

ULTIMATE TEST SERIES NEET 2020

TEST-03

PATTERN : NEET

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the Examination Hall before the end of the test.

Name :

M.M.: 720

Time : 3 hrs

BRANCH : DEHRADUN, KOTDWAR, HALDWANI, AGRA, SAHARANPUR Test Date : 07-03-2020

TOPIC :

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

Chemistry : Thermodynamics, Equilibrium

Biology : Structural Organization in Plants : Morphology of Flowering Plants, Anatomy of Flowering Plants. Human Physiology-I Biomolecules, Digestion and Absorption, Breathing and Exchange of Gases

INSTRUCTIONS :

- Attempt **All** the questions. This Test booklet consists of **180** questions. The maximum marks are 720
- There are three parts in the question paper of **Physics, Chemistry** and **Biology (Botony, Zoology)** having **45** questions .
- Each question is allotted **4 (four)** marks for each correct response
- There is **1/4th** negative marking for each wrong attempt The total duration of the test is **3 hrs**.
- There is no negative marking for un-attempted questions.
- Use Blue/black ball point pen to fill the **OMR**
- Write your **Name** and **Roll number** carefully on the **OMR** sheet as well as the question paper.



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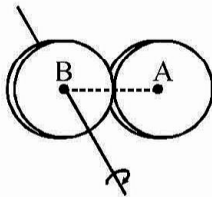
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PHYSICS

1. Two thin discs each of mass M and radius r are attached as shown in figure, to form a rigid body. The rotational inertia of this body about an axis perpendicular to the plane of disc B and passing through its centre is :-



- (1) $2Mr^2$ (2) $3Mr^2$
 (3) $4Mr^2$ (4) $5Mr^2$

2. A lift of mass 920 kg has a capacity of 10 persons. If average mass of person is 68 kg. Friction force between lift and lift shaft is 6000 N. The minimum power of motor required to move the lift upward with constant velocity 3 m/s is [$g = 10 \text{ m/s}^2$]

- (1) 66000 W (2) 63248 W
 (3) 48000 W (4) 56320 W

3. Two rings of radius R and nR having different masses and made up of same wire have the ratio of moment of inertia about an axis passing through centre as 1 : 8. The value of n is :

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

4. A circular plate of uniform thickness of diameter 56 cm, whose center is at origin. A circular part of diameter 42 cm is removed from one edge. What is the distance of the centre of mass of the remaining part

- (1) 3 cm (2) 6 cm (3) 9 cm (4) 12 cm

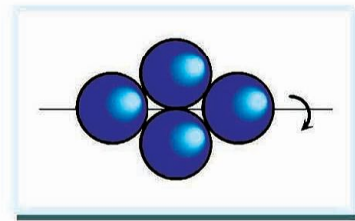
5. Two loops P and Q are made from a uniform wire. The radii of P and Q are r_1 and r_2 respectively, and their moments of inertia are I_1 and I_2 respectively. If $I_2/I_1 = 4$ then $\frac{r_2}{r_1}$ equals

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

6. A particle P is moving in a circle of radius 'a' with a uniform speed v . C is the centre of the circle and AB is a diameter. When passing through B the angular velocity of P about A and C are in the ratio :-

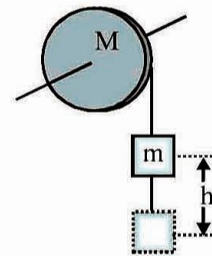
- (1) 1 : 1 (2) 1 : 2 (3) 2 : 1 (4) 4 : 1

7. The moment of inertia of a sphere (mass M and radius R) about its diameter is I . Four such spheres are arranged as shown in the figure. The moment of inertia of the system about axis XX' will be :-



- (1) $3I$ (2) $5I$ (3) $7I$ (4) $9I$

8. A massless string is wrapped round a disc of mass M and radius R . Another end is tied to a mass m which is initially at height h from ground level as shown in the fig. If the mass is released then its velocity while touching the ground level will be



- (1) $\sqrt{2gh}$ (2) $\sqrt{2gh} \frac{M}{m}$
 (3) $\sqrt{2ghm/M}$ (4) $\sqrt{4mgh/2m+M}$

9. A body of mass 2 kg moving with a velocity of 3 m/sec collides head on with a body of mass 1 kg moving in opposite direction with a velocity of 4 m/sec. After collision, two bodies stick together and move with a common velocity which in m/sec is equal to

- (1) $1/4$ (2) $1/3$ (3) $2/3$ (4) $3/4$

10. At time $t = 0$, a 2 kg particle has position vector $\vec{r} = (4\hat{i} - 2\hat{j}) \text{ m}$ relative to the origin. Its velocity is given by $\vec{v} = 2t^2\hat{i} \text{ (m/s)}$. The torque acting on the particle about the origin at $t = 2\text{s}$, is

- (1) $32 \hat{k} \text{ N-m}$ (2) $-16 \hat{k} \text{ N-m}$
 (3) $16 \hat{k} \text{ N-m}$ (4) $12 \hat{k} \text{ N-m}$

11. Three masses of 2kg, 4 kg and 4 kg are placed at the three points (1, 0, 0) (1, 1, 0) and (0, 1, 0) respectively. The position vector of its center of mass is :-

(1) $\frac{3}{5}\hat{i} + \frac{4}{5}\hat{j}$ (2) $(3\hat{i} + \hat{j})$

(3) $\frac{2}{5}\hat{i} + \frac{4}{5}\hat{j}$ (4) $\frac{1}{5}\hat{i} + \frac{4}{5}\hat{j}$

12. A constant power is supplied to a rotating disc. Angular velocity (ω) of disc varies with number of rotations (n) made by the disc as :

(1) $\omega \propto (n)^{1/3}$ (2) $\omega \propto (n)^{3/2}$

(3) $\omega \propto (n)^{2/3}$ (4) $\omega \propto (n)^2$

13. The moment of inertia of a body does not depend on:

(1) the mass of the body

(2) the angular velocity of the body

(3) the axis of rotation of the body

(4) the distribution of the mass in the body

14. Two point masses of 0.3 kg and 0.7 kg are fixed at the ends of a rod of length 1.4 m and of negligible mass. The rod is set rotating about an axis perpendicular to its length with a uniform angular speed. The point on the rod through which the axis should pass in order that the work required for rotation of the rod is minimum is located at a distance of

(1) 0.4 m from mass of 0.3 kg

(2) 0.98 m from mass of 0.3 kg

(3) 0.70 m from mass of 0.7 kg

(4) 0.98 m from mass of 0.7 kg

15. The centre of mass of two particles lies

(1) on the line perpendicular to the line joining the particles

(2) on a point outside the line joining the particles

(3) on the line joining the particles.

(4) none of the above

16. A solid sphere of mass M, radius R and having moment of inertia about an axis passing through the centre of mass as I, is recast into a disc of thickness t, whose moment of inertia about an axis passing through its edge and perpendicular to its plane remains I. Then, radius of the disc will be:

(1) $\frac{2R}{\sqrt{15}}$ (2) $R\sqrt{\frac{2}{15}}$ (3) $\frac{4R}{\sqrt{15}}$ (4) $\frac{R}{4}$

17. A thin uniform rod of length ℓ and mass m is swinging freely about a horizontal axis passing through its end. Its maximum angular speed is ω . Its centre of mass rises to a maximum height of:

(1) $\frac{1}{3} \frac{\ell^2 \omega^2}{g}$ (2) $\frac{1}{6} \frac{\ell \omega}{g}$

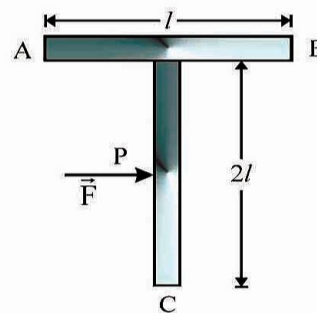
(3) $\frac{1}{2} \frac{\ell^2 \omega^2}{g}$ (4) $\frac{1}{6} \frac{\ell^2 \omega^2}{g}$

