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IIT-JEE | NEET | Foundation

NEET

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

ALL INDIA SKY TEST SERIES

Pulse Batch – Neet

Date : 25/09/2023

SYLLABUS

PHYSICS	CHEMISTRY	BOTANY	ZOOLOGY
Previous + Rotation	Previous + Thermochemistry	Plant kingdom	Breathing and exchange of gases

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

INSTRUCTIONS:

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

GENERAL INSTRUCTION

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

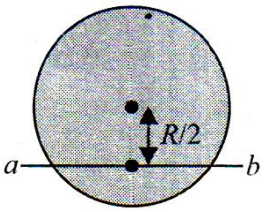
Name of the candidate: _____

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

PHYSICS

SECTION - A

1. The moment of inertia of the uniform disc of mass M of radius R about the line *ab*.



(a) MR^2 (b) $\frac{MR^2}{4}$

(c) $\frac{MR^2}{2}$ (d) None

2. The moment of inertia of a uniform rod of length *L* and mass *M* about an axis passing through a point at a distance of L/3 from one of its ends and perpendicular to the rod is.

(a) $\frac{ML^2}{12}$ (b) $\frac{ML^2}{9}$ (c) $\frac{7ML^2}{48}$ (d) $\frac{ML^2}{48}$

3. One solid sphere A and another hollow sphere B are of same mass and same outer radius. Their moments of inertia about their diameters are respectively I_A and I_B such that.

(a) $I_A = I_B$ (b) $I_A > I_B$

(c) $I_A < I_B$ (d) $\frac{I_A}{I_B} = \frac{1}{2}$

4. The ratio of the radii of gyration of a circular disc about a tangential axis in the plane of the disc and of a circular ring of the same radius about a tangential axis in the plane of the ring is.

(a) $\sqrt{3} : \sqrt{5}$ (b) $\sqrt{12} : \sqrt{3}$

(c) $1 : \sqrt{3}$ (d) $\sqrt{5} : \sqrt{6}$

5. A thin wire of mass M and length L is bent to form a circular ring. The moment of inertia of this ring about its axis is.

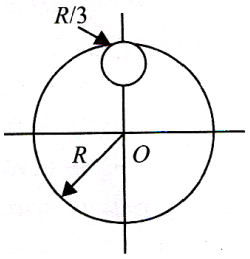
(a) $\frac{1}{4\pi^2}ML^2$ (b) $\frac{1}{12}ML^2$

(c) $\frac{1}{3\pi^2}ML^2$ (d) $\frac{1}{\pi^2}ML^2$

6. A circular disc of radius R and thickness R/6 has moment of inertia I about an axis passing through its centre and perpendicular to its plane. It is melted and recasted into a solid sphere. The moment of inertia of the sphere about its diameter as axis of rotation is.

(a) I (b) $\frac{2I}{3}$ (c) $\frac{I}{5}$ (d) $\frac{I}{6}$

7. From a circular disc of radius R and mass 9M, a small disc of radius R/3 is removed from the disc. The moment of inertia of the remaining disc about an axis perpendicular to the plane of the disc and passing through O is.



(a) $4MR^2$ (b) $\frac{40}{9}MR^2$ (c) $10MR^2$

(d) $\frac{37}{9}MR^2$

8. A homogeneous disc with a radius of r = 0.4 m and mass 5kg rotates around an axis passing through its centre. The relation between angular velocity of the disc and time is given by $\omega = a + bt$ where b = 4 rad s^{-2}. Find the tangential force applied to the rim of the disc.

(a) 4N (b) 5N (c) 6N (d) 7 N

9. A wheel of moment of inertia 2.5 kg m^2 has an initial angular velocity of 40 rad s^{-1}. A constant torque of 10 Nm acts on the wheel. The time during which the wheel is accelerated to 60 rad s^{-1} is.

(a) 4s (b) 6s (c) 5s (d) 2.5 s

10. A rigid body is in pure rotation that is, undergoing fixed axis rotation. Then which of the following statement (s) are true?

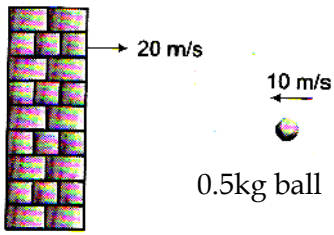
(a) You can find two points to the axis in a plane perpendicular to the axis of rotation having same velocity.

(b) You can find two points in the body in a plane perpendicular to the axis of rotation having same acceleration.

(c) Speed of all the particles lying on the curved surface of a cylinder whose axis coincides with the axis of rotation is same.

(d) Angular speed of the body is different for different points in the body.

11. Consider the situation as shown in the diagram, the ball strikes the wall normally and the collision is elastic, the change in the kinetic energy of the ball is



(a) 300 J (b) 600 J (c) 900 J (d) 1200 J

12. A child is standing with folded hands at the centre of a platform rotating about its central axis. The kinetic energy of the system is K. The child now stretches his arms so that the moment of inertia of the system doubles. The kinetic energy of the system now is.

(a) 2K (b) $\frac{K}{2}$ (c) $\frac{K}{4}$ (d) 4K

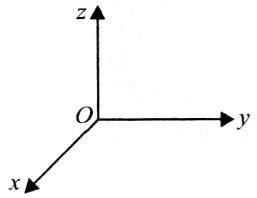
13. The angle turned by a body undergoing circular motion depends on time as $\theta = \theta_o + \theta_1 t + \theta_2 t^2$. Then angular acceleration of the body is.

(a) θ_1 (b) θ_2 (c) $2\theta_1$ (d) $2\theta_2$

14. A constant torque acting on a uniform circular object changes its angular momentum from A_o to $4A_o$ in 4 sec. The magnitude of this torque is.

(a) $\frac{3A_o}{4}$ (b) A_o (c) $4A_o$ (d) $12A_o$

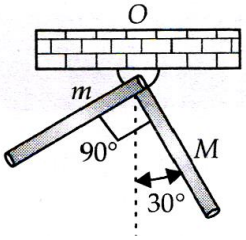
15. A force of $-F\hat{k}$ acts on O, the origin of the coordinate system. The torque about the point (1, - 1) is.



(a) $F(\hat{i} - \hat{j})$ (b) $-F(\hat{i} + \hat{j})$

(c) $F(\hat{i} + \hat{j})$ (d) $-F(\hat{i} - \hat{j})$

16. Two uniform rods of equal length but different masses are rigidly joined to form an L – shaped body, which is then pivoted as shown. If in equilibrium, the body is in the shown configuration, ratio M/m will be.



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

17. From a circular ring of mass M and R, an arc corresponding to a 90^o sector is removed. The moment of inertia of the remaining part of the about an axis passing through the centre of the ring and perpendicular to the plane ring is k times MR^2. Then the value of k is.

(a) $\frac{3}{4}$ (b) $\frac{7}{8}$ (c) $\frac{1}{4}$ (d) 1

18. Moment of inertia of a big drop is *I*. If 8 droplets are formed from big drop, then moment of inertia of small droplet is.

(a) $\frac{1}{32}$ (b) $\frac{1}{16}$ (c) $\frac{1}{8}$ (d) $\frac{1}{4}$

19. A thin horizontal circular disc is rotating about a vertical axis passing through its centre. An insect is at rest at a point near the rim of the disc. The insect now moves along a diameter of the disc to reach its other end. During the journey of the insect, the angular speed of the disc.

(a) Continuously decreases
(b) continuously increases
(c) first increases and then decreases
(d) remains unchanged

20. The angular momentum of a particle describing uniform circular motion is *L*. If its kinetic energy is halved and angular velocity doubled, its new angular momentum is.

(a) 4L (b) $\frac{L}{4}$ (c) $\frac{L}{2}$ (d) 2L

21. A solid sphere is rotating in free space. If the radius sphere is increased keeping mass same which one of the following will not be affected?

