloderm

   (3) Phelloderm also called as secondary cortex

   (4) Phelloderm is also known as periderm

138. The spring wood is :

   (i) Lighter in colour

   (ii) Having low density

   (iii) With high density

   (iv) Dark in colour

   Which of the given statement is correct :

   (1) i only

   (2) i & ii only

   (3) i & iii only

   (4) ii only

139. In isobilateral leaf :

    (1) Stomata present on both surface

    (2) Stomata present on lower surface

    (3) Stomata present on upper surface

    (4) Stomata are found only on apex of leaf

140. Which of the following statement is not correct for monocot stem :

    (1) It has parenchymatous hypodermis

    (2) Vascular bundle are conjoint & close

    (3) Phloem parenchyma is absent

    (4) Water containing cavity present within vascular bundle

141. Cork cambium in dicot stem is formed by :

    (1) Cortex   (2) Endodermis

    (3) Pericycle   (4) Hypodermis

142. In dicot root :

    (1) Vascular bundle are scattered with cambium

    (2) Vascular bundle are conjoint

    (3) Xylem & phloem are radial

    (4) Xylem is always endarch

143. Which of the following is not true for the vascular bundles of monocotyledonous stems ?

    (1) Scattered in the ground tissue

    (2) Possess water containing cavities

    (3) Ring arrangement

    (4) Conjoint and closed

144. In a dicot stem the interfascicular cambium strip arises –

    (1) Between xylem and phloem

    (2) From medullary rays

    (3) From pith

    (4) From pericycle

145. **Assertion (A) :-** Oldest layer of sapwood lies just outside vascular cambium.

    Reason (R) :- Sapwood contains actively conducting vessels and occupies peripheral part of the stem.

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

    (2) **(A)** is correct but **(R)** is not correct.

    (3) **(A)** is incorrect but **(R)** is correct.

    (4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**.

146. Match the following -

	Column-I		Column-II
(a)	Hypodermis in dicot stem	(i)	Absent
(b)	Hypodermis in monocot stem	(ii)	Parenchymatous
(c)	Ground tissue in monocot stem	(iii)	Collenchymatous
(d)	Phloem parenchyma in monocot stem	(iv)	Sclerenchymatous

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

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

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

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

147. Which of the following option correctly differentiate dicot stem and monocot stem :

	Dicot stem	Monocot stem
(1)	Sclerenchymatous hypodermis	Collenchymatous hypodermis
(2)	Parenchymatous pericycle	Sclerenchymatous pericycle
(3)	Epidermis with trichomes	Water containing cavities in vascular bundles
(4)	Oval bundles	Wedge shaped bundles

148. **Statement-I :-** The vascular cambium ring is generally more active towards inner side.

Statement-II :- During water stress, the bulliform cells become turgid.

(1) Statement-I is correct but statement-II is incorrect.

(2) Statement-I is incorrect but statement-II is correct.

(3) Statement-I and II both are correct.

(4) Both statement-I and II are incorrect.

149. Match the following -

	Column-I		Column-II
(a)	Chlorenchyma	(i)	Mechanical strength
(b)	Aerenchyma	(ii)	Bast fibres
(c)	Collenchyma	(iii)	Photosynthesis
(d)	Sclerenchyma	(iv)	Large air cavities

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

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

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

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

150. Choose the correct option w.r.t. stomata.

(i) The outer cell wall of guard cell is thick while the inner layer is thin.

(ii) Dicot leaves have stomata on both surfaces in equal numbers.

(iii) Sunken stomata is a common feature of xerophytes.

(iv) Stomatal apparatus is composed of guard cells, a stomatal pore and subsidiary cells.

(1) i & ii are incorrect

(2) All are correct

(3) i & iii are correct

(4) ii & iv are correct

SECTION - A (ZOOLOGY)

151. Under normal physiological condition, how much mililiter of oxygen is carried by 500 ml of oxygenated blood ?

(1) 10 ml

(2) 20 ml

(3) 100 ml

(4) 1000 ml

152. Which part of brain possess "Respiratory rhythm center" ?

(1) Hypothalamus

(2) Cerebrum

(3) Pons

(4) Medulla oblongata
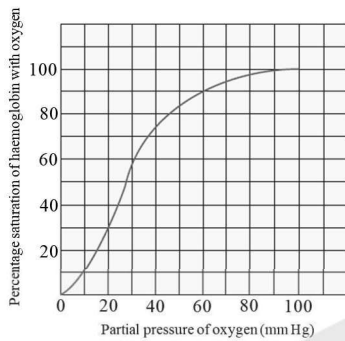
153. Percentage of oxygen delivered to tissue by blood under normal physiological condition is ?