18. A thin rod of length L and mass M is bent at its mid-point into two halves so that the angle between them is 90° . The moment of inertia of the bent rod about an axis passing through the bending point and perpendicular to the plane defined by the two halves of the rod is :

(1) $\frac{ML^2}{6}$ (2) $\frac{\sqrt{2}ML^2}{24}$

(3) $\frac{ML^2}{24}$ (4) $\frac{ML^2}{12}$

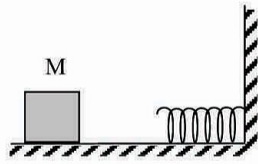
19. A T-shaped object of uniform thickness & same material with dimensions shown in the figure, is lying on a smooth floor. A force \vec{F} is applied at the point P parallel to AB, such that the object has only the translation motion without rotation. Find the location of P with respect to C :



(1) $\frac{4\ell}{3}$ (2) ℓ

(3) $\frac{2\ell}{3}$ (4) $\frac{3\ell}{2}$

20. The block of mass M moving on the frictionless horizontal surface collides with the spring of spring constant K and compresses it by length L . The maximum momentum of the block after collision is -



- (1) $\sqrt{MK} L$ (2) $\frac{KL^2}{2M}$
 (3) zero (4) $\frac{ML^2}{K}$

21. Two particles whose masses are 10 kg and 30kg 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) $-\frac{(\hat{i} + \hat{j} + \hat{k})}{2}$ (2) $\frac{(\hat{i} + \hat{j} + \hat{k})}{2}$
 (3) $-\frac{(\hat{i} + \hat{j} + \hat{k})}{4}$ (4) $\frac{(\hat{i} + \hat{j} + \hat{k})}{4}$

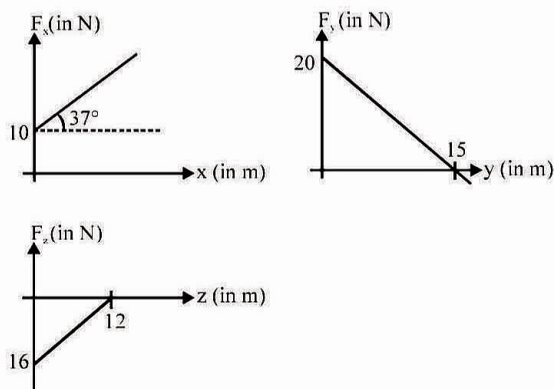
22. A loop rolls down on an inclined plane. The fraction of its total kinetic energy that is associated with the rotational motion is:

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

23. Two blocks of masses 10 kg and 4 kg are connected by a spring of negligible mass and placed on a frictionless horizontal surface. An impulse gives a velocity of 14 m/s to the heavier block in the direction of the lighter block. The velocity of the centre of mass is -

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

24. The components of a force acting on a particle are varying according to the graphs shown. To reach at point B (8, 20, 0) from point A(0, 5, 12) the particle moves on paths parallel to x-axis then y-axis and then z-axis, then work done by this force is



- (1) 192 J (2) 58 J (3) 250 J (4) 125 J

25. Work done by the frictional force is
 (1) Negative (2) Positive
 (3) Zero (4) All of the above
26. A spring of spring constant $5 \times 10^3 \text{ N/m}$ is stretched initially by 5cm from the unstretched position. Then the work required to stretch it further by another 5 cm is :-
 (1) 6.25 N-m (2) 12.50 N-m
 (3) 18.75 N-m (4) 25.00 N-m
27. A uniform chain of length $2m$ is kept on a table such that a length of 60cm hangs freely from the edge of the table. The total mass of the chain is 4kg. What is the work done in pulling the entire chain on the table
 (1) 7.2 J (2) 3.6 J (3) 120 J (4) 1200 J

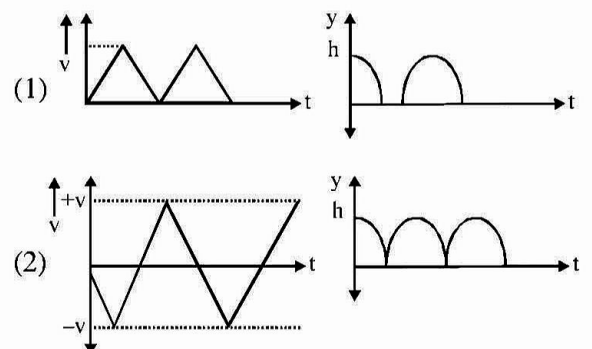
28. A person, with outstretched arms, is spinning on a rotating stool. He suddenly brings his arms down to his sides. Which of the following is true' about his kinetic energy K and angular momentum L ?

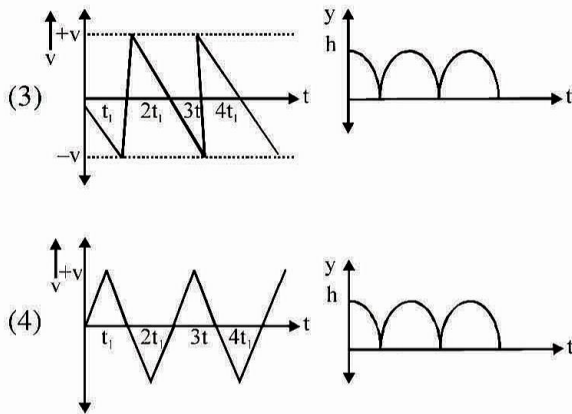
- (1) Both K and L increase.
 (2) Both K and L remain unchanged.
 (3) K remains constant, L increases.
 (4) K increases but L remains constant.

29. Assume the aerodynamic drag force on a car is proportional to its speed. If the power output from the engine is doubled, then the maximum speed of the car.

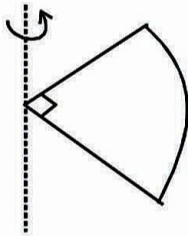
- (1) is unchanged
 (2) increases by a factor of $\sqrt{2}$
 (3) is also doubled
 (4) increases by a factor of four.

30. Consider a rubber ball freely falling from a height $h = 4.9 \text{ m}$ on a horizontal elastic plate. Assume that the duration of collision is negligible and the collision with the plate is totally elastic. Which one of the following graph represents the velocity as a function of time and the height as a function of time ?



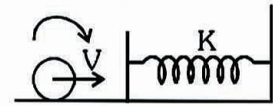


31. One quarter sector is cut from a uniform circular disc of radius R . This sector has mass M . It is made to rotate about a line perpendicular to its plane and passing through the centre of the original disc. Its moment of inertia about the axis of rotation is :-

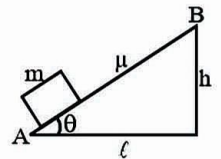


- (1) $\frac{MR^2}{2}$ (2) $\frac{MR^2}{4}$
 (3) $\frac{MR^2}{8}$ (4) $\sqrt{2} MR^2$
32. A satellite of mass m is orbiting in a circular path of radius r around the earth. If its kinetic energy is E , then its angular momentum is :-
- (1) $(2mr^2E)^{1/2}$ (2) $\left(\frac{1}{2}mr^2E\right)^{1/2}$
 (3) $\left(\frac{2}{3}mr^2E\right)^{1/2}$ (4) $(mr^2E)^{1/2}$
33. The MI of disc is minimum about an axis :-
 (1) coinciding with the diameter
 (2) Tangential to the rim and lying in the plane of disc
 (3) Passing through centre of mass and perpendicular to the plane of the disc
 (4) Any axis passing through centre of mass

34. A solid sphere of mass M is rolling with a speed V on a horizontal surface and strikes a massless spring of force constant K . Then the maximum compression of spring is :-