(a) Angular velocity
(b) Angular momentum
(c) Moment of inertia
(d) Rotational kinetic energy

22. A particle is projected with a speed *v* at 45^0 with the horizontal. The magnitude of angular momentum of the projectile about the point of projection when the particle is at its maximum height *h* is

(a) zero (b) $\frac{mvh^2}{\sqrt{2}}$ (c) $\frac{mv^2h}{2}$ (d) $\frac{mvh}{\sqrt{2}}$

23. A round disc of moment of inertia I_2 about is axis perpendicular to its plane and passing through its centre is placed over another disc of moment of inertia I_1 rotating with an angular velocity ω about the same axis. The final angular velocity of the combination of discs is

(a) $\frac{I_2\omega}{I_1 + I_2}$ (b) ω (c) $\frac{I_1\omega}{I_1 + I_2}$ (d) $\frac{(I_1 + I_2)\omega}{I_1}$

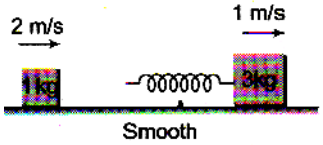
24. A thin circular ring of mass m and radius R is rotating about its axis with a constant angular velocity ω. The objects each of mass M are attached gently to the opposite ends of a diameter of the ring. The ring now rotates with an angular velocity ω′ is equal to

(a) $\frac{\omega(m + 2M)}{m}$ (b) $\frac{\omega(m - 2M)}{(m + 2M)}$

(c) $\frac{\omega m}{(m+M)}$ (d) $\frac{\omega m}{(m+2M)}$

25. A particle of mass m = 5 units is moving with a uniform speed $v = 3\sqrt{2}$ m in the XOY plane along the line $Y = X + 4$. The magnitude of the angular momentum about origin is
(a) zero (b) 60 unit
(c) 7.5 unit (d) $40\sqrt{2}$

26. Two blocks of masses 1 kg and 3 kg are moving with velocities 2 m/s and 1 m/s, respectively, as shown. If the spring constant is 75 N/m, the maximum compression of the spring is



(a) 5 cm (b) 10 cm (c) 15 cm (d) 20 cm

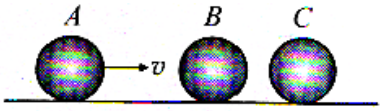
27. Which one of the following statements is true for collision between two particles?
(a) Momentum is conserved in elastic collision but not in inelastic collision
(b) Total kinetic energy is conserved in elastic collisions but momentum is not
(c) Total KE is not conserved but momentum is conserved in inelastic collision
(d) KE and momentum both are conserved in all types of collision.

28. Two perfectly elastic balls of same mass m are moving with velocities u_1 and u_2. They collide elastically n times. The kinetic energy of the system finally is
(a) $\frac{1}{2}\frac{m}{n}u_1^2$ (b) $\frac{1}{2}\frac{m}{n}(u_1^2+u_2^2)$
(c) $\frac{1}{2}m(u_1^2+u_2^2)$ (d) $\frac{1}{2}mn(u_1^2+u_2^2)$

29. After perfectly inelastic collision between two identical particles moving with same speed in different directions, the speed of the particles become half the initial speed. The angle between the velocities of the two before collision is
(a) 60^0 (b) 45^0 (c) 120^0 (d) 30^0

30. Two balls with masses in the ratio of 1 : 2 moving in opposite direction have a head-on elastic collision. If their velocities before impact were in the ratio of 3 : 1, then speeds after impact will have the ratio;
(a) 5 : 3 (b) 7 : 5 (c) 4 : 5 (d) 2 : 3

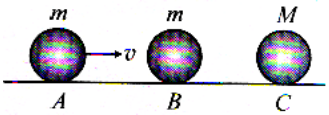
31. Two identical balls marked B and c, in contact with each other and at rest on a horizontal frictionless table, are hit head on by another identical ball marked A moving initially with a speed v as shown. What is observed, if the collision is elastic?



(a) A comes to rest, B and C roll out with speed $\frac{v}{2}$ each
(b) A and B come to rest and C roll out with speed v
(c) A, B, C roll out with $\frac{v}{3}$ each
(d) A, B, C come to rest

32. A ball is dropped from a height h above a floor. If the coefficient of restitution between the floor and the ball is 'e' the ball, after the first rebound will rise to a height of
(a) eh (b) e^2h (c) h/e (d) h/e^2

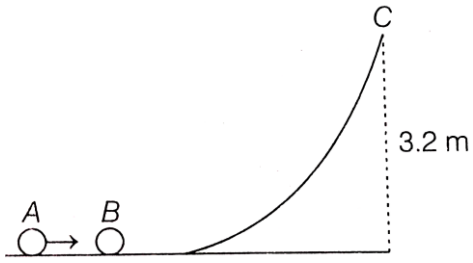
33. Three ball A, B, C are placed on a smooth horizontal surface. Ball A moves with velocity v towards ball B and C. All collisions are perfectly elastic. If M < m, the number of collisions between the balls will be



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

34. If in above question M > m, then the number of collisions between the balls will be
(a) 1 (b) 2 (c) 3 (d) 4

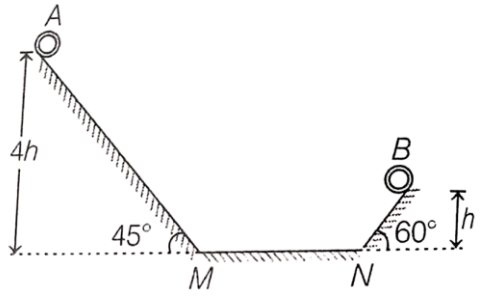
35. Two identical ball A and B lie on a smooth horizontal surface, which gradually merges into a curve to a height 3.2 m. Ball A is given a velocity of 10 m/s. It collides head on with ball B, which then moves on the curved path. The minimum coefficient of restitution e for the collision between A and B in order that ball B reaches the highest point C of the curve is (Take, g = 10 m/s²)



(a) $\frac{1}{4}$ (b) $\frac{3}{5}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

SECTION - B

36. Two identical balls A and B are released from the positions shown in figure. They collide elastically on horizontal portion MN. The ratio of the height attained by A and B after collision will be (neglect friction)



(a) 1 : 4 (b) 2 : 1 (c) 4 : 13 (d) 2 : 5

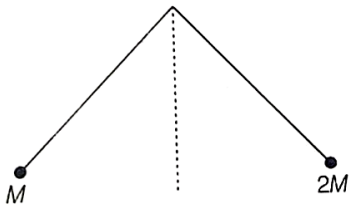
37. On a frictionless surface, a block of mass M moving at speed v collides elastically with another block of same mass M which is initially at rest. After collision, the first block moves at an angle θ to its initial direction and has a speed v/3. The second block's speed after the collision is.

(a) $\frac{2\sqrt{2}}{3}$v (b) $\frac{3}{4}$v (c) $\frac{3}{\sqrt{2}}$v (d) $\frac{\sqrt{3}}{2}$v

38. A moving block having mass m, collides with another stationary block having mass 4m. The lighter block comes to rest after collision. When the initial velocity of the lighter block is v, the value of coefficient of restitution (e) will be.

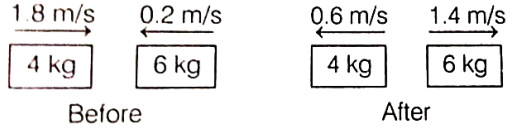
(a) 0.8 (b) 0.25 (c) 0.5 (d) 0.4

39. Two pendulum bobs of masses M and 2M are released from same height H. If they collide perfectly inelastically at mean position, then the height upto which the composite mass would rise is.



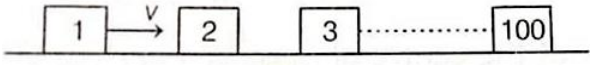
(a) $\frac{H}{3}$ (b) $\frac{H}{9}$ (c) $\frac{2H}{3}$ (d) $\frac{4H}{9}$

40. In figure, determine the character of the collision. The masses of the blocks and the velocities before and after are given. The collision is.



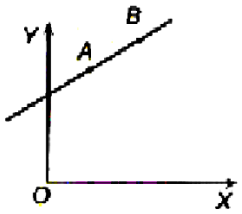
(a) completely inelastic
(b) partially inelastic
(c) perfectly elastic
(d) this collision is not possible

41. There are hundred identical blocks equally spaced on a frictionless track as shown. Initially all the blocks are at rest. Block 1 is pushed with velocity v towards block 2. All collisions are perfectly inelastic. The final velocity of the set of hundred stucked block will be.