(1) 5%

(2) 25%

(3) 100%

(4) 75%

154. Value of pCO_2 and pO_2 in plumonary artery is respectively ?

(1) $pCO_2 = 40$ mm Hg, $pO_2 = 95$ mm Hg

(2) $pCO_2 = 45$ mm Hg, $pO_2 = 40$ mm Hg

(3) $pCO_2 = 45$ mm Hg, $pO_2 = 95$ mm Hg

(4) $pCO_2 = 40$ mm Hg, $pO_2 = 45$ mm Hg

155.

Given diagram represent oxygen-dissociation curve. Identify the option which correctly shows those factors which are responsible to shift the curve towards right.

(1) High temperature, Low pH, High pCO_2

(2) High temperature, High pH, High pCO_2

(3) High temperature, High pH, Low pCO_2

(4) Low temperature, Low pH, Low pCO_2

156. Statement-I : Every 100 ml of oxygenated blood can deliver around 5 ml of oxygen to the tissue under normal physiological condition.

Statement-II : 100 ml oxygenated blood delivers 75% of the oxygen it carries to tissue under normal physiological condition.

(1) Both statement-I and statement-II are correct.

(2) Statement-I correct and statement-II is incorrect.

(3) Statement-I is incorrect and statement-II is correct.

(4) Both statement-I and statement-II are incorrect.

157. $CO_2 + H_2O \rightleftharpoons H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$
(Carbonic acid)
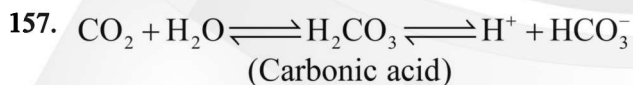
Identify the location where this reaction mainly takes place & also identify the enzyme which catalyzes it.

(1) Plasma and Carboxylase

(2) RBC and Carboxylase

(3) RBC and Carbonic anhydrase

(4) Plasma and Carbonic anhydrase

158. How much CO_2 is delivered to the alveoli by 300 ml of deoxygenated blood ?

(1) 12 ml

(2) 20 ml

(3) 15 ml

(4) 4 ml

159. Dissociation of oxyhemoglobin at tissue capillary in the presence of higher pCO_2 is called ?

(1) Haldane's effect

(2) Bohr's effect

(3) Reverse Bohr's effect

(4) Chloride shift

160. How will the increased pH of blood affect oxygen dissociation curve ?

(1) Shift curve towards right

(2) Will not affect at all

(3) Shift the curve towards left

(4) Change the curve to straight line

161. Chemoreceptor which are located in the wall of carotid artery and aorta are mainly sensitive for ?

(1) CO_2 and H^+ concentration

(2) O_2 and CO_2

(3) O_2 and H^+ concentration

(4) Only O_2

162. Identify the structure which is responsible to decrease the duration of inspiration and increase rate of breathing.

(1) Hypothalamus

(2) Medulla oblongata

(3) Pons (Pneumotaxic centre)

(4) Aortic body

163. Identify the factors among given which decrease P_{50} value and shift oxygen dissociation curve towards left.

(a) Low pCO_2

(b) Low pH

(c) High 2-3 BPG (Bis phosphoglycerate)

(d) High PO_2

(1) (c) and (d)

(2) (a) and (b)

(3) (a) and (d)

(4) (b) and (c)

164. Identify the disease which can be categorized under occupational respiratory disorder ?

(1) Bronchitis

(2) Asthma

(3) Emphysema

(4) Asbestosis

165. Transportation of CO_2 by RBCs is done in the form of ?

(1) 70% in sodium Bicarbonate

(2) 20-25% in form of carboxyhemoglobin

(3) 20-25% in the form of carbamino haemoglobin

(4) 97% in the form of oxyhaemoglobin

166. What will be the effect on exchange of gases if pO_2 in alveolar space becomes 40 mm Hg instead of 104 mm Hg ?

(1) No net diffusion of oxygen will take place at alveolar capillary.

(2) More oxygen will diffuse from alveoli to alveolar capillary.

(3) Oxygen will diffuse from alveolar capillary to Alveoli.

(4) No change in diffusion rate will be observed.

