

CLICK
HERE



CLICK
HERE

APUL
NEET FLIX

AIMA FREE EDUCATION TO ALL

NEET CHANNEL



JOIN
OUR TELEGRAM CHANNELS HERE

TEST PAPERS <<< CLICK

TOPPER'S NOTES <<< CLICK

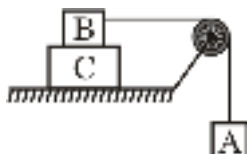
BEST FROM KOTA LECTURES <<< CLICK

QUIZES <<< CLICK

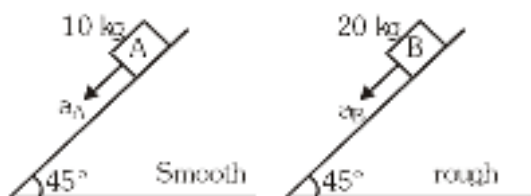
REVISION FLASH CARDS &
MANY MORE <<< CLICK

PHYSICS

1) Three bodies each of mass 2kg are arranged as shown in figure. The coefficient of kinetic friction between B & C is 0.4 and between C and ground is 0.1. Then choose the correct option(s) :



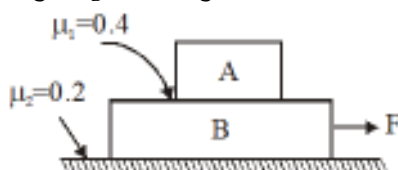
- (1) The acceleration of block A is 1 m/s^2
- (2) The acceleration of block A is 3 m/s^2
- (3) The acceleration of block C is 4 m/s^2
- (4) The acceleration of block B is 1 m/s^2



2) The ratio of acceleration of blocks A placed on smooth incline with block B placed on rough incline is 2 : 1. The coefficient of kinetic friction between block B and incline is :-

- (1) 0.5
- (2) 0.75
- (3) 0.57
- (4) None of these

3) For the figure shown $m_A = 10 \text{ kg}$, $m_B = 15 \text{ kg}$ and $F = 90 \text{ N}$. Find the accelerations of the blocks



and the frictional forces acting.

- (1) 1.6 m/s^2 , 16 N
- (2) 1.6 m/s^2 , 40 N
- (3) 2 m/s^2 , 16 N
- (4) 2 m/s^2 , 40 N

4) The mass of a lift is 600 kg and it is moving upwards with a uniform acceleration of 2 m/s^2 . Then the tension in the cable of the lift is :-

- (1) 7080 N

- (2) 5880 N
 (3) 4680 N
 (4) Zero

5) A truck starts from rest and accelerates uniformly with 5 m/s^2 . The minimum value of coefficient of static friction between surface of truck and a box placed on it such that box does not slip back, will be :-

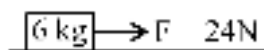
- (1) 0.4
 (2) 0.6
 (3) 0.5
 (4) 0.2

6) With what minimum acceleration can a fireman slides down a rope while breaking strength of the rope is $\frac{2}{3}$ of his weight.

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

7) A uniform rope of length ℓ lies on a table. If the coefficient of friction is μ , then the maximum length ℓ_1 of the part of this rope which can overhang from the edge of the table without sliding down is

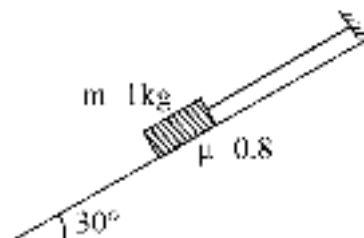
- (1) $\frac{\ell}{\mu}$
 (2) $\frac{\ell}{\mu + 1}$
 (3) $\frac{\mu\ell}{1 + \mu}$
 (4) $\frac{\mu\ell}{\mu - 1}$



8) Force of friction acting on the block is

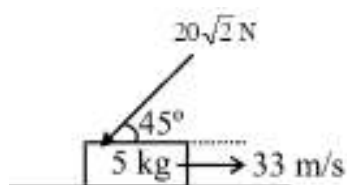
- (1) 36 N
 (2) 32 N
 (3) 24 N
 (4) 12 N

9) For the arrangement shown in the figure, the tension in the string is : -



- (1) 6N
- (2) 6.4 N
- (3) 0.4 N
- (4) Zero

10) A block of mass 5 kg is kept on a rough horizontal floor. It is given a velocity 33 m/s towards right. A force of $20\sqrt{2}$ N continuously acts on the block as shown in the figure. If the coefficient of friction between block and floor is 0.5 the velocity of block after 3 seconds is ($g = 10 \text{ m/s}^2$)