(a) $\frac{v}{99}$ (b) $\frac{v}{100}$ (c) v (d) zero

42. A particle of mass m moves in the x-y plane with a velocity v along the straight line AB. If the angular momentum of the particle with respect to origin O is L_A when it is at A and L_B when it is at B, then



(a) $L_A > L_B$
(b) $L_A = L_B$
(c) The relationship between L_A and L_B depends upon the slop of the line AB
(d) $L_A < L_B$

43. A wheel starting from rest is uniformly accelerated at 2 rad/s^2 for 5s. It is allowed to rotate uniformly for the next 10 s and is finally brought to rest in the next 5 s. Find the total angle rotated by the wheel.

(a) 150 rad (b) 200 rad
(c) 160 rad (d) 175 rad

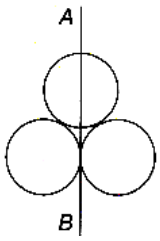
44. Four point masses each of value m, are placed at the corners of a square ABCD of side *l*. The moment of inertia of this system about an axis passing through A and parallel to BD is.

(a) $2ml^2$ (b) $\sqrt{3}ml^2$ (c) $3ml^2$ (d) ml^2

45. One quarter sector is cut from a uniform circular disc of radius R. This sector has mass M. It is made to rotate about a line perpendicular to its plane and passing through the center of the original disc. Its moment of inertia about the axis of rotation is.

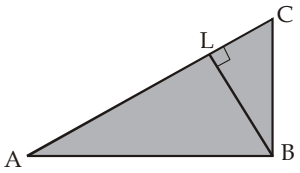
(a) $\frac{1}{2}MR^2$ (b) $\frac{1}{4}MR^2$ (c) $\frac{1}{8}MR^2$ (d) $\sqrt{2}MR^2$

46. Three rings each of mass M and radius R are arranged as shown in the figure. The moment of inertia of the system about AB



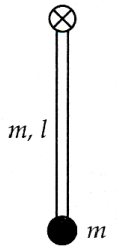
(a) $3MR^2$ (b) $\frac{3}{2}MR^2$ (c) $5MR^2$ (d) $\frac{7}{2}MR^2$

47. About which axis moment of inertia in the given triangular lamina is maximum?



(a) AB (b) BC (c) AC (d) BL

48. A particle is attached to the lower end of a uniform rod which is hinged at its other end as shown in the figure. The minimum speed given to the particle so that the rod performs circular motion in a vertical plane will be (length of the rod is l, consider masses of both rod and particle to be same).

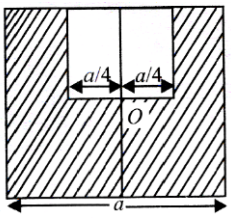


(a) $\sqrt{5gl}$ (b) $\sqrt{4gl}$
(c) $\sqrt{4.5gl}$ (d) $\sqrt{2.25gl}$

49. A uniform rod of mass M and length L is pivoted at one end such that it can rotate in a vertical plane. There is negligible friction at the pivot. The free end of the rod is held vertically above the pivot and then released. The angular acceleration of the rod when it makes an angle $\Delta E + 2RT$ with the vertical is.

(a) $g\sin\theta$ (b) $\frac{g}{L}\sin\theta$
(c) $\frac{3g}{2L}\sin\theta$ (d) $6gL\sin\theta$

50. A square plate of edge a/2 is cut out front a uniform square plate of edge a as shown in figure. The mass of the remaining portion is M. The moment of the inertia of the shaded portion about an axis passing through O (centre of the square of side a) and perpendicular to plane of the plate is.



(a) $\frac{9}{64}Ma^2$ (b) $\frac{3}{16}Ma^2$
(c) $\frac{5}{12}Ma^2$ (d) $\frac{Ma^2}{6}$

CHEMISTRY

SECTION - A

51. For the reaction,

$\frac{1}{2}A_2 + \frac{1}{2}B_2 \rightarrow AB, \Delta H = -50k\,cal$

If bond energies of A_2, B_2 and AB are respectively x, x/2 and x k cal, the value of x is :

(a) 50 (b) 100 (c) 200 (d) 400

52. In which of following ΔS is positive :

(a) $H_2O_{(l)} \rightarrow H_2O_{(s)}$

(b) $3O_{(2g)} \rightarrow 2O_{3(g)}$

(c) $H_2O_{(l)} \rightarrow H_2O_{(g)}$

(d) $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

53. Standard molar enthalpy of formation of CO_2 is equal to :

(a) zero

(b the standard molar enthalpy of combustion gaseous carbon.

(c) the sum of standard molar enthalpies of formation of CO and O_2

(d) the standard molar enthalpy of combustion carbon (graphite.)

54. Which one of following is an exothermic reaction

(a) $N_{2(g)} + O_{2(g)} + 18/0.8kJ \rightarrow 2NO_{(g)}$

(b) $N_{2(g)} + 3H_{2(g)} - 92kJ \rightarrow 2NH_3$

(c) $C_{(g)} + H_2O_{(g)} \rightarrow CO_{(g)} + H_{2(g)} - 131.1kJ$

(d) $C_{(graphite)} + 2S \rightarrow CS_{2(l)} - 91.9KJ$

55. At 27^oC one mole of ideal gas is compressed isothermally and reversible from a pressure of atm to 10 atm. The value of ΔE and q are: (if R 2 cal) -

(a) 0, – 965.84 cal.

(b) – 965.84 cal., – 865.58 cal.

(c) 865.58 cal., – 865.58 cal.

(d) +965.84 cal., +865.58 cal.

56. The spontaneous nature of a reaction impossible if:
(a) $\Delta H = +ve, \Delta S = +ve$
(b) $\Delta H = -ve, \Delta S = -ve$
(c) $\Delta H = -ve, \Delta S = -ve$
(d) $\Delta H = +ve, \Delta S = -ve$

57. Which of the following does not represent enthalpy change during phase transformation?
(a) Standard enthalpy of fusion
(b) Standard enthalpy of vaporization
(c) Standard enthalpy of sublimation
(d) Standard enthalpy of formation

58. Which of the following reactions will have the value of enthalpy of neutralization as -57.1 kJ mol-?
(a) $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$
(b) $HCl + NaOH \rightarrow NaCl + H_2O$
(c) $HCl + NH_4OH \rightarrow NH_4Cl + H_2O$
(d) $HCOOH + NaOH \rightarrow HCOONa + H_2O$

59. Formation of ammonia is shown by the reaction,
$N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}, \Delta_r H^o = -91.8\,kJ\ mol^{-1}$
What will be the enthalpy of reaction for the decomposition of NH_3 according to the reaction ?
$2NH_{3(g)} \rightarrow N_{2(g)} + 3H_{2(g)}; \Delta_r H^o = ?$
(a) -91.8 kJ mol-1 (b) +91.8 kJ mol-1
(c) -45.9 kJ mol-1 (d) + 45.9 kJ mol-1

60. The amount of heat evolved when 0.50 mole of HCl is mixed with 0.30 mole of NaOH solution is
(a) 57.1 kJ (b) 28.55 kJ
(c) 11.42 kJ (d) 17.13 kJ

61. The enthalpy of formation of ammonia when calculated from the following bond energy data is (B.E. of N-H, H-H, $N \equiv N$ is 389 kJ mol-1, 435 kJ mol-1, 945.36 kJ mol-1 respectively)
(a) -41.82 kJ mol-1 (b) +83.64 kJ mol-1
(c) -945.36 kJ mol-1 (d) -833 kJ mol-1

62. For the reaction : $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl; \Delta H = -44$ kcal What is the enthalpy of decomposition of HCl ?
(a) + 44 kcal/mol (b) -44 kcal/mol
(c) -22 kcal/mol (d) +22 kcal/mol

63. How much heat is evolved if 3.2 g of methane is burnt and if the heat of combustion of methane is -880 kJ mol-1 ?
(a) 88 kJ (b) 264 kJ
(c) 176 kJ (d) 440 kJ

64. The enthalpies of elements in their standard states are taken as zero. The enthalpy of formation of a compound
(a) is always negative
(b) is always positive
(c) may be positive or negative
(d) is never negative.