167. How many of the below mentioned condition will increase dissociation of oxyhemoglobin.

(a) High pCO_2

(b) High pO_2

(c) Low pH

(d) High temperature

(1) (a) and (d) only

(2) (a), (c) and (d) only

(3) (a) and (c) only

(4) (b) and (d) only

168. Find the incorrect match related to respiratory structures and animals :

	Respiratory structures	Animal
(1)	Gills	Fishes
(2)	Lungs	Mammals
(3)	Moist cuticle	Cockroach
(4)	Tracheal tubes	Arthopods

169. In human trachea is a straight tube extending upto _____ :

(1) the upper-thoracic cavity

(2) the mid-thoracic cavity

(3) the mid-abdominal cavity

(4) the upper-abdominal cavity

170. Thoracic cage of man is formed of :

(1) Ribs and sternum only

(2) Sternum and lumbar vertebrae only

(3) Ribs, sternum and thoracic vertebrae

(4) Ribs, sternum and lumbar vertebrae

171. Total number of alveoli in human lungs are :

(1) 100 million   (2) 300 billion

(3) 300 million   (4) 70 million

172. The covering of the lungs are called :

(1) Perichondrium

(2) Pericardium

(3) Pleural membranes

(4) Fascia

173. Consider the following lung volumes and capacities

TLC, VC, RV, FRC, TV, EC, IC

how many of the above capacities and volume can be measured by spirometer completely.

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

174. During swallowing glottis can be covered by a ___A___ flap called epiglottis to prevent the entry of food into the ___B___.
Find the correct option which fills above blanks correctly :

(1) A-Thick elastic bony, B-Pharynx

(2) A-Thin elastic bony, B-Pharynx

(3) A-Thick elastic cartilaginous, B-Larynx

(4) A-Thin elastic cartilaginous, B-Larynx

175. Lower invertebrates like sponges, coelenterates, flatworms, etc exchange O_2 with CO_2 by ___A___ over their ___B___.
Find the correct option which fills above blanks correctly :

(1) A-active transport, B-entire body surface

(2) A-simple diffusion, B-entire body surface

(3) A-Simple diffusion, B-Gills

(4) A-Secondary active transport, B-Tracheal tubes

176. The muscles responsible for normal inspiration is/are :

(a) EICM   (b) Diaphragm

(c) IICM   (d) Abdominal muscles

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

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

177. Which of the following labelled structure is made up of phrenic muscles :
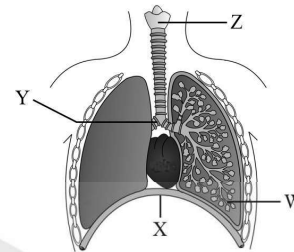
(1) W   (2) X   (3) Y   (4) Z

178. **Assertion (A) :-** Larynx is also known as sound box.
Reason (R) :- Larynx is a cartilaginous box which helps in sound production.

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

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

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

179. **Assertion (A) :-** The branching network of bronchi bronchioles and alveoli comprise the lungs.
Reason (R) :- Human have two lungs which are covered by two single layered pleura.

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

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

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

180. **Assertion (A) :-** In human trachea divides at the level of 5th thoracic vertebra.
Reason (R) :- In human lungs are present in abdominal cavity.

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

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

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

181. Utilisation of O_2 by the cells for __a__ reactions and resultant release of __b__ .
Find the correct option which fills above blank correctly

(1) a-anabolic, b-CO_2 (2) a-catabolic, b-O_2

(3) a-catabolic, b-CO_2 (4) a-metabolism, b-CO

182. **Assertion (A) :-** Pleural fluid present between pleura.
Reason (R) :- It reduces friction on lung-surface.

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

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

(4) Both **(A)** and **(R)** is correct and **(R)** is the correct explanation of **(A)**

183. The part starting with external nostrils upto the which part constitute the conducting part :

(1) Alveoli

(2) Terminal bronchioles

(3) Alveolar duct

(4) Respiratory bronchioles

184. In human inspiration can occur if the pressure within the lungs is :

(1) More than the atmospheric pressure

(2) Equal than the atmospheric pressure

(3) Less than the atmospheric pressure

(4) Both (1) and (2)

185. Volume of air inspired or expired during a normal respiration is known as :

(1) Expiratory reserve volume

(2) Inspiratory reserve volume

(3) Tidal volume

(4) Residual volume

SECTION - B (ZOOLOGY)

186. Identify the factors which are not responsible for formation of oxyhemoglobin in alveolar capillary.
(A) Low H^+ concentration
(B) Low pCO_2
(C) High Temperature
(D) Low pO_2

(1) A and B only

(2) A, B, C only

(3) C and D only

(4) B, C and D only

187. In given question one is assertion and another sentence is reason. Identify suitable relation based on given options.
Assertion: Solubility of CO_2 is 20 - 25 times higher than that of oxygen.
Reason: Amount of CO_2 that can diffuse through the diffusion membrane per unit difference in partial pressure is much higher compared to that of oxygen.