- (1) $\sqrt{\frac{5MV^2}{3K}}$ (2) $\sqrt{\frac{7MV^2}{5K}}$
 (3) $\sqrt{\frac{MV^2}{K}}$ (4) None of the above
35. A force $\vec{F} = (3\hat{i} + 4\hat{j})$ N displaces a particle by $\vec{S} = (3\hat{j} + 4\hat{k})$ m in 3 sec. find the power :-
 (1) 4 W (2) 2W (3) 1 W (4) None
36. A uniform chain of length ℓ and mass m overhangs from a smooth table so that $\frac{2}{3}$ rd part of it is on the table then velocity of chain when it completely slips off the table :-
 (1) $\sqrt{2g\ell}$ (2) $\frac{2}{3}\sqrt{2g\ell}$
 (3) $\sqrt{\frac{2}{3}g\ell}$ (4) None
37. In a children's park, there is a slide which has a total length of 10 m and a height of 8 m. A vertical ladder is provided to reach the top. A boy weighing 200 N climbs up the ladder to the top of the slide and slides down to the ground. The average friction offered by the slide is three tenth of his weight. The work done by the friction on the boy as he comes down is :-
 (1) 0 J (2) +600 J
 (3) -600 J (4) +1600 J
38. Amount of work done to carry a block from A to B will be (Assume friction coefficient μ)
 (1) mgh
 (2) $\mu mg \sqrt{\ell^2 + h^2}$
 (3) $\mu mg(\ell + h)$
 (4) $mg(h + \mu\ell)$



39. A ball impinges directly on a similar ball at rest. If $\frac{1}{4}$ th of the kinetic energy is lost by the impact, the value of coefficient of restitution is :-

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

40. A body of mass M and moving with velocity u makes a head on-elastic collision with another stationary body of m . If $A = m/M$, then the ratio (f) of the loss of energy of M to its initial energy will be :-

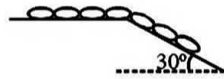
(1) $f = A(A + 1)^2$ (2) $f = \frac{A}{(A+1)^2}$

(3) $f = \frac{uA}{(A+1)^2}$ (4) $f = \frac{4A}{(A+1)^2}$

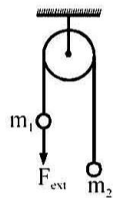
41. $\frac{1}{n}$ th portion of a uniform chain of mass m and length ℓ lies on inclined plane as shown in figure. Workdone in pulling the hanging part on the horizontal part of the plane is (Assume there is no friction everywhere)

(1) $\frac{2mg\ell}{n^2}$ (2) $\frac{mg\ell}{2n^2}$

(3) $\frac{mg\ell}{4n^2}$ (4) $\frac{mg\ell}{n^2}$



42. Two bodies of mass m_1 and m_2 ($m_2 > m_1$) are connected by a light inextensible string which passes through a smooth fixed pulley.



The instantaneous power delivered by an external agent to pull m_1 with constant velocity v is :

- (1) $(m_2 - m_1) g/v$ (2) $(m_2 - m_1) v/g$
 (3) $(m_2 - m_1) gv$ (4) $(m_1 - m_2) gv$

43. From a circular disc of radius R and mass $9M$, a small disc of mass M and radius $\frac{R}{3}$ is removed concentrically. The moment of inertia of the remaining disc about an axis perpendicular to the plane of the disc and passing through its centre is:-

- (1) MR^2 (2) $4MR^2$
 (3) $\frac{4}{9}MR^2$ (4) $\frac{40}{9}MR^2$

44. A drum of radius R and mass M , rolls down without slipping along an inclined plane of angle θ . The frictional force -

- (1) Decreases the rotational and translational motion
 (2) Dissipates energy as heat
 (3) Decreases the rotational motion
 (4) Converts translational energy to rotational energy

45. A particle moves along a circle of radius $\left(\frac{20}{\pi}\right)m$ with constant tangential acceleration. If the velocity of the particle is 80 m/s at the end of the second revolution after motion has begin, the tangential acceleration is :-

- (1) 40 ms^{-2} (2) $640 \pi \text{ ms}^{-2}$
 (3) $160 \pi \text{ ms}^{-2}$ (4) $40 \pi \text{ ms}^{-2}$

46. Temperature of 1 mole of an ideal gas is increased by 2°C at constant pressure, work done is:
 (1) R (2) $-2R$ (3) $R/2$ (4) $3R$
47. What is the final temperature of 0.10 mole monoatomic ideal gas that performs 75 cal of work adiabatically if the initial temperature is 227°C ? (use $R = 2 \text{ cal/K-mol}$)
 (1) 250 K (2) 300 K
 (3) 350 K (4) 750 K
48. If a gas expands adiabatically from 1 Lt. to 12 Lt. against a constant pressure of 0.75 atm. The ΔU of the gas is :
 (1) -853.9 J (2) 835.9 J
 (3) 853.9 J (4) -835.9 J
49. The strongest Bronsted base in the following anion is :-
 (1) ClO^- (2) ClO_2^- (3) ClO_3^- (4) ClO_4^-
50. Which among the following salt show anionic hydrolysis :-
 (1) CuSO_4 (2) NH_4Cl (3) AlCl_3 (4) K_2CO_3
51. pH of buffer solution will be if it contains 1 mole $(\text{NH}_4)_2\text{SO}_4$ and 1 mole NH_4OH ($K_b = 10^{-5}$):-
 (1) 5 (2) 9
 (3) 5.3010 (4) 8.6690
52. The heat of solution of anhydrous $\text{CuSO}_4(s)$ is -15.9 kcal and that of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(s)$ is 2.8 kcal . Calculate the heat of hydration of CuSO_4 :-
 (1) -18.7 Kcal. (2) -13.1 Kcal.
 (3) 18.7 Kcal. (4) 13.1 Kcal.
53. For the reversible reaction,

$$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$$
 at 500°C , the value of K_p is 1.44×10^{-5} when partial pressure is measured in atmosphere. The corresponding value of K_c with concentration in mol/L is :-
 (1) $\frac{1.44 \times 10^{-5}}{(0.082 \times 500)^{-2}}$ (2) $\frac{1.44 \times 10^{-5}}{(8.314 \times 773)^{-2}}$
 (3) $\frac{1.44 \times 10^{-5}}{(0.082 \times 773)^2}$ (4) $\frac{1.44 \times 10^{-5}}{(0.082 \times 773)^{-2}}$
54. The entropy change during an isothermal expansion of an ideal gas from V_1 to V_2 at temperature T is given by :-
 (1) $\Delta S = 0$
 (2) $\Delta S = 2.303 R \log_{10} V_2/V_1$
 (3) $\Delta S = 2.303 RT \log_{10} V_2/V_1$
 (4) $\Delta S = 2.303 R \log_{10} V_1/V_2$
55. $\text{Ag}^+ + \text{NH}_3 \rightleftharpoons [\text{Ag}(\text{NH}_3)]^+$; $k_1 = 3.5 \times 10^{-3}$
 $[\text{Ag}(\text{NH}_3)]^+ + \text{NH}_3 \rightleftharpoons [\text{Ag}(\text{NH}_3)_2]^+$;
 $k_2 = 1.7 \times 10^{-3}$
 Then the formation constant of $[\text{Ag}(\text{NH}_3)_2]^+$ is :-
 (1) 6.08×10^{-6} (2) 6.08×10^6
 (3) 6.08×10^{-9} (4) None of these
56. Entropy of universe, in the case of adiabatic expansion of a gas is :-
 (1) $\Delta S_{\text{univ}} = 0$ (2) $\Delta S_{\text{univ}} > 0$
 (3) $\Delta S_{\text{univ}} < 0$ (4) $\Delta S_{\text{univ}} \geq 0$
57. A certain weak acid has a dissociation constant of 1.0×10^{-4} . The equilibrium constant for its reaction with a strong base is :-
 (1) 1.0×10^{-4} (2) 1.0×10^{-10}
 (3) 1.0×10^{10} (4) 1.0×10^{14}
58. Which of the following is a strongest acid :-
 (1) HClO_4 (2) HClO_3
 (3) H_2SO_4 (4) H_2SO_3