65. Enthalpy change for the reaction $4H(g) \rightarrow 2H_2(g)$ is -869.5 KJ. The dissociation energy of H-H bond is :
(a) 217.4 KJ (b) -438.4 KJ
(c) -869.6 KJ (d) +434.8 KJ

66. For the reaction, $\Delta H = 3\,kJ, \Delta S = 10\,J/K$ beyond which temperature this reaction will be spontaneous :
(a) 300 K (b) 200 K (c) 273 K (d) 373 K

67. The heat of neutralization of any strong acid and strong base is nearly equal to :
(a) -75.3 KJ (b) +57.3 KJ
(c) -57.3 KJ (d) 75.3 KJ

68. Hess law is used to calculate :
(a) enthalpy of reaction
(b) entropy of reaction
(c) work done in reaction
(d) all of these

69. For $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g), \Delta H$ is equal to :
(a) $\Delta E + 2RT$ (b) $\Delta E - 2RT$
(c) $\Delta E + RT$ (d) $\Delta E - RT$

70. Heat of neutralization will be minimum for which of following reaction :
(a) NaOH + H_2SO_4
(b) $NH_4OH + CH_3COOH$
(c) $NaOH + HCl$
(d) $NaOH + CH_3COOH$

71. If heat of formation of SO_2 is -298 kJ. What is heat of combustion of 4 gm of sulphur :
(a) 37 KJ (b) -37.25 KJ
(c) 298 KJ (d) 18.6 KJ

72. Which of following reaction define ΔH^o_r
(a) $C_{(diamond)} + O_2(g) \rightarrow CO_2(g)$
(b) $\frac{1}{2}H_2(g) + \frac{1}{2}F_2(g) \rightarrow HF(g)$
(c) $H_4P_2O_7 + H_2O \rightarrow 2H_3PO_4$
(d) $SO_2(g) + \frac{1}{2}O_2(g) \rightarrow SO_3(g)$

73. Bond energies of H- H and Cl-Cl are 430 kJ mol^{-1} and 242 kJ mol^{-1} respectively. ΔH_f for HCl is 91 kJ mol^{-1}. What will be the bond energy of H-Cl ?
(a) 672 kJ (b) 182 kJ (c) 245 kJ (d) 88 kJ

74. Which of the following relationship is not correct ?
(a) $\Delta H = \Delta E + \Delta n_g RT$
(b) $\Delta H_{sub} = \Delta H_{fusion} + \Delta H_{vap}$
(c) $\Delta H_r^o = \Sigma\, H_{f\,(reacants)}^o - \Sigma\, H_{f\,(products)}^o$
(d) $\Delta H_r^o = \Sigma$ B.E. of reactants - Σ B.E. of products

75. Which of the following reactions will have the value of ΔS with a negative sign?
(a) $H_2O_{(l)} \rightarrow H_2O_{(g)}$
(b) $2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$
(c) $Cl_{2(g)} \rightarrow 2Cl_{(g)}$
(d) $CaCO_{3(s)} \rightarrow CaO_{(s)} + CO_{2(g)}$

76. What is the entropy change when 1 mole oxygen gas expands isothermally and reversibly from an initial volume of 10 L to 100 L at 300 K ?
(a) 19.14 J K^{-1} (b) 109.12 J K^{-1}
(c) 29.12 J K^{-1} (d) 10 J K^{-1}

77. At what temperature liquid water will be in equilibrium with water vapour ?
$\Delta H_{vap} = 40.73\,kJ\,mol^{-1}, \Delta S_{vap} = 0.109\,kJ\,K^{-1}mol^{-1}$
(a) 282.4 K (b) 373.6 K
(c) 100 K (d) 400 K

78. At absolute zero, the entropy of a pure crystal is zero. This is
(a) first law of thermodynamics
(b) second law of thermodynamics
(c) third law of thermodynamics
(d) zeroth law of thermodynamics.

79. The correct relation between '$K_{eq.}$' and standar free energy change is :
(a) $\Delta G^o = RT \log K$ (b) $\Delta G^o = RT \ln K$
(c) $\frac{\Delta G^o}{nRT} = -\log K$ (d) $\frac{\Delta G^o}{nRT} = -2.30 \log K$

80. If ΔG^o is zero for a reaction then :
(a) $\Delta H = 0$ (b) $\Delta S = 0$
(c) $K_{eq.} = 0$ (d) $K_{eq.} = 1$

81. Match the column I with column II and mark the appropriate choice.

Column I		Column II	
(A)	State function	(i)	At constant pressure
(B)	$\Delta H = q$	(ii)	Specific heat
(C)	$\Delta U = q$	(iii)	Entropy
(D)	Intensive property	(iv)	At constant volume

(a) (A) → (iii), (B) → (i), (C) → (iv), (D) → (ii)
(b) (A) → (ii), (B) → (iv), (C) → (i), (D) → (iii)
(c) (A) → (ii), (B) → (iv), (C) → (iii), (D) → (i)
(d) (A) → (iii), (B) → (ii), (C) → (i), (D) → (iv)

82. The enthalpies of combustion of carbon and carbon monoxide are respectively are -393.5 and -283 kJ mol^{-1}. Enthalpy of formation of carbon monoxide per mole will be :
(a) -110.5 KJ (b) -676.5 KJ
(c) 676.5 KJ (d) 110.5 KJ

83. The energy required to raise temperature of 1 gm of substance by 1K is define as :
(a) Specific heat (b) Latent Heat
(c) Both above (d) None of these

84. The following reactions carried out in open vessel. The reaction for which $\Delta H = \Delta U$ will be :
(a) $PCl_5(g) \rightarrow PCl_3(g) + Cl_2(g)$
(b) $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$
(c) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
(d) $H_2(g) + I_2(g) \rightarrow 2HI(g)$

85. Match the following columns and mark the appropriate choice.

Column I		Column II	
(A)	Exothermic	(i)	$\Delta H = 0$, $\Delta E = 0$
(B)	Spontaneous	(ii)	$\Delta G = 0$
(C)	Cyclic process	(iii)	ΔH is negative.
(D)	Equilibrium	(iv)	ΔG is negative.

(a) (A) → (ii), (B) → (iii), (C) → (i), (D) → (iv)
(b) (A) → (iv), (B) → (i), (C) → (iii), (D) → (ii)
(c) (A) → (i), (B) → (ii), (C) → (iv), (D) → (iii)
(d) (A) → (iii), (B) → (iv), (C) → (i), (D) → (ii)

SECTION – B

86. Which of the following statements is not correct ?
(a) For a spontaneous process, ΔG must be negative,
(b) Enthalpy, entropy, free energy etc. are state variable.
(c) A spontaneous process is reversible in nature.
(d) Total of all possible kinds of energy of a system is called its internal energy.

87. Thermodynamics is not concerned about ___.
(a) energy changes involved in a chemical reaction
(b) the extent to which a chemical reaction proceeds
(c) the rate at which a reaction proceeds
(d) the feasibility of a chemical reaction

88. The volume of gas is reduced to half from its original volume. The specific heat will _____.
(a) be reduced to half
(b) be doubled
(c) remain constant
(d) be increased four times

89. $(\Delta H - \Delta U)$ for formation of carbon monoxide from its elements at 298 K is :
(a) -1238.78 J mol^{-1} (b) 1238.78 J mol^{-1}
(c) -2477.57 J mol^{-1} (d) 2477.57 J mol^{-1}

90. Predict the total number of intensive properties :
(i) Free energy
(ii) Critical density
(iii) Viscosity (iv) specific heat capacity
(v) molar heat capacity
(vi) kinetic energy
(vii) specific gravity
(viii) Dielectric constant
(ix) pH
(a) 9 (b) 8 (c) 7 (d) 6

91. If 100 calorie of heat are added to system and a work of 50 calorie is done on the system, calculate the energy change of the system.
(a) -150 Joule (b) +150 cal.
(c) +50 cal (d) -50 Joule

92. For which of the following reaction ΔH is greater than ΔE ?
(a) $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$
(b) $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(\ell)}$
(c) $PCl_{5(s)} \rightarrow PCl_{3(g)} + Cl_{2(g)}$
(d) $HCl_{(aq)} + NaOH_{3(g)} \rightarrow NaCl_{(aq)} + H_2O$

93. For the reaction of one mole of zinc dust with one mole of sulphuric acid in a bomb calorimeter, ΔU and w correspond to
(a) $\Delta U < 0, w = 0$ (b) $\Delta U = 0, w < 0$
(c) $\Delta U > 0, w = 0$ (d) $\Delta U < 0, w > 0$