- (1) 2 m/s
- (2) Zero
- (3) 33/12 m/s
- (4) None of above

11) A smooth cylinder of mass m and radius R is resting on two corner edges A and B as shown in

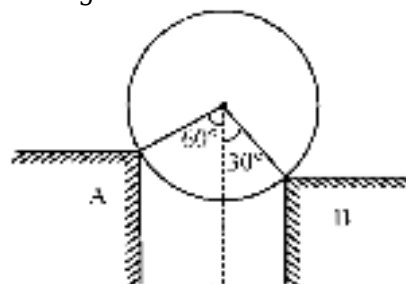
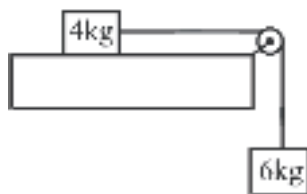


fig. The relation between normal reaction at the edges A and B is :-

- (1) $N_A = \sqrt{2}N_B$
- (2) $N_B = \frac{2\sqrt{3}N_A}{5}$
- (3) $N_A = \frac{N_B}{2}$
- (4) $N_B = \sqrt{3}N_A$

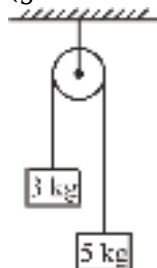
12) Two bodies of mass 6 kg and 4 kg are tied to a string as shown in the adjoining figure. If the table is smooth and pulley is frictionless, then acceleration of mass 6 kg will be : ($g = 10 \text{ ms}^{-2}$)



- (1) 60 ms^{-2}
- (2) 40 ms^{-2}
- (3) 6 ms^{-2}
- (4) 4 ms^{-2}

13) Two blocks of masses 3 kg and 5 kg are connected to a pulley as shown. What will be their acceleration if the pulley is set free ?

(g = acceleration due to gravity)



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

14) A particle moving in a straight line covers half the distance with speed of 3 m/s. The other half of the distance is covered in two equal time intervals with speed of 4.5 m/s and 7.5 m/s respectively. The average speed of the particle during this motion is :-

- (1) 4.0 m/s
- (2) 5.0 m/s
- (3) 5.5 m/s
- (4) 4.8 m/s

15) A man walk 40 m along north direction then he walk 30 m along east direction and finally $30\sqrt{2}$ m along s-w direction then its displacement is :-

- (1) 10m, North
- (2) 10m, South
- (3) 10 m, East
- (4) 10 m, West

16) A body is moving with constant speed of 5m/s on a circular path of radius 5m. The magnitude of average velocity of the body after 7π secs is :-

- (1) 5 m/s

(2) $\frac{5\sqrt{2}}{7\pi}$ m/s

(3) $\frac{10}{7\pi}$ m/s

(4) 0 m/s

17) The displacement of a body along x-axis depends on time as $\sqrt{x} = t + 1$. Then the velocity of body:-

- (1) increases with time
- (2) decreases with time
- (3) independent of time
- (4) none of these

18)

The position vector of a particle is given as $\vec{r} = (t^2 - 4t + 6)\hat{i} + (t^2)\hat{j}$. The time after which the velocity vector and acceleration vector becomes perpendicular to each other is equal to :-

- (1) 1 sec.
- (2) 2 sec.
- (3) 1.5 sec.
- (4) 5 sec.

19) The position x of a particle with respect to time t along x-axis is given by: $x = 9t^2 - t^3$, where x is in metres and t in second. What will be the position of this particle when it achieves maximum speed along the +x direction?

- (1) 54 m
- (2) 81 m
- (3) 24 m
- (4) 32 m

20) A body is moving along a straight line according to the equation of motion $x = t^2 - 3t + 4$, where x is in meter and t is in second. What is the acceleration of the body when it comes to rest ?