59. Correct order of basic nature :-
 (1) $\text{CH}_3^- < \text{NH}_2^- < \text{OH}^- < \text{F}^-$
 (2) $\text{CH}_3^- < \text{F}^- < \text{NH}_2^- < \text{OH}^-$
 (3) $\text{F}^- < \text{OH}^- < \text{NH}_2^- < \text{CH}_3^-$
 (4) $\text{F}^- < \text{CH}_3^- < \text{NH}_2^- < \text{OH}^-$
60. Calculate the molar solubility of AgCl in a 1L solution which contains 10.0 g of CaCl₂ [$K_{sp}(\text{AgCl}) = 1.6 \times 10^{-10}$]
 (1) 8.9×10^{-10} (2) 8.9×10^{-11}
 (3) 8.9×10^{-9} (4) 8.9×10^{-12}
61. Which of the following solutions has the highest pH ?
 (1) 0.10 M KNO₃ (2) 0.10 M AlCl₃
 (3) 0.10 M NH₄Cl (4) 0.10 M CH₃NH₂
62. The correct formula to calculate the hydroxyl ion concentration of an aqueous solution of $\text{C}_6\text{H}_5\text{NH}_3^+\text{Cl}^-$ is
 (1) $\sqrt{\frac{CK_w}{K_b}}$ (2) $\sqrt{\frac{K_w \times K_b}{C}}$
 (3) $\sqrt{\frac{CK_w}{K_a}}$ (4) $\sqrt{\frac{K_a \times K_w}{C}}$
63. For the reaction $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s}) \rightleftharpoons \text{CuSO}_4 \cdot 3\text{H}_2\text{O}(\text{s}) + 2\text{H}_2\text{O}(\text{g})$ which one is correct representation
 (1) $K_p = [\text{P}_{\text{H}_2\text{O}}]^2$ (2) $K_c = [\text{H}_2\text{O}]^2$
 (3) $K_p = K_c[\text{RT}]^2$ (4) All
64. The equilibrium constant for the reaction $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$ is 6.10×10^{-3} at 25°C. Calculate the value of k for this reaction : $\text{NO}_2(\text{g}) \rightleftharpoons (1/2)\text{N}_2\text{O}_4(\text{g})$
 (1) 327 (2) 164
 (3) 12.8 (4) 3.05×10^{-3}
65. Given that ΔG° for the reaction below is $-5.40 \text{ kJ mol}^{-1}$, calculate ΔG at 298 K when the pressure is 0.50 atm for NO₂(g) and 2.0 atm for N₂O₄(g). $2\text{NO}_2 \rightleftharpoons \text{N}_2\text{O}_4$
 (1) -250 J mol^{-1} (2) -8800 J mol^{-1}
 (3) -1900 J mol^{-1} (4) $-11,000 \text{ J mol}^{-1}$
66. For which of the following reactions, ΔH is not equal to ΔE ?
 (1) $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) = 2\text{HI}(\text{g})$
 (2) $\text{C}(\text{s}) + \text{O}_2(\text{g}) = \text{CO}_2(\text{g})$
 (3) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) = 2\text{NH}_3(\text{g})$
 (4) None of these
67. 25.3 g of sodium carbonate, Na₂CO₃ is dissolved in enough water to make 250 mL of solution. If sodium carbonate dissociates completely, molar concentration of sodium ion, Na⁺ and carbonate ions, CO₃²⁻ are respectively (Molar mass of Na₂CO₃ = 106 g mol⁻¹)
 (1) 0.477 M and 0.477 M
 (2) 0.955 M and 1.910 M
 (3) 1.910 M and 0.955 M
 (4) 1.90 M and 1.910 M
68. The ionization constant of ammonium hydroxide is 1.77×10^{-5} at 298 K. Hydrolysis constant of ammonium chloride is :-
 (1) 5.65×10^{-12}
 (2) 5.65×10^{-10}
 (3) 6.50×10^{-12}
 (4) 5.65×10^{-13}
69. The dissociation constants for acetic acid and HCN at 25°C are 1.5×10^{-5} and 4.5×10^{-10} , respectively. The equilibrium constant for the equilibrium $\text{CN}^- + \text{CH}_3\text{COOH} \rightleftharpoons \text{HCN} + \text{CH}_3\text{COO}^-$ would be :-
 (1) 3.0×10^4 (2) 3.0×10^5
 (3) 3.0×10^{-5} (4) 3.0×10^{-4}
70. Calculate the pOH of a solution at 25°C that contains 1×10^{-10} M of hydronium ions, i.e. H₃O⁺:
 (1) 1.000 (2) 7.000
 (3) 4.000 (4) 9.000
71. The correct order of decreasing acid strength of trichloroacetic acid (A), trifluoroacetic acid (B), acetic acid (C) and formic acid (D) is:
 (1) A > B > C > D
 (2) A > C > B > D
 (3) B > A > D > C
 (4) B > D > C > A



72. In which of the following arrangements the given sequence is not strictly according to the property indicated against it ?
 (1) $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3$:
 increasing acidic character
 (2) $\text{CO}_2 < \text{SiO}_2 < \text{SnO}_2 < \text{PbO}_2$:
 increasing oxidising power
 (3) $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$:
 increasing acidic strength
 (4) $\text{H}_2\text{O} < \text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$:
 increasing pK_a values
73. For a reaction $\text{H}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \longrightarrow \text{H}_2\text{O}(\text{l})$
 $\Delta C_p = 32 \text{ JK}^{-1}$, ΔH at $27^\circ\text{C} = -285.8 \text{ kJ mol}^{-1}$.
 What will be the value of ΔH at 127°C ?
 (1) -289 kJ/mol (2) -282.6 kJ/mol
 (3) -317 kJ/mol (4) -253.8 kJ/mol
74. At 298 K , the solubility product of PbCl_2 is 1.0×10^{-6} . What will be the solubility of PbCl_2 in moles/litre -
 (1) 6.3×10^{-3} (2) 1.0×10^{-3}
 (3) 3.0×10^{-3} (4) 4.6×10^{-14}
75. When two mole of an ideal gas $\left(C_{p,m} = \frac{5}{2}R \right)$ heated from 300 K to 600 K at constant pressure. the change in entropy of gas (ΔS) is :
 (1) $\frac{3}{2}R \ln 2$ (2) $-\frac{3}{2}R \ln 2$
 (3) $5R \ln 2$ (4) $\frac{5}{2}R \ln 2$
76. A certain buffer solution contains equal concentration of X^- and HX . The K_b for X^- is 10^{-10} . The pH of the buffer is
 (1) 4 (2) 7 (3) 10 (4) 14
77. In what manner will increase of pressure affect the following equation ?
 $\text{C}_{(\text{s})} + \text{H}_2\text{O}_{(\text{g})} \rightleftharpoons \text{CO}_{(\text{g})} + \text{H}_2(\text{g})$
 (1) Shift in the forward direction
 (2) Shift in the backward direction
 (3) Increase in the yield of H_2
 (4) No effect
78. 18 gm of ice is converted into water at 0°C and 1 atm . The entropies of $\text{H}_2\text{O}(\text{s})$ and $\text{H}_2\text{O}(\text{l})$ are 38.2 and 60 J/mol K respectively. The enthalpy change for this conversion is:
 (1) 5951.4 J/mol (2) 595.14 J/mol
 (3) -5951.4 J/mol (4) 2975.7 J/mol
79. 100 ml of PH_3 when completely decomposed produces phosphorus and hydrogen. The change in volume of the gas is -
 $\text{PH}_3(\text{g}) \longrightarrow \text{P}(\text{s}) + \frac{3}{2}\text{H}_2(\text{g})$
 (1) 50 ml increase (2) 500 ml decrease
 (3) 900 ml decrease (4) nil
80. The maximum work done in expanding 16 g oxygen at 300 K and occupying a volume of 5 dm^3 isothermally and reversibly until the volume become 25 dm^3 is: ($\log 5 = 0.699$)
 (1) $2.01 \times 10^3 \text{ J}$ (2) $+2.81 \times 10^3 \text{ J}$
 (3) $2.01 \times 10^{-3} \text{ J}$ (4) $+2.01 \times 10^{-6} \text{ J}$
81. The gas absorbs 100 J and is simultaneously compressed by a constant external pressure of 1.50 atm from 8 lit to 2 lit volume. Hence ΔU will be:
 (1) -812 J (2) 812 J
 (3) 1011 J (4) 911 J
82. For the given reaction :
 $\text{H}_2(\text{g}) + \text{S}(\text{s}) \rightarrow \text{H}_2\text{S}(\text{g})$; $\Delta H_r = 100 \text{ kJ/mol}$ and $\Delta S_r = 400 \text{ J/mol/K}$
 Temperature at which above reaction occurs reversibly is (Assuming ΔH_r and ΔS_r are independent of temperature)
 (1) 200 K (2) 250 K
 (3) 400 K (4) None
83. How will the viscosity of liquid be affected by the increase in temperature?
 (1) Increase
 (2) No effect
 (3) Decrease
 (4) No regular pattern will be followed
84. What is the pH of a solution in which 10.0 mL of 0.010 M $\text{Sr}(\text{OH})_2$ is added to 10.0 mL of 0.010 M HCl ?
 (1) 2.30 (2) 1.50
 (3) 11.70 (4) 7.00
85. What will be the pH of an aqueous solution of 1.0 M ammonium formate ? (Given: $\text{pK}_a = 3.8$ and $\text{pK}_b = 4.8$)
 (1) 7.5 (2) 3.4 (3) 6.5 (4) 10.2