94. If 900 J/g of heat is exchanged at boiling point of water, then what is increase in entropy ?
(a) 43.4 J/mol K (b) 87.2 J/mol K
(c) 900 J/mol K (d) Zero

95. Which of the following represents an exothermic reaction : -
(a) $N_{2(g)} + O_{2(g)} \rightarrow 2NO_{(g)}, \Delta H = 18.5$ KJ
(b) $H_2O(g) + C(s) \rightarrow CO(g) + H_{2(g)}, \Delta E = 131.2$KJ
(c) $2HgO(s) + 180.4\,KJ \rightarrow 2Hg(\ell) + O_2(g)$
(d) $2Zn(s) + O_2(g) \rightarrow 2ZnO(s), \Delta H = -693.8$ KJ

96. $N_2(g) + 2O_2(g) \rightarrow 2NO_2 \quad \Delta H = +x\,kJ$
$2NO(g) + O_2(g) \rightarrow 2NO_2(g) \quad \Delta H = +y\,kJ$
The enthalpy of formation of NO is
(a) (2x-2y) kJ/mol (b) (x-y)kJ/mol
(c) $\frac{1}{2}(y-x)$kJ/mol (d) $\frac{1}{2}(x-y)$kJ/mol

97. Standard enthalpy of formation is zero for –
(a) $C_{diamond}$ (b) $Br_2(g)$
(c) $C_{graphite}$ (d) $O_3(g)$

98. The heat of neutralization of four acids A, B, C and D when neutralized against a common base ate 13, 7, 9.4, 11.2 and 12.4 kcal respectively. The weakest among these acids is :
(a) A (b) B (c) C (d) D

99. Heat of dissociation of benzene to elements is 5535 KJ mol^{-1}. The bond enthalpies of C-C, C=C and C-H are 347.3, 615.0 and 416.2 KJ respectively. Resonance energy of benzene is
(a) 1.51 KJ (b) 15.1 KJ
(c) 151 KJ (d) 1511 KJ

100. The heat of solution of anhydrous $CuSO_4$ and $CuSO_4.5H_2O$ are -15.89 and 2.80 Kcal mol^{-1} respectively. What will be the heat of hydration of anhydrous $CuSO_4$?
(a) -18.69 kcal (b) 18.69 kcal
(c) -28.96 kcal (d) 28.96 kcal

BOTANY

SECTION – A

101. Asexual reproduction is by the production of different types of flagellated spores (motile) and on germination gives rise to new plants is:
(a) Anisogamy (b) Aplanospore
(c) Zoospore (d) Isogamy

102. Chlorophyll – bearing, simple, thalloid, autotrophic largely aquatic (both fresh water and marine), mostly multicellular and some are unicellular. Name this plant group:
(a) Blue green algae (b) Algae
(c) Bryophytes (d) Fungi

103. Fusion between one large, non-motile (static) female gamete and a smaller, motile male gamete is termed as oogamous. This type of sexual reproduction is found in which algae:
(i) *Volvox* and some *Chlamydomonas*
(ii) *Fucus* and *Volvox*
(iii) *Polysiphonia* and *Volvox*
(iv) *Fucus* and *Polysiphonia*
(a) i and ii (b) i, ii and iii
(c) i, ii, iii & iv (d) Only in ii and iv

104. Chief characteristic feature of Bryophytes are given below. Among them select the correct option:
(i) Amphibians of the plant kingdom
(ii) Play an important role in plant succession on bare rocks/soil
(iii) Rhizoids of them are unicellular as well as multicelluar and sex organs are unicellular
(iv) Main plant body is gametophytic or haploid
(a) i, iv (b) i, iii, iv
(c) i, ii, iv (d) i, ii, iii, iv

105. Pick out wrong statement regarding gymnosperms:
(a) Double fertilization is unique to gymnosperms and monocotyledons seeds are with testa
(b) *Sequoia*, a gymnosperm, is one of the tallest tree and also known as red wood tree
(c) The multicellular female gametophyte is retained within the megasporangium
(d) The gymnosperms are heterosporous and its endosperm is haploid

106. Match the following columns:

Column I	**Column II**
(a)*Chara*	(i) Brown algae
(b)*Dictyota*	(ii) Green algae
(c)*Porphyra*	(iii) Liverworts
(d)Male *Marchantia*	(iv) Red algae

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

107. Haplo – diplontic life cycle found in:
(a) *Polysiphonia* an alga
(b) Bryophytes only
(c) Both 1 and 2
(d)Gymnosperms

108. The plant group that produces spores and zygote but lacks vascular tissues and seeds is:
(a) Pteridophyta (b) Gymnosperm
(c) Bryophyta (d) Angiosperm

109. George Bentham and Joseph Dalton Hooker gave a system of classification which is called:
(a) Phylogenetic classification system
(b) Artificial classification system
(c) Natural classification system
(d) Cytotaxomic classification

110. Match the following columns:

Column I	**Column II**
(a) Brown algae	(i) *Marchantia*
(b) Red algae	(ii) *Ginkgo*
(c) Liverwort	(iii) *Dictyota*
(d) Gymnosperm	(iv) *Porphyra*

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

111. Which of the following statements is/are true
A. The member of phaeophyceae are commonly called green algae
B. Carageenin is obtained from red algae
C. Chloroplast of Chlamydomonas is cup shaped
D. Porphyra, Laminaria and Sargassum are marine algae
(a) A, B, C, D are correct
(b) B, C, D are correct
(c) C, D are correct
(d) Only D is correct

112. Match the following columns:

Column I	**Column II**
(A)Agar – agar	i.*Gracilaria*
(B)Algin	ii.*Laminaria*
(C)Protein	iii.Brown algae
(D)Iodine	iv.*Spirullina*

(a) A – i, B – iii, C – iv, D – ii
(b) A – i, B – iv, C – iii, D – ii
(c) A – iii, B – i, C – ii, D – iv
(d) A – ii, B – i, C – iii, D – iv

113. Gemmae of liver worts is/are:
(a) Green and develop in small receptacle
(b) Multicellular asexual bud
(c) Sexual bud
(d) All except (c)

114. Evolutionary, pteridophytes are first terrestrial plants which have:
(a) Vascular tissues and seed habit
(b) True root, stem and leaf
(c) Main plant body is sporophytic
(d) All of the above

115. Which is incorrect:
(a) Asexual reproduction in liverwort take place by gemmae
(b) Mosses have an elaborate mechanism of spore dispersal
(c) Pteridophytes are used for medicine purpose and as a soil binders
(d) Only *selaginella* is heterosporous but *salvinia* is not a heterosporous

116. Which is incorrect:
(a) Algae such as volvox represent haplontic life cycle
(b) Male gamete fuses with diploid secondary nucleus to produce triploid primary endosperm nucleus
(c) *Equisetum* belongs to class psilopsida
(d) Sequoia is giant redwood tree

117. If the diploid number of chromosomes in roots of pteridophytes is 12, what will be the number of chromosomes in the root and endosperm of gymnosperm?
(a) 12, 6 (b)12, 24
(c) 24, 36 (d) 24, 12

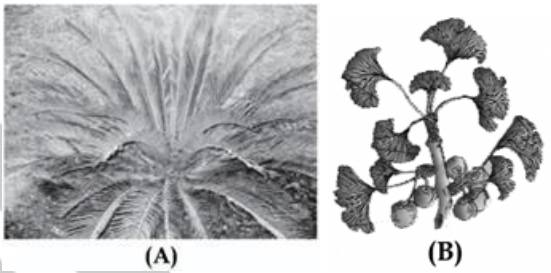
118. In kingdom plantae alteration of generation is not associated with
(a) Sporophytic and gametophytic phase
(b) Length of haploid & diploid phases
(c) Number of haploid and diploid phases
(d) Freeliving or dependent nature of haploid & diploid phases

119. Find the false statement from the followings:
(a) Cyanobacteria, that are also referred to as blue-green algae are not algae any more
(b) Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms are described under the kingdom plantae
(c) Artificial systems gave equal weightage to vegetative and sexual characteristics.
(d) Cytotaxonomy uses the chemical constituents of the plant cells to resolve confusions of taxonomy.