(1) Both Assertion and Reason are correct and Reason is the correct explanation.

(2) Both Assertion and Reason are correct but Reason is not correct explanation of Assertion.

(3) Assertion is correct but Reason is incorrect.

(4) Both Assertion and Reason are incorrect.

188. Transport of CO_2 is mainly performed in the form of ?

(1) Dissolved form as CO_2

(2) Carbamino haemoglobin

(3) Bicarbonate

(4) Carboxy haemoglobin

189. Identify the disorder in which proliferation of fibrous tissue takes place in Lungs.

(1) Bronchitis

(2) Silicosis

(3) Asthma

(4) Emphysema

190. (a) It occurs due to specific occupations which involve grinding or stone breaking.

(b) Inflammation of bronchi and bronchioles.

(c) One of the major cause is cigarette smoking.

(d) Causing wheezing sound.

(e) Proliferation of fibrous tissue in lungs.

(f) Decreased respiratory surface.

(g) Wearing protective mask can prevent this disorder.

Which of the above motioned sentences are true for occupational respiratory disorders.

(1) (a), (e) and (g)

(2) (a), (b), (d)

(3) (b), (c), (e)

(4) (d), (e), (f)

191. (a) Role of oxygen in regulation of respiratory rhythm is very significant.

(b) One molecule of haemoglobin carries maximum 2 molecule of oxygen.

(c) Binding of oxygen with haemoglobin is primarily related to partial pressure of oxygen.

Which option correctly identifies above mentioned sentences.

(1) (a), (b) and (c) wrong

(2) (a) correct, (b) and (c) wrong

(3) (a) and (b) correct, (c) wrong

(4) (a) and (b) wrong, (c) correct

192. Which of the option represents conditions related with 'Emphysema' disorder.

(A) Production of wheezing sound.

(B) Inflammation in bronchi and bronchioles.

(C) Decreased respiratory surface due to damaged alveolar walls.

(D) Fibrosis in lungs which cause serious damage.

(1) B and D both

(2) C and D both

(3) Only D

(4) Only C

193. Match the column I and column II.

	Column-I		Column-II
(a)	pO_2 in oxygenated blood	(i)	104 mm Hg
(b)	pCO_2 in oxygenated blood	(ii)	40 mm Hg
(c)	pO_2 in Alveoli	(iii)	45 mm Hg
(d)	pCO_2 in Deoxygenated blood	(iv)	95 mm Hg

(1) a – i, b – ii, c – iii, d – iv

(2) a – ii, b – i, c – iv, d – iii

(3) a – iv, b – ii, c – i, d – iii

(4) a – iv, b – ii, c – iii, d – i

194. Find the odd one structure related to C-shaped incomplete cartilaginous rings :

(1) Primary bronchi

(2) Secondary bronchi

(3) Tertiary bronchi

(4) Respiratory branchioles

195. The largest cartilage of larynx is :

(1) Cricoid

(2) Arytenoid

(3) Thyroid

(4) Cartilage of Santorini

196. Thoracic cage expand in anterior posterior axis is due to :

(1) Contraction of EICM

(2) Contraction of diaphragm

(3) Contraction of IICM

(4) Relaxation of diaphragm

197. Consider the following structures of human respiratory system :

Trachea, alveolar duct, terminal branchioles, alveoli, secondary bronchi, tertiary bronchi

how many above structure are not included in conduction zone of respiratory system.

(1) 6

(2) 3

(3) 2

(4) 4

198. **Assertion (A) :-** The lungs are situated in the thoracic chamber which is anatomically an air tight chamber.

Reason (R) :- Human can directly alter the pulmonary volume.

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

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

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

199. Find the incorrect one related to total lung capacity :

(1) RV + ER + TV + IRV

(2) VC + RV

(3) IRC + FRC

(4) EC + FRC

200. The maximum volume of air a person can breathe in after a forced expiration, this is :

(1) TLC-RV   (2) VC

(3) EC + IRV   (4) All of these