86. Which of the following relation is incorrect :-

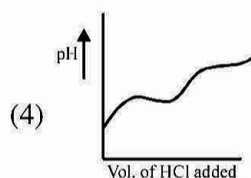
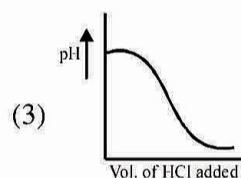
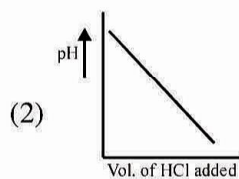
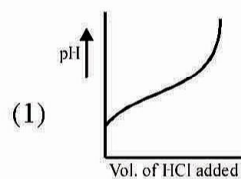
(1) $K_p = \left(\frac{e}{RT}\right)^{\Delta G^\circ}$

(2) $K_p = e^{-\frac{\Delta G^\circ}{RT}}$

(3) $\Delta G^\circ = -2.303 RT \log K_p$

(4) $\log K_{eq} = \frac{-\Delta G^\circ}{2.303RT}$

87. When 100 mL of 0.1 M NaCN solution is titrated with 0.1 M HCl solution the variation of pH of solution with volume of HCl added will be :



88. For the reaction $\text{FeCO}_3(s) \longrightarrow \text{FeO}(s) + \text{CO}_2(g)$

$\Delta H = 82.8 \text{ kJ}$ at 25°C . What is ΔU at 25°C ?

(1) 82.8 kJ (2) 80.32 kJ

(3) -2394.77 kJ (4) 85.28 kJ

89. The pH of two equimolar weak acids are 3.0 and 5.0 respectively. Their relative strength is:

(1) 3 : 5

(2) 5 : 3

(3) 100 : 1

(4) 1 : 100

90. The equilibrium constant (K_c) for the reaction,



is equal to :

(1) $[\text{H}_2\text{O}]^2$

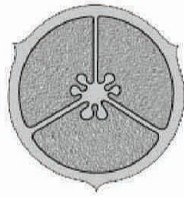
(2) $\frac{[\text{CaSO}_4 \cdot 3\text{H}_2\text{O}]}{[\text{CaSO}_4 \cdot 5\text{H}_2\text{O}]}$

(3) $[\text{H}_2\text{O}]$

(4) $\frac{[\text{CaSO}_4 \cdot 3\text{H}_2\text{O}][\text{H}_2\text{O}]^2}{[\text{CaSO}_4 \cdot 5\text{H}_2\text{O}]}$

BIOLOGY

91. Answer the following questions (A & B) by using the given diagram :-



- (A) Type of placentation ?
 (B) Example of this placentation ?

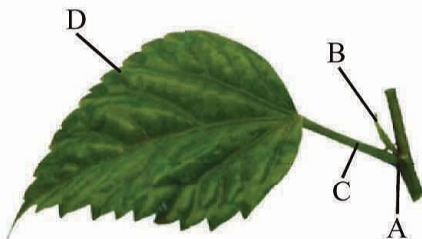
- (1) A – Marginal B – Pea
 (2) A – Axile B – Tomato
 (3) A – Axile B – Argemone
 (4) A – Parietal B – Primrose

92. In cyathium inflorescence ratio between male to female is –
 (1) One : Many (2) One : Infinite
 (3) Four : One (4) Many : One

93. Axillary bud is derived from :-

- (1) Leaf primordium
 (2) Lateral meristem
 (3) Shoot apical meristem
 (4) Root apical meristem

94. What are A, B, C & D in the figure?



- (1) A – Stipule ; B – Leafbase ; C – Petiole, D – Lamina
 (2) A – Leafbase ; B – Petiole ; C – Stipule, D – Lamina
 (3) A – Leafbase ; B – Stipule ; C – Petiole, D – Lamina
 (4) A – Lamina ; B – Leafbase ; C – Petiole, D – stipule

95. Consider the following four statements (a–d) and select the option which includes all the **correct** one only :-

- (a) In aerenchyma, air chambers are lysigenous in origin
 (b) Resin glands are schizogenous
 (c) All lateral meristems are primary in origin
 (d) Tissue which are present inside the cortex constitute the stele.
 (1) Statement (a) and (b)
 (2) Statement (b) and (c)
 (3) Statement (c) and (d)
 (4) Statement (b) and (d)

96. Which of the following condition is **not** present in fabaceae family?

- (1) $K_{(5)}$ (2) $A_{1+2+(2)}$
 (3) G_1 (4) many ovules

97. Which one of the following tissue provide tensile strength against bending and swaying ?

- (1) Parenchyma
 (2) Collenchyma
 (3) Sclerenchyma
 (4) Aerenchyma

98. The edible part of potato is –

- (1) Tap root (2) Adventitious root
 (3) Aerial stem (4) Underground stem

99. In dorsiventral leaves, the location of xylem and spongy tissue towards :-

- (1) Abaxial surface
 (2) Adaxial surface
 (3) Adaxial and abaxial surface respectively
 (4) Abaxial and adaxial surface respectively

100. Find out the **correct** match from the following:-

	Column-I	Column-II	Column -III
(1)		Valvate	Cotton
(2)		Twisted	Chinarose
(3)		Imbricate	Cassia
(4)		Vexillary	Bean