120. The megaspore mother cell in gymnosperms is differentiated from:
(a) Integument (b) Embryosac
(c) Nucellus (d) Endosperm

121. When sporophylls are arranged spirally along an axis, they form:
(a) Strobillus (b) Flowers
(c) Inflorescence (d) Sporophyte

122.



Identify the given figures:
(a) A – Cycas B – Ginkgo
(b) A – Cycas B – Cycas
(c) A – Ginkgo B – Cycas
(d) A – Ginkgo B – Ginkgo

123. "Natural classification" is the best classification system, because:
(a) It involves few vegetative characters
(b) It involves only the morphological characters
(c) It involves complete morphological characters
(d) It involves the economic importance of the plants

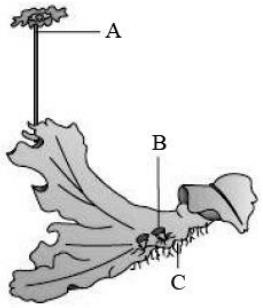
124. Select out the odd one with respect to systematic position:
(a) Lycopsida (b) Sphenopsida
(c) Hepaticopsida (d) Pteropsida

125. Which of the following are non-vascular cryptogams:
(a) Algae and fungi
(b) Thallophyta & Bryophyta
(c) Thallophyta, Bryophyta & pteridophyta
(d) Only pteridophyta

126. Which is the correct match for phaeophyceae members?
(a) Major pigments – Chlorophyll a & b
(b) Stored food – Floridian starch
(c) Cell wall – Cellulose and algin
(d) Flagella – 2-8 equal, apical

127. Choose correct statement:-
(a) Female gametophyte of gymnosperm has one archegonium.
(b) In cycas male and female cones borne on the same tree but in pinus male cones and megasporophylls are borne on diffrent trees.
(c) Pollination in gymnosperm is carried out by air.
(d) In gymnosperms male and female gametophytes have independent free-living existence.

128. Examine the figure given below and choose the structure in which asexual buds are produced:-



(a) A (b) B (c) C (d) D

129. In angiosperms, endosperm is developed by the activity of
(a) Egg cell and male gamete
(b) Two polar nuclei of embryosac
(c) Secondary nucleus and male gamete
(d) Synergids

130. Heterosporous pteridophytes show certain characteristics which are precursor to the seed habit in gymnosperm. One such characteristics is:-
(a) Presence of vascular tissue
(b) Presence of embryo stage
(c) Development of embryo inside the female gametophyte.
(d) External water required for fertilization.

131. How many plants in the list given below are the members of non-vascular embryophytes?
Spirogyra, Volvox, Fucus, Polysiphonia, Polytrichum, Sphagnum, Marchantia, Funaria, Selaginella, Equisetum.
(a) Six (b) Five (c) Four (d) Three

132. Diplontic algal genera is
(a) *Ectocarpus* - Brown algae
(b) *Polysiphonia* - Red algae
(c) *Fucus* - Brown algae
(d) *Spirogyra* - Green algae

133. Gametophyte of pteridophyte
(a) Long lived haploid (b) Unicellular
(c) Parasite (d) Bear sex organ

134. Winged pollen grain and polyembryony is found in-
(a) *Pinus* (b) *Marchantia*
(c) *Albugo* (d) *Chlamydomonas*

135. How many organisms belongs to Brown Algae, Bryophytes and Peteridophytes ?
Organism are - Chara, Sargassum, Sphagnum, Psilotum, Marchantia, Funaria, Equisetum, Spirogyra, Selaginella, Azolla, Laminaria, Cycas, Oryza,Fucus, Volvox, Porphyra,Anaebena, Adiantum.

	Brown algae	**Bryophytes**	**Pteridophytes**
(a)	5	2	4
(b)	3	3	5
(c)	3	4	5
(d)	4	8	6

SECTION - B

136. Which of the following is not correct?
(a) Isogamous – Spirogyra
(b) Isogamous – Chlamydomonas
(c) Oogamous – Volvox
(d) Zoospores – Porphyra

137. Assertion: Bryophytes have independent alternation of generation.
Reason: Bryophytes have independent gametophyte.
(a) If both Assertion and Reason are true and Reason is correct explanation of the Assertion.
(b) If both Assertion and Reason are true but Reason is not correct explanation of the Assertion.
(c) If Assertion is True but Reason is False.
(d) If Assertion is False but Reason is True.

138. Assertion: Approach towards seed habit was first found in Pteridophytes.
Reason: Pteridophytes are first terrestrial plants to possess vascular tissues.
(a) If both Assertion and Reason are true and Reason is correct explanation of the Assertion.
(b) If both Assertion and Reason are true but Reason is not correct explanation of the Assertion.
(c) If Assertion is True but Reason is False.
(d) If Assertion is False but Reason is True.

139. **Statement-I:** Agar is used in preparation of ice-creams.
Statement-II: Agar is obtained from red algae.
(a) Both Statement-I and Statement-II are correct.
(b) Both Statement-I and Statement-II are incorrect
(c) Statement-I is correct & Statement-II is incorrect
(d) Statement-I is incorrect & Statement-II is correct

140. **Statement-I:** Late moss gametophyte is protonema stage.
Statement-II: Early moss gametophyte is leafy stage.
(a) Both Statement-I and Statement-II are correct.
(b) Both Statement-I and Statement-II are incorrect
(c) Statement-I is correct & Statement-II is incorrect
(d) Statement-I is incorrect & Statement-II is correct

141. Pyriform gametes with laterally attached flagella are present in
(a) Red algae (b) Brownalga
(c) Green algae (d) Blue green algae

142. Select the feature which is not present in red algae
(a) Biflagellated zoospores
(b) Floridean starch as stored food
(c) Complex post fertilization development
(d) Carrageen in cell wall

143. How many of the following features is/are associated with mosses?
A. Haploid plant body
B. Non-jacketed sex organs
C. Unicellular rhizoids
D.Zygote undergoes meiosis
(a) One (b) Two (c) Three (d) Four

144. All of the following have elaborate mechanisms of spore dispersal, except
(a) *Riccia* (b) *Polytrichum*
(c) *Sphagnum* (d) *Funaria*

145. Pteridophytes differ from bryophytes in
(a) Lacking true root, stem and leaves
(b) Being non-photosynthetic
(c) Have vascular tissues
(d) Requiring water for fertilization

146. Features related to Selaginella is/are
A. Heterospory
B. Presence of strobili
C. Macrophyllous leaves
(a) Only A. (b) Only C.
(c) A and B (d) B and C

147. Prothallus is
(a) Monoecious
(b) Mostly non-photosythetic
(c) Dependent on sporophyte
(d) Large in size

148. The pteridophyte which does not belong to Pteropsida is
(a) *Adiantum* (b) *Pteris*
(c) *Equisetum* (d) *Dryopteris*

149. Leaves of conifers do not have
(a) Needle like shape
(b) Very thin cuticle
(c) Sunken stomata
(d) Adaptation to withstand extreme temperature

150. Pinus
(a) Is a dioecious plant
(b) Has unbranched stem
(c) Has symbiotic association of fungi with its roots
(d) Does not form female strobili

ZOOLOGY

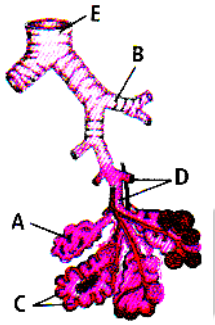
SECTION - A

151. Which structure of man is similar to gills of fish ?
(a) Nostril (b) Bronchiole
(c) Lung (d) Trachea

152. Which of the following options is incorrect about the larynx (sound box) ?
(a) It is a bony box.
(b) Glottis is the opening into the larynx.
(c) During swallowing of food glottis is covered by epiglottis to prevent food entry into the larynx.
(d) All of these

153. In man and other mammals, air passes from outside into the lungs through
(a) nasal cavity, larynx, pharynx, trachea, bronchi, alveoli
(b) nasal cavity, pharynx, larynx, trachea, bronchioles, bronchi, alveoli
(c) nasal cavity, larynx, pharynx, trachea, bronchioles, alveoli
(d) nasal cavity, pharynx, larynx, trachea, bronchi, bronchioles, alveoli.