- (1) Zero
- (2) 2m/s^2
- (3) $\frac{3}{2}\text{m/s}^2$
- (4) 1m/s^2

21) A car is moving with speed 15 m/s. Suddenly the driver sees an obstruction on the road and takes 0.4 sec to apply the brake, which cause a deacceleration of 5 m/s^2 . Then distance travelled by car before stopping-

- (1) 22.5 m

- (2) 24.5 m
- (3) 26.5 m
- (4) 28.5 m

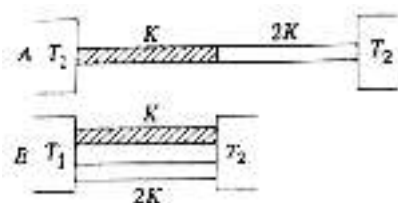
22) A particle is moving with velocity 50 m/s & acceleration 25 m/s^2 is acting opposite to velocity then find distance travelled by it in $t = 0$ to $t = 4 \text{ sec}$:-

- (1) 0
- (2) 2s
- (3) 50
- (4) 100 m

23) A thin walled metal tank of surface area 5 m^2 is filled with water and contains an immersion heater dissipating 1kW. The tank is covered with 4 cm thick layer of insulation whose thermal conductivity is 0.2 watt/m-K . The outer face of the insulation is at 25°C . The temperature of the tank in the steady state is -

- (1) -15°C
- (2) 65°C
- (3) 20°C
- (4) 90°C

24) Two rods with the same dimensions have thermal conductivities in the ratio 1 : 2. They are arranged between heat reservoirs with the same temperature difference, in two different configurations, A and B. The rates of heat flow in A and B are I_A and I_B respectively. The ratio I_A/I_B is



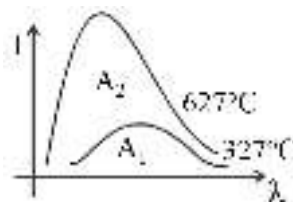
equal to:-

- (1) 1:2
- (2) 1:3
- (3) 2:5
- (4) 2:9

25) The temperature gradient in a rod of 0.5 m long is 80°C/m . If the temperature of hotter end of the rod is 30°C , then the temperature of the cooler end is

- (1) 40°C
- (2) -10°C
- (3) 10°C
- (4) 0°C

26) The emission spectra of a body at temperature 327°C and 627°C is shown. If A_1 and A_2 be the



area under the two curves, the ratio of (A_2/A_1) :-

- (1) 81/16
- (2) 9/4
- (3) 27/8
- (4) 16/81

27) Suppose the sun expands so that its radius becomes 100 times its present radius and its surface temperature becomes half of its present value. The total energy emitted by it will becomes:

- (1) 10^4 times
- (2) 625 times
- (3) 256 times
- (4) 16 times

28) A pan filled with hot food cools from 94°C to 86°C in 2 minutes when the room temperature is at 20°C . How long will it take to cool from 71°C to 69°C ?

- (1) 48 sec.
- (2) 42 sec.
- (3) 60 sec.
- (4) 72 sec.

29) The power emitted per unit area of a black body is $R \text{ watt/m}^2$. At what wavelength will the power radiated by the black body be maximum, If the stefan's constant is σ and Wein's constant is b , then:-

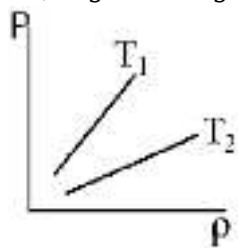
- (1) $\lambda = \left(\frac{b\sigma}{R}\right)^{1/4}$
- (2) $\lambda = \left(\frac{b}{R}\right)^{1/4}$
- (3) $\lambda = \left(\frac{bR}{\sigma}\right)^{1/4}$
- (4) $\lambda = b\left(\frac{\sigma}{R}\right)^{1/4}$

30) A rigid tank contains 35 kg of nitrogen at 6 atm. Sufficient quantity of oxygen is supplied to increase the pressure to 9 atm, while the temperature remains constant. Amount of oxygen supplied to the tank is :

- (1) 5 kg
- (2) 10 kg
- (3) 20 kg

(4) 40 kg

31) Fig. shows graphs of pressure vs density for an ideal gas at two temperatures T_1 and T_2 :



- (1) $T_1 > T_2$
- (2) $T_1 = T_2$
- (3) $T_1 < T_2$
- (4) any of the three is possible

32) The temperature of an ideal gas is increased from 27°C to 927°C the rms speed of its molecules becomes :-

- (1) twice
- (2) half
- (3) four times
- (4) one-fourth

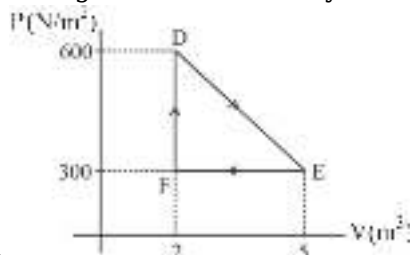
33) The temperature of a gas at -68°C . At what temperature will the average kinetic energy of its molecules be twice that of at -68°C .