101. Agranal chloroplast are found in :-
 (1) Mesophyll of pea leaves
 (2) Bundle sheath of mango leaves
 (3) Mesophyll of maize leaves
 (4) Bundle sheath of sugar cane leaves
102. Blue dye neel is obtained from:-
 (1) Roots of *Ashwagandha*
 (2) Seeds of *Plantago ovata*
 (3) Leaves of *Indigofera*
 (4) Seeds of *Croton tiglium*
103. Find incorrect match :-
 (1) *Capsicum*, Tomato – Solanaceae
 (2) *Allium cepa* (onion) – Liliaceae
 (3) *Aloe vera*, Garlic – Fabaceae
 (4) Pea, Bean, Gram – Fabaceae
104. Character shown by members of Fabaceae (Pea, Bean) is:-
 (1) Ovary with marginal placentation
 (2) False septum
 (3) Swollen placenta
 (4) Presence of perianth
105. In which plant, the calyx is persistent :-
 (1) *Sonchus*, Banana (2) *Taraxacum*, Papaya
 (3) *Mussaenda*, Potato (4) Tomato, Brinjal
106. Floral formula of Solanaceae is :-
 (1) $\oplus \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_{(5)} \overset{\text{♂}}{\text{C}}_{(5)} \overset{\text{♂}}{\text{A}}_5 \underline{\text{G}}_{(2)}$
 (2) $\oplus \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_{(5)} \text{C}_{(5)} \text{A}_x \underline{\text{G}}_1$
 (3) $\% \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_5 \text{C}_5 \text{A}_{5+5} \underline{\text{G}}_1$
 (4) $\% \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_{(3/2)} \overset{\text{♂}}{\text{C}}_{(2/3)} \overset{\text{♂}}{\text{A}}_{2+2} \underline{\text{G}}_{(2)}$
107. Match the following (w.r.t. to edible part)
 (a) Apple (i) Thalamus
 (b) Tomato (ii) Pericarp and placenta
 (c) Banana (iii) Mesocarp and endocarp
 (d) Mango (iv) Mesocarp
 (1) a(iv), b(iii), c(ii), d(i)
 (2) a(iii), b(i), c(ii), d(iv)
 (3) a(i), b(ii), c(iii), d(iv)
 (4) a(ii), b(iii), c(iv), d(i)
108. Vascular bundles (vascular tissues) are absent in:-
 (1) Gymnosperms (2) Angiosperms
 (3) Pteridophytes (4) None of these
109. Tracheids and vessels are related with :-
 (1) Xylem of pteridophytes
 (2) Xylem of angiosperms (flowering plants)
 (3) Xylem of gymnosperms
 (4) All of the above
110. The lacuna (cavity) in the vascular bundles of monocot stem is :-
 (1) Schizolysigenous cavity
 (2) Mucilage canal
 (3) Schizogenous cavity
 (4) Lysigenous cavity
111. Name of the some tissue are given below :-
 Primary xylem, Phellem, Phelloderm, Secondary Xylem, Inter fascicular cambium, Phellogen, Primary Phloem and secondary phloem.
 Out of them how many are the products of differentiation, dedifferentiation and redifferentiation, respectively
 (1) Two, Three and Three
 (2) Two, Two and Four
 (3) Four, Two and Two
 (4) Three, Three and Two
112. The correct floral formula of *Atropa belladonna* is :-
 (1) $\text{Br} \oplus \underset{\text{♀}}{\overset{\text{♂}}{\text{P}}}_{3+3} \text{A}_{3+3} \underline{\text{G}}_{(0)}$
 (2) $\oplus \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_{(5)} \overset{\text{♂}}{\text{C}}_{(5)} \overset{\text{♂}}{\text{A}}_5 \underline{\text{G}}_{(2)}$
 (3) $\% \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_{(5)} \text{C}_{1+2-(2)} \text{A}_{(9)+1} \underline{\text{G}}_1$
 (4) $\underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_{2+2} \text{C}_4 \text{A}_{2+4} \underline{\text{G}}_{(2)}$
113. The structure in which few leaf primordia & shoot apex of monocot embryo remain enclosed is :-
 (1) Coleoptile (2) Coleorhiza
 (3) Epiblast (4) Epicotyl

114. Which of the following is mismatch :-
 (1) Mucous cells → The mucous and HCO_3^- secreted by them protect the stomach epithelium from alkaline gastric secretion
 (2) Oxyntic cells → Secrete HCl and intrinsic factor
 (3) Chief cells → Secrete pepsinogen
 (4) Endocrine cells → Secrete serotonin Like hormones
115. Read the following five statement and answer as asked next to them ?
 (a) Digestion of protein is accomplished in small intestine
 (b) Enterokinase is a enzyme of pancreatic juice
 (c) Weight of liver is more than 1.5 kg
 (d) Major part of pancreas is endocrine
 (e) Spicy food may cause indigestion
 How many of the above statements are correct?
 (1) Four (2) One (3) Two (4) Three
116. The primary dentition in human differs from permanent dentition in not having one of the following type of teeth?
 (a) Incisors (b) Canine
 (c) Premolars (d) Molars
117. Which of the following stimulate pancreatic secretion ?
 (1) Gastrin (2) Secretin
 (3) CCK-Pz (4) Both 2 and 3
118. Which one of the following match is correct ?
 (1) Vitamin E – Water soluble – Sterility
 (2) Vitamin D – Fat soluble – Beri-Beri
 (3) Vitamin B_{12} – Water soluble – Pellagra
 (4) Vitamin A – Fat soluble – Night blindness
119. Read the following four statements (A–D) :-
 (A) Infection in alimentary canal can be caused by round worm
 (B) Rennin enzyme found in gastric juice of infants helps in digestion of milk sugar.
 (C) Principle organ for absorption of nutrients is small intestine
 (D) Serosa is the outermost layer of alimentary canal
 How many of the above statements are correct?
 (1) Four (2) One (3) Two (4) Three
120. Flowers of pea, gram & bean are :-
 (1) Actinomorphic and epigynous
 (2) Actinomorphic and hypogynous
 (3) Zygomorphic and hypogynous
 (4) Zygomorphic and epigynous
121. Which of the following sequence is incorrect?
 (1) Starch $\xrightarrow{\text{Amylase}}$ disaccharides
 (2) Fats $\xrightarrow{\text{Lipases}}$ diglycerides
 (3) Nucleic acids $\xrightarrow{\text{Nucleases}}$ nucleotides
 (4) Lactose $\xrightarrow{\text{Lactase}}$ glucose + glucose
122. In brinjal flowers are :-
 (1) Hypogynous
 (2) Epigynous
 (3) Perigynous
 (4) Both hypogynous & perigynous
123. Valvate aestivation of corolla is found in :-
 (1) *Pisum* / Fabaceae
 (2) *Tamarindus* / Caesalpinoidae
 (3) *Sesbania* / Fabaceae
 (4) Tomato / Solanaceae
124. Laticiferous vessels are found in :-
 (1) Xylem tissue (2) Phloem tissue
 (3) Cortex (4) None of the above
125. Meristematic cells have :-
 (1) Thick cell wall and large intercellular spaces
 (2) Thick cell wall and no intercellular spaces
 (3) Thin cell wall and large intercellular spaces
 (4) Thin cell wall and no intercellular spaces
126. Which of the following is heteropolymer :-
 (1) Protein (2) Inulin
 (3) Glycogen (4) Starch
127. A typical fat molecule is made up of
 (a) three glycerol molecules and one fatty acid molecule
 (b) one glycerol and three fatty acid molecules
 (c) one glycerol and one fatty acid molecule
 (d) three glycerol and three fatty acid molecules
128. The maximum volume of air a person can breathe in after a forced expiration :-
 (1) TV + ERV (2) TV + IRV
 (3) TV + ERV + IRV (4) ERV + RV

129. How many enzymes in the list given below are protein digesting enzyme found in pancreatic juice?

Lactase, Trypsin, Pepsin, Chymotrypsin, Aminopeptidase, Rennin, Carboxypeptidase, Nuclease, Maltase

- (1) Six (2) Three (3) Four (4) Five

130. Find out the correct match in the following columns.

Column-I

Column-II

- | | |
|----------------------------|--------------------|
| (A) Vitamin A | (1) Calciferol |
| (B) Vitamin D | (2) Nicotinic acid |
| (C) Vitamin C | (3) Phylloquinone |
| (D) Vitamin B ₃ | (4) Ascorbic acid |
| (E) Vitamin B ₇ | (5) Retinol |
| (F) Vitamin K | (6) Biotin |
- (1) A-5 B-6 C-2 D-4 E-1 F-3
 (2) A-5 B-1 C-4 D-2 E-6 F-3
 (3) A-5 B-1 C-2 D-4 E-6 F-3
 (4) A-2 B-5 C-1 D-4 E-4 F-3

131. AT.S. of monocot stem can be distinguished from that of a dicot stem by observing the :-

- (1) Vascular bundles, which are scattered in monocot stem.
 (2) Sunken stomata
 (3) Radial vascular bundles
 (4) Concentric vascular bundles

132. Which modification is reported in *Asparagus* and *Ruscus*?

- (1) Cladodes (2) Phyllodes
 (3) Leaf spines (4) Phylloclades

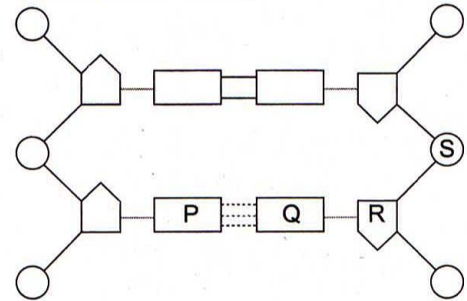
133. An example of non-competitive inhibition is:-

- (1) The inhibition of succinic dehydrogenase by malonate
 (2) Cyanide action on cytochrome oxidase
 (3) Sulpha drug on folic acid synthesizing bacteria
 (4) None of above

134. Which one of the following statements is true regarding digestion and absorption of food in humans ?

- (1) About 60% of starch is hydrolysed by salivary amylase in our mouth
 (2) Oxyntic cells in our stomach secrete the proenzyme pepsinogen
 (3) Fructose and amino acids are absorbed through intestinal mucosa with the help of carrier ions like Na⁺
 (4) Chylomicrons are small lipoprotein particles that are transported from intestine into blood capillaries

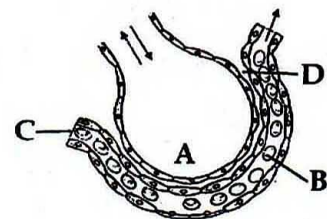
135. The given figure illustrates the structural components of a molecule.