154. Study the given figure of respiratory passage carefully and identify the parts labelled as A, B, C, D and E.



	A	B	C	D	E
(a)	Alveolar sac	Secondary bronchus	Alveoli	Bronchioles	Trachea
(b)	Alveoli	Secondary bronchus	Alveolar sac	Trachea	Bronchioles
(c)	Alveolar sac	Tertiary bronchus	Alveoli	Trachea	Bronchioles
(d)	Alveoli	Tertiary bronchus	Alveolar sac	Bronchioles	Trachea

155. Mammalian lungs have an enormous number of minute alveoli (air sacs). This is to allow
(a) more surface area for diffusion of gases
(b) more space for increasing the volume of inspired air
(c) more nerve supply to keep the lungs working
(d more spongy texture for keeping lungs in proper shape.

156. Thoracic chamber is formed dorsally by the (i), ventrally by the (ii), laterally by the (iii) and on lower side by the dome shaped (iv).
Select the correct option to complete the above paragraph.

	(i)	(ii)	(iii)	(iv)
(a)	Vertebral Column	Sternum	ribs	Diaphragm
(b)	Sternum	Vertebral column	Diaphragm	Ribs
(c)	Diaphragm	Ribs	Vertebral colunn	Sternum
(d)	ribs	Diaphragm	Verstebral column	Sternum

157. Inspiration occurs when there is a negative pressure in the lungs with respect to atmospheric pressure. This negative pressure is achieved when
(a) intrapulmonary pressure is less than the atmospheric pressure
(b) intrapulmonary pressure is greater than the atmospheric pressure
(c) intrapulmonary pressure is equal to the atmospheric pressure
(d) intrapleural pressure becomes more than the intraalveolar pressure.

158. Which of the following parts are involved in the mechanism of breathing?
(a) Abdominal muscles
(b) Diaphragm
(c) Intercostal muscles
(d) All of these

159. Which of the following changes occur in diaphragm and intercostal muscles when expiration of air takes place?
(a) Internal intercostal muscles relax and diaphragm contracts
(b) External intercostal muscles and diaphragm relax
(c) Internal intercostal contract and diaphragm relax
(d) External intercostal muscles and diaphragm contract

160. Given below are four respiratory capacities and their respiratory volumes.

	Respiratory volumes and capacities	Volume of air
(i)	Tidal volume	500 mL
(ii)	Vital capacity	2500 mL
(iii)	Functional residual capacity	2300 mL
(iv)	Total lung capacity	3200 mL

Select the correctly matched pair.
(a) (i) and (ii) (b) (ii) and (iii)
(c) (i) and (iii) (d) (iii) and (iv)

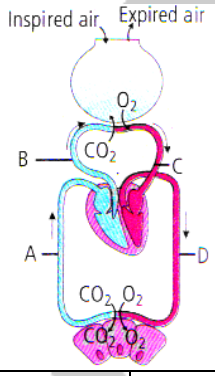
161. Consider the following statement each with one or two blanks.
(i) (1) and (2) are supported by incomplete cartilaginous rings.
(ii) Snail respires with (3) and insects with (4).
(iii) Amount of air inhaled and exhaled with maximum effort is referred to as the (5) of the lungs.
Fill up the above blanks by selecting the correct option.
(a) (1)-Trachea, (2)-terminal bronchiole, (3)-gills (4)-tracheae
(b) (1)- Trachea, (2)-bronchi, (5)-vital capacity

(c) (3)-gills, (4)-tracheae, (5)-tidal volume
(d) (3)-tracheae, (4)-gills, (5)-tidal volume

162. After forceful inspiration, the amount of air that can be breathed out is equal to
(a) Inspiratory Reserve Volume (IRV) + Expiratory Reserve volume (ERV) + Tidal Volume (TV) + Residual Volume (RV)
(b) IRV + RV + ERV
(c) IRV + TV+ ERV
(d) TV + RV + ERV.

163. The exchange of gases in the alveoli of the lungs takes place by
(a) passive transport (b) active transport
(c) osmosis (d) simple diffusion.

164. The given figure shows diagrammatic representation of exchange of gases at the alveolus and the body tissues with blood and transport of oxygen and carbon dioxide. Identify the blood vessels A to D.



	A	B	C	D
(a)	Systemic vein	Pulmonary artery	Pulmonary vein	Systemic artery
(b)	Systemic artery	Pulmonary artery	Pulmonary vein	Systemic vein
(c)	Pulmonary artery	Systemic vein	Pulmonary vein	Systemic artery
(d)	Systemic vein	Pulmonary vein	Pulmonary artery	Systemic artery

165. Partial pressure of oxygen and carbon dioxide (in mm Hg) in alveolar air respectively are

	PO_2	pCO_2
(a)	40	95
(b)	40	45
(c)	95	40
(d)	104	40

166. Among the following the partial pressure of oxygen is maximum in
(a) alveolar air (b) arterial blood
(c) venous blood (d) expired air

167. Which of the following statements is correct?
(a) The contraction of internal intercostal muscles lifts up the ribs and sternum.
(b) The RBCs transport oxygen only.
(c) The thoracic cavity is anatomically an air tight chamber.
(d) Healthy man can inspire approximately 500 mL of air per minurte.

168. Concentration gradient for exchange of oxygen is from ____to _____.
(a) alveoli, blood (b) tissue, blood
(c) blood, alveoli (d) both (a) and (b)

169. Which of the following is true for CO_2 concentration ?
(a) More in alveolar air than in expired air
(b) More in expired air than in alveolar air
(c) More in inspired air than in alveolar air
(d) More in inspired air than in expired air

170. Consider the following four statements (i-iv) and select the correct option stating which ones are true (T) and which ones are false (F).
(i) Formation of oxyhaemoglobin occurs on alveolar surface.
(ii) During gasesous exchange the gases diffuse from high partial pressure to low partial pressure.
(iii) Carbon dioxide cannot be transported with haemoglobin.
(iv) Earthworm respires through parapodia.

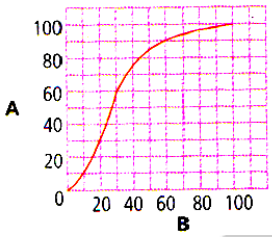
	(i)	(ii)	(iii)	(iv)
(a)	T	F	T	F
(b)	F	F	T	F
(c)	F	T	F	T
(d)	T	T	F	F

171. Which of the following statements is true about RBCs in humans?
(a) They carry about 20-25 percent of CO_2.
(b) They transport 99.5 percent of O_2.
(c) They transport about 80 per cent oxygen only and the rest 20 percent of it is transported in dissolved state in blood plasma.
(d) They do not carry CO_2 at all.

172. Blood carries the CO_2 in three forms. The correct percentage of CO_2 in these forms are

	As carbamino haemoglobin	As bicarbonates	Dissolved form in plasma
(a)	20-25%	70%	7%
(b)	70%	20-25%	7%
(c)	20-25%	7%	70%
(d)	7%	20-25%	70%

173. Which of the following is incorrect about the given graph?



(a) The curve is called oxygen dissociation curve.
(b) The part 'A' represents percentage saturation of haemoglobin with oxygen.
(c) The part 'B' represents partial pressure of carbon dioxide.
(d) This curve is highly useful in studying the effect of factors like pCO_2, H^+ concentration, etc. on binding of O_2 with haemoglobin.

174. Which of the following factors is not favourable for the formation of oxyhaemoglobin?
(a) High pO_2 (b) Low temperature
(c) Less H^+ (d) High pCO_2

175. In the tissues, high concentrations of carbon dioxide
(a) increases the affinity of haemoglobin to both oxygen and hydrogen
(b) increases the affinity of haemoglobin to oxygen but decreases its affinity to hydrogen
(c) decreases the affinity of haemoglobin to oxygen but increases its affinity to hydrogen
(d) decreases the affinity of haemoglobin to both oxygen and hydrogen.

176. The enzyme that increses the reaction rate between CO_2 and H_2O in red blood cells is
(a) carbonic anhydrase
(b) adenylate cyclase
(c) carbonic synthetase
(d) alkaline phosphatese.

177. All the factor are favourable for formation of oxyhemoglobin in alveoli, except
(a) low pCO_2 (b) high H^+
(c) high pO_2 (d) low temperature

178. Every 100 mL of deoxygenated blood delivers approximately
(a) 14 mL of O_2 to the alveoli
(b) 40 mL of CO_2 to the alveoli
(c) 140 mL of O_2 to the tissues
(d) 4 mL of CO_2 to the alveoli.