- (1) 137°C
- (2) 127°C
- (3) 100°C
- (4) 105°C

34) The amount of heat needed to raise the temperature of 4 moles of a rigid diatomic gas from 0°C to 50°C when no work is done is :

- (1) 250 R
- (2) 750 R
- (3) 175 R
- (4) 500 R

35) The P-V diagram of a thermodynamic system is as shown, then work done by gas from D to E to



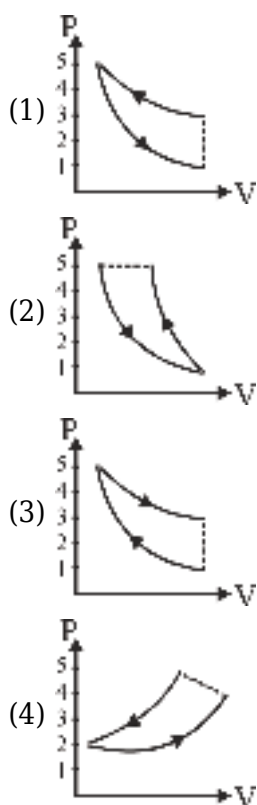
F will be -

- (1) -450 J
- (2) 450 J
- (3) 900 J
- (4) 135 J

36) If an ideal gas is compressed during isothermal process then :-

- (1) No work is done against gas
- (2) heat is rejected by gas
- (3) It's internal energy will increase
- (4) Pressure does not change

37) A fixed mass of air at 1 atmospheric pressure is compressed adiabatically to 5 atmospheric pressure and allowed to expand isothermally to its original volume. The process is represented in which one of the following indicator diagrams :-



38) A diatomic ideal gas undergoes an adiabatic process at room temperature. The relation between temperature and volume of this process is $TV^X = \text{constant}$ then X is-

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

39) A particle executes simple harmonic motion according to equation $4\frac{d^2x}{dt^2} + 320x = 0$. Its angular frequency of oscillation is

- (1) $\sqrt{320}$
- (2) $\sqrt{80}$
- (3) $\sqrt{160}$
- (4) $\sqrt{640}$

40) The function $\sin(2\omega t)$ represents :

- (1) A simple harmonic motion with a period $2\pi/\omega$
- (2) A simple harmonic motion with a period π/ω .
- (3) A periodic, but not simple harmonic motion with a period $2\pi/\omega$.
- (4) A periodic, but not simple harmonic motion with a period π/ω .

41) **Assertion** : Acceleration is proportional to the displacement; this condition is not sufficient for motion in simple harmonic.

Reason : In simple harmonic motion, direction of displacement is also considered.

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

42) Two SHMs are represented by equations :

$$y_1 = 6 \cos\left(6\pi t + \frac{\pi}{6}\right),$$

$$y_2 = 3(\sqrt{3}\sin 3\pi t + \cos 3\pi t); \text{ then}$$

- (1) ratio of their amplitudes is 1
- (2) ratio of their time periods is 1
- (3) ratio of their maximum velocities is 1
- (4) ratio of their maximum acceleration is 1

43) Out of the following functions representing motion of a particle which represents SHM :

(A) $y = \sin \omega t - \cos \omega t$

(B) $y = \sin^3 \omega t$

(C) $y = 5\cos\left(\frac{3\pi}{4} - 3\omega t\right)$

(D) $y = 1 + \omega t + \omega^2 t^2$

Which functions represent SHM ?

- (1) Only (A)
- (2) Only (D) does not represent SHM
- (3) Only (A) and (C)

(4) Only (A) and (B)

44) Which of the following motion is oscillatory ?