The names of the labels are identified in which alternative?

- (a) P-cytosine; Q-thymine; R-ribose; S-phosphate
 (b) P-adenine; Q-guanine; R-ribose; S-hydrogen
 (c) P-cytosine; Q-guanine; R-deoxyribose; S-phosphate
 (d) P-adenine; Q-thymine; R-deoxyribose; S-hydrogen

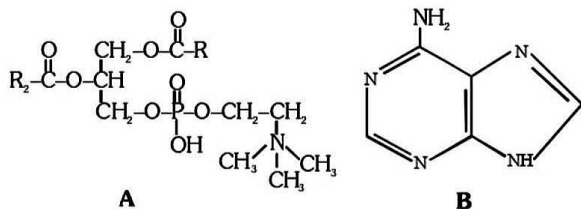
136. The figure given below shows a small part of human lung where exchange of gases takes place. In which one of the options given below, the one part, A, B, C or D is correctly identified along with its function



Options :

- (1) C : arterial capillary-passes oxygen to tissues
 (2) A : alveolar cavity-main site of exchange of respiratory gases
 (3) D : Capillary wall-exchange of O₂ and CO₂ takes place here
 (4) B : red blood cell-transport of CO₂ mainly

137. About 98 percent of the mass of every living organism is composed of just six elements including carbon, hydrogen, nitrogen, oxygen and:
- (1) Calcium and phosphorus
 - (2) Phosphorus and sulphur
 - (3) Sulphur and magnesium
 - (4) Magnesium and sodium
138. Which one of the following structural formulae of two organic compounds is correctly identified along with its related function ?



- (1) B : adenine - a nucleotide that makes up nucleic acids
 - (2) A : Triglyceride - major source of energy
 - (3) B : Uracil - a component of DNA
 - (4) A : Lecithin - a component of cell membrane
139. Which one of the following pairs of nitrogenous bases of nucleic acids, is *wrongly* matched with the category mentioned against it ?
- (1) Guanine, Adenine – Purines
 - (2) Adenine, Thymine – Purines
 - (3) Thymine, Uracil – Pyrimidines
 - (4) Uracil, Cytosine – Pyrimidines
140. Ground tissue includes :-
- (1) All tissues external to endodermis
 - (2) All tissues except epidermis and vascular bundles
 - (3) Epidermis and cortex
 - (4) All tissues internal to endodermis
141. An example of axile placentation is :-
- (1) Marigold
 - (2) Argemone
 - (3) Dianthus
 - (4) Lemon

142. Consider the following four statements A, B, C and D and select the right option for two correct statements :

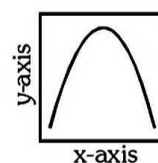
Statements :

- (A) In vexillary aestivation, the large posterior petal is called - *standard*, two lateral ones are *wings* and two small anterior petals are termed *keel*.
- (B) The floral formula for Liliaceae is $\oplus \overset{\uparrow}{\ominus} P_{3+3} A_{3+3} G_{(3)}$
- (C) In pea flower the stamens are monadelphous
- (D) The floral formula for Solanaceae is $\oplus \overset{\uparrow}{\ominus} K_{(3)} C_{(3)} A_{(4)} G_{(2)}$

The correct statements are :-

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

143. The curve given below shows enzymatic activity with relation to three conditions (pH, temperature and substrate concentration)



What do the two axes (x and y) represent ?

- | x-axis | y-axis |
|-----------------------------|--------------------|
| (1) Enzymatic activity | pH |
| (2) Temperature | Enzyme activity |
| (3) Substrate concentration | Enzymatic activity |
| (4) Enzymatic activity, | Temperature |

144. Cellulose is a polysaccharide, which is a :-
- (1) Branched chain with 1, 4 and 1, 6 bonds
 - (2) Branched chain with 1, 6 bonds
 - (3) Unbranched chain with 1, 6 bonds
 - (4) Unbranched chain with 1, 4 bonds
145. Chitin that forms arthropod exoskeleton, is the second most abundant organic molecule on earth is a :-
- (1) Storage polysaccharide
 - (2) Mucopolysaccharide
 - (3) Nitrogen containing structural polysaccharide
 - (4) Structural oligosaccharide
146. Essential fatty acids are :-
- (1) Not synthesized in plants
 - (2) Not synthesized in animal
 - (3) Must be present in animal diet
 - (4) Both (2) and (3)

147. Which of the following process will be affected by the absence of enterokinase?
 (a) Lipid → Fatty acid + Glycerol
 (b) Dipeptides → Amino acid
 (c) Proteoses → Dipeptide
 (d) Amylose → Maltose

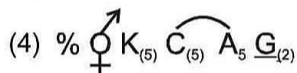
148. For its activity, carboxypeptidase requires
 (a) iron (b) niacin (c) copper (d) zinc

149. The enzymes that is not present in succusentericus is
 (a) lipase (b) maltase (c) nucleases (d) nucleosidase

150. Which of the following statements is not correct?
 (a) Acini are present in the pancreas and secrete carboxypeptidase
 (b) Brunner's glands are present in the submucosa of stomach and secrete pepsinogen
 (c) Goblet cells are present in the mucosa of intestine and secrete mucus
 (d) Oxyntic cells are present in the mucosa of stomach and secrete HCL

151. Where do certain symbiotic microorganisms normally occur in human body?
 (a) Oral lining and tongue surface
 (b) Vermiform appendix and rectum
 (c) Duodenum (d) Caecum

152. Which of the following is not a feature of Solanaceae family.
 (1) Cymose inflorescence
 (2) Swollen placenta & oblique ovary
 (3) Pentamerous, axile placentation



153. Select correct statement related to human beings respiratory system.
 (a) Cigarette smoking may lead to inflammation of mouth and nose
 (b) Neural signals from the pneumotoxic centre in the pons region of the brain cannot increase the duration of inspiration
 (c) Workers in grinding and stone breaking industries may suffer from lung fibrosis
 (d) About 7% of CO₂ is carried out by haemoglobin as carbominohaemoglobin

154. Select correct combination of the respiratory disorder given below.

Column-I	Column-II
(A) Asthma	(1) Inflammation of nasal tract
(B) Bronchitis	(2) Spasm of tracheal muscle
(C) Rhinitis	(3) Fully blown out alveoli
(D) Emphysema	(4) Inflammation of bronchi
	(5) Cough with blood stained sputum

- (a) A-5 B-3 C-2 D-1
 (b) A-3 B-1 C-5 D-4
 (c) A-2 B-4 C-1 D-3
 (d) A-3 B-1 C-4 D-2

155. The mode of arrangement of sepals or petals in floral bud with respect to the other members of same whorl is known as :-

- (1) Placentation (2) Aestivation
 (3) Venation (4) Cohesion

156. The function of xylem is :-

- (1) Conduction of water
 (2) Conduction of minerals
 (3) Mechanical support (Mechanical strength)
 (4) All of the above