179. Which one of the following can bind several hundred times more strongly to the haemoglobin than oxygen ?
(a) H_2CO_3 (b) CO_2
(c) CO (d) None of these

180. Pneumotaxic centre which can moderate the functions of the respiratory rhythm centre is present in
(a) pons region of brain
(b) thalamus
(c) spinal cord
(d) right cerebral hemixphere.

181. Match column I with Column II and select the correct option from the codes given below.

	Column I		Column II
A.	Carbonic anhydrase	(i)	Breathing
B.	Diaphragm	(ii)	Respiratory rhythm centre
C.	Medulla oblongata	(iii)	Pneumotaxic centre
D.	Pons varolii	(iv)	Carbon dioxide transport

(a) A-(iv); B-(i); C-(ii); D-(iii)
(b) A-(i); B-(ii); C-(iv); D-(iii)
(c) A-(ii); B-(i); C-(iii) ; D-(iv)
(d) A-(iii); B-(i); C-(ii); D-(iv)

182. Chemosensitive area of respiratory centre in medulla is affected by
(a) less CO_2 and H^+ ions
(b) less O_2 and H^+ ions
(c) excess CO_2 and H^+ ions
(d) excess O_2 and H^+ions.

183. Rate of breathing is controlled mainly by
(a) CO_2 level in blood
(b) pH in blood
(c) O_2 level in blood
(d) O_2 level and pH in blood.

184. Name the pulmonary disease in which alveolar surface area involved in gaseous exchange is drastically reduced due to damage in the alveolar walls.
(a) Pneumonia (b) Asthma
(c) Pleurisy (d) Emphysema

185. Which respiratory disorder is characterised by proliferation of connective tissue into lung?
(a) Asthma
(b) Emphsema
(c) Bronchitis
(d) Occupational respiratory disorder

Section B

186. Complete the following sentences by selecting the correct option.
(A) Inspiratory capacity (IC) = (i) + IRV
(B) (ii) = TV + IRV + ERV
(C) Functional residual capacity (FRC) = ERV + (iii)

	(i)	(ii)	(iii)
(a)	Vital capacity	Tidal volume	Residual volume
(b)	Expiratory capacity	Residual volume	Inspiratory reserve volume
(c)	Tidal volume	Vital capacity	Residual volume
(d)	Tidal volume	Total lung capacity	Expiratory capacity

187. Consider the following four statements and select the correct option stating which ones are true (T) and which ones are false (F).
(i) Expiration is normally brought about by the relaxation of inspiratory muscles.
(ii) Oxyhaemoglobin can hold much less carbon dioxide in the form of carbaminohaemoglobin than what deoxyhaemoglobin can.
(iii) A person can expel all the air from the lungs by a forceful expiration.
(iv) A rise in pCO_2 increases the oxygen affinity of haemoglobin.

	(i)	(ii)	(iii)	(iv)
(a)	F	F	T	F
(b)	T	T	F	F
(c)	F	T	T	F
(d)	T	T	T	F

188. Match column I with column II and select the correct option from the given codes.

	Column I		Column II
A.	Trachea	(i)	pO_2 in alveolar air
B.	Respiratory centre	(ii)	ATP
C.	Chemosensitive area	(iii)	Cartilaginous rings
D.	Camel	(iv)	Medulla oblongata
E.	Fish	(v)	Larynx
F.	Vocal cords	(vi)	Lungs
		(vii)	CO_2 sensitive
		(viii)	Brachial respiration

(a) A-(iii), B-(iv), C-(vii), D-(vi), E-(viii), F-(v)
(b) A-(v), B-(ii), C-(vii), D-(viii), E-(vi), F-(iv)
(c) A-(vi), B-(iv), C-(viii), D-(iv), E-(i), F-(ii)
(d) A-(i), B-(v), C-(vii), D-(iii), E-(viii), F-(ii)

189. Which of the following equations is correct?
(a) $CO_2 \rightarrow H_2CO_3 \rightarrow HCO_3^- + H^+$
(b) $CO_2 + H_2O \underset{\text{anhydrase}}{\overset{\text{Carbonic}}{\rightleftharpoons}} H_2CO_3 \underset{\text{anhydrase}}{\overset{\text{Carbonic}}{\rightleftharpoons}} H^+ + HCO_3^-$
(c) $CO_2 + H_2O \rightarrow CH_4 + 2O_2$
(d) $CO_2 + H_2O \rightleftharpoons CO + H_2O_2$

190. Read the given statements and select the correct option.
Statement I: Rate of breathing is regulated by respiratory centres present in the medulla oblongata.
Statement II: Changes in the CO_2 level of the arterial blood control the rate of breathing.
(a) Both statement I and II are correct.
(b) Statement I is correct but statement 2 is incorrect.
(c) Statement 1 is incorrect but statement 2 is correct
(d) Both statement I and II are incorrect.

191. Which one of the following is the incorrect statement for respiration in humans?
(a) Cigarette smoking may lead to inflammation of bronchi.
(b) In asthma, the lining of the airways becomes swollen and inflammated.
(c) Workers in grinding and stone-breaking industries may suffer from lung fibrosis.
(d) None of these

192. 'X' is a respiratory disorder causing wheezing due to inflammation of bronchi and bronchioles. Identify disease 'X'.
(a) Emphysema (b) Carcinoma
(c) Silicosis (d) Asthma

193. Blood analysis of a patient reveals an unusually high quantity of carboxyhaemoglobin content. Which of the following conclusions is most likely to be correct?
The patient has been inhaling polluted air containing unusually high content of
(a) carbon disulphide (b) chloroform
(c) carbon monoxide (d) none of these

194. The oxygen haemoglobin dissociation curve will show a right shift in case of
(a) high pCO_2
(b) high pO_2
(c) low pCO_2
(d) less H^+ concentration. +

195. Match the following and mark the correct options.

	Animal		**Respiratory Organ**
A.	Earthworm	(i)	Moist cuticle
B.	arthoropods	(ii)	Gills
C.	Fishes	(iii)	Lungs
D.	Birds/Reptiles	(iv)	Tracheal tube

(a) A-(ii), B-(i), C-(iv), D-(iii)
(b) A-(i), B-(iv), C-(ii), D-(iii)
(c) A-(i) B-(iii), C-(ii), D-(iv)
(d) A-(i), B-(ii), C-(iv), D-(iii)

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

196. **Assertion :** Pressure gradient for CO_2 transport is from tissue to blood.
Reason : Gases diffuse from higher to lower partial pressure.
(a) (b) (c) (d)

197. **Assertion :** Trachea, primary, secondary and tertiary bronchi are supported by incomplete cartilaginous rings.
Reason : These rings of cartilage make the wall non collapsible.
(a) (b) (c) (d)

198. Which of the following is incorrect regarding the given mechanism of breathing during inspiration
(a) Volume of thorax decreases
(b) Ribs and sternum are raised
(c) Diaphragm contracts and becomes flate
(d) All of these

199. In the given mechanism, diaphragm, sternum and intercostal muscles work together to _____ the thoracic volume and thereby pulmonary volume. This leads to _____ in intra pulmonary pressure to slightly _____ the atmospheric pressure, causing expiration.
Select the correct sequence of words to complete the above paragraph.
(a) decrease, decrease, below
(b) Increase, decrease, above
(c) decrease, increase, above
(d) increase, increase, below

200. If alveolar ventilation is 4200 mL/min, respiratory frequency is 12 breaths per minute, and tidal volume is 500 mL, what is the anatomical-dead-space ventilation ?
(a) 1800 mL/min (b) 6000 mL/min
(c) 350 mL/min (d) 1200 mL/min

TEST ASSESMENT AND ANALYSIS SHEET

Name……..……Test topic - ……Date ……

Physics	**Marks per question**	**Total Ques.**	**Attempted**	**Unattempted**	**Correct**	**Incorrect**	**Net score**
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Chemistry	**Marks per question**	**Total Ques.**	**Attempted**	**Unattempted**	**Correct**	**Incorrect**	**Net score**
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Biology	**Marks per question**	**Total Ques.**	**Attempted**	**Unattempted**	**Correct**	**Incorrect**	**Net score**
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Total net score							