157. Inflorescence in Liliaceae is :-

- (1) Cyathium (2) Catkin
 (3) Umbellate Clusters (4) Corymb

158. Abnormal secondary growth is found in :-

- (1) *Cycas*, *Pinus* (2) Wheat, Pea
 (3) *Helianthus*, *Tagetus* (4) *Kingia*, *Sansiviera*

159. Undifferentiated ground tissue is met within :-

- (1) *Cucurbita* stem (2) Maize stem
 (3) Pea stem (4) Sunflower stem

160. Match the placentation types (column-I) with their examples (column-II)

Column-I	Column-II
(a) Basal	(i) Argemone
(b) Axile	(ii) Citrus
(c) Parietal	(iii) Dianthus
(d) Free central	(iv) Sunflower

Choose the correct answer from the following options:

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

161. In the dicot root the vascular cambium originates from :

- (1) Tissue located below the phloem bundles and a portion of pericycle tissue above protoxylem.
 (2) Cortical region
 (3) Parenchyma between endodermis and pericycle
 (4) Intrafascicular and interfascicular tissue in a ring

162. Which of the following layer is composed of barrel shaped cells without any intercellular spaces in dicot root?

- (1) Endodermis (2) Epidermis
(3) Hypodermis (4) Pericycle

163. Calyptrogen is derived from :-

- (1) Dermatogen (2) Periblem
(3) Plerome (4) Root cap

164. Regarding to ideal enzyme which of the following should not be high -

- (1) K_{cat} (2) V_{max}
(3) K_m (4) Catalytic efficiency

165. Ribs move outwards during inspiration due to

- (1) Contraction of external intercostal muscles
(2) Contraction of internal intercostal muscles
(3) Contraction phrenic muscles
(4) Relaxation of phrenic muscles

166. Which of the following is not a respiratory pigment :

- (1) Haemozoin (2) Haemoglobin
(3) Haemocyanin (4) Chloro corin

167. Hering Bruer reflex is related with

- (1) Effect of pH on respiratory centre
(2) Effect of CO_2 on respiratory centre
(3) Effect of Vagus nerve on respiratory centre
(4) Effect of temperature on respiratory centre

168. Which of followings is correctly match ?

(1) Parietal placentation	A. Prim rose
(2) Axile placentation	B. Mustard
(3) Basal placentation	C. Sunflower
(4) Free central placentation	D. Lemon

169. Substituted methane is another name of :-

- (1) Glycerole (2) α -amino acid
(3) Palmitic acid (4) Arachidonic acid

170. Match the following :-

A. Secretin	a. Stomach
B. Gastrin	b. Submucosa
C. Brunner's gland	c. Pancreas
D. Dentine	d. Yellow

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

171. Which is non reducing carbohydrate-

- (1) Sucrose (2) Starch
(3) Glycogen (4) All of the above

172. In which part of lungs gaseous exchange takes place?

- (1) Trachea & alveolar duct
(2) Trachea & Bronchi
(3) Alveolar duct & Alveoli
(4) Alveoli & Trachea

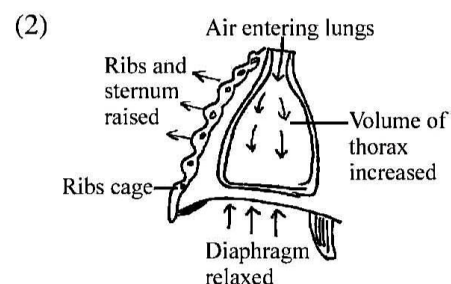
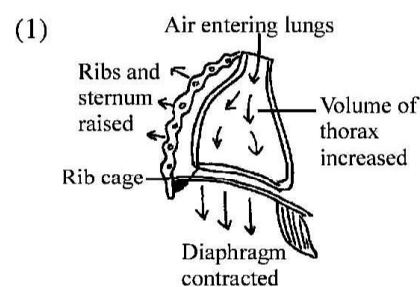
173. Which of the following factors favour the dissociation of HbO_2 at tissue level ?

- (1) $pO_2 \downarrow$, $pCO_2 \uparrow$, $H^+ \uparrow$, temperature \uparrow
(2) $pO_2 \uparrow$, $pCO_2 \uparrow$, $H^+ \uparrow$, temperature \uparrow
(3) $pO_2 \uparrow$, $pCO_2 \downarrow$, $H^+ \downarrow$, temperature \downarrow
(4) $pO_2 \uparrow$, $pCO_2 \downarrow$, $pH^+ \downarrow$, temperature \uparrow

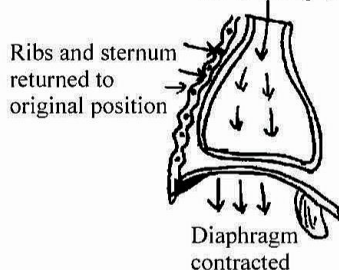
174. In a villus, some of the glycerol and fatty acids are combined to form fats, coated with proteins and then transported as chylomicrons to the :-

- (1) Lacteals
(2) Capillaries
(3) Lumen of the small intestine
(4) Lumen of the large intestine

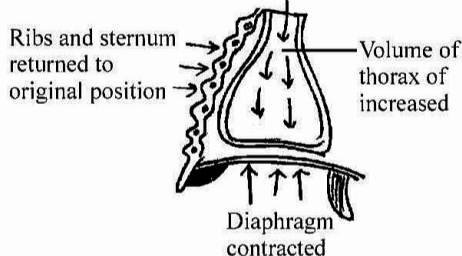
175. Which of the following diagram is correct representation of inspiration?



(3) Air entering lungs



(4) Air entering lungs



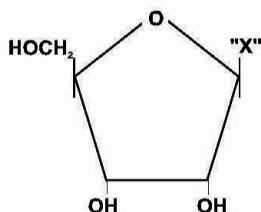
176. Read the following four statement (A – D):-

- (A) The water we intake plays an important role in metabolic processes and also prevents dehydration of the body
- (B) Digestion is carried out by our digestive system by mechanical and biochemical methods
- (C) Large intestine is principal organ for absorption of nutrients.
- (D) In most mammals two sets of teeth appear during their life.

How many of the above statements are correct?

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

177. Given below is the diagrammatic representation of one of the categories of small molecular weight organic compounds in the living tissues. Identify the **category** shown and the one blank component "X" in it.



Category	Component- X
(1) Cholesterol	– Guanine
(2) Amino acid	– NH ₂
(3) Nucleotide	– Adenine
(4) Nucleoside	– Uracil

178. How many of the following statements are concerned with diaphragm.

- (I) Found in mammals
(II) Highly muscular and fibrous partition, elevated towards the thorax like a dome
(III) Separates thoracic and abdominal cavity
(a) I and II (b) II and III
(c) I and II (d) None of these

179. Read the following statements thoroughly and identify whether they are true and false. Choose the right option accordingly.

- (I) Bile is produced and stored in the liver and gall bladder, respectively
(II) Common hepatic duct is the fusion of all the right and left hepatic ducts
(III) Hepato-pancreatic duct opens into the proximal part of the small intestine
(IV) Pancreas consists of two parts, exocrine and endocrine, which secretes insulin and glucagon hormone and pancreatic juice containing enzymes, respectively
(V) Pepsinogen, a secretion of chief cells is activated by hydrochloric acid
(VI) Peptides are converted into dipeptides with the action of carboxypeptidase
(a) All statements are true
(b) All statements are false
(c) Statement I, II, III and V are true while IV and VI are false
(d) Statement I, III, V and VI are true while III and IV are false

180. Go through the following statements regarding the disorders of the digestive system. Choose the correct statements and select appropriate option from the codes given below.

- (I) Indigestion is caused by the poor supply of digestive enzyme, overeating, anxiety and eating a lot of junk food
(II) Constipation, an irregular movement of bowel is caused due to poor habits, fiberless diet, emotional stress and certain drugs
(III) Indigestion can be caused by milk of magnesia
(IV) Ejection of stomach content is controlled by hypothalamus of prosencephalon
(a) All statements are correct.
(b) All statements are incorrect.
(c) I and II statements are correct.
(d) III and IV statements are correct.