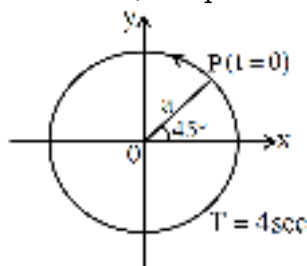
(1) $a = -4(x - 2)^3$

(2) $a = 2(x - 2)^6$

(3) $a = +10(x - 3)^3$

(4) $a = 10(x - 3)^2$

45) The radius of circle, the period of revolution initial position and sense of revolution, are indicated



in the figure.

x-projection of the radius vector of rotating particle P is :-

(1) $x = a \cos \left(\pi t + \frac{\pi}{4} \right)$

(2) $x = a \sin \left(\pi t + \frac{\pi}{4} \right)$

(3) $x = a \cos \left(\frac{2\pi t}{4} + \frac{\pi}{4} \right)$

(4) $x = a \sin \left(\frac{2\pi t}{4} + \frac{\pi}{4} \right)$

CHEMISTRY

1) 6×10^{-3} mole $K_2Cr_2O_7$ reacts completely with 9×10^{-3} mole X^{n+} to give XO_3^- and Cr^{3+} . The value of n is :-

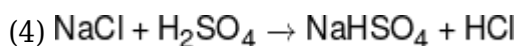
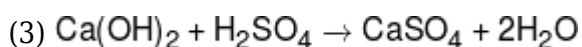
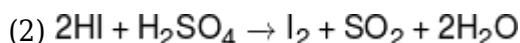
(1) 1

(2) 2

(3) 3

(4) None of these

2) Which of the following chemical reaction depicts the oxidising behaviour of H_2SO_4 ?



3)

Review the reaction

$3\text{Br}_2 + 6\text{OH}^- \rightarrow 5\text{Br}^- + \text{BrO}_3^- + 3\text{H}_2\text{O}$ and indicate the equivalent weight of Br_2

- (1) $M/2$
- (2) $[M/2 + M/10]$
- (3) $M/10$
- (4) $M/6$

4) What is the volume (in ml) of 0.1M potassium permanganate solution required to completely oxidize 100ml of 0.5 M ferrous sulphate solution in acidic medium ?

- (1) 20 ml
- (2) 200 ml
- (3) 100 ml
- (4) 50 ml

5) 2 mole of N_2H_4 loses 20 mole of electrons determine final oxidation number of Nitrogen

- (1) +2
- (2) +3
- (3) +5
- (4) -3

$6) \text{XFeSO}_4 + \text{K}_2\text{Cr}_2\text{O}_7 + 7\text{H}_2\text{SO}_4 \rightarrow \text{YFe}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{Cr}_2(\text{SO}_4)_3 + \text{ZH}_2\text{O}$

Identify X, Y, Z respectively

- (1) 6, 3, 7
- (2) 7, 3, 6
- (3) 3, 6, 7
- (4) 1, 2, 7

7) Equivalent weight of FeS_2 in the reaction

$\text{FeS}_2 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2$ is :-

- (1) $\frac{M}{10}$
- (2) $\frac{M}{11}$
- (3) $\frac{M}{6}$
- (4) $\frac{M}{1}$

8)

Match list-I with list-II :

List-I (Reaction)	List-II (Type of Redox Reaction)
----------------------	-------------------------------------

(A)	$\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$	(I)	Decomposition redox reaction
(B)	$2\text{Pb}(\text{NO}_3)_2 \rightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$	(II)	Comproportionation redox reaction
(C)	$\text{NaH} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$	(III)	Intermolecular redox reaction
(D)	$\text{Cl}_2 + 2\text{NaOH} \rightarrow \text{NaCl} + \text{NaClO} + \text{H}_2\text{O}$	(IV)	Disproportionation redox reaction

(1) A \rightarrow III, B \rightarrow I, C \rightarrow II, D \rightarrow IV

(2) A \rightarrow I, B \rightarrow IV, C \rightarrow III, D \rightarrow II

(3) A \rightarrow I, B \rightarrow III, C \rightarrow IV, D \rightarrow II

(4) A \rightarrow II, B \rightarrow III, C \rightarrow I, D \rightarrow IV

9) Which of the following cannot act as a reducing agent :

(1) SO_2

(2) Cl_2O_3

(3) NO_2

(4) CO_2

10) A compound containing x, y and z atoms oxidation no of x is +3, y is -5 and z is +1 then the possible formula of compound is :-

(1) xyz

(2) xyz_2

(3) x_2yz

(4) $(\text{xy})_2\text{z}$

11) For a given reaction, the overall enthalpy change is +100 kJ/mol and activation energy of the reverse reaction is +200 kJ/mol. The activation energy for the forward reaction would be :-

(1) +300 kJ/mol

(2) +200 kJ/mol

(3) +0.100 kJ/mol

(4) +100 kJ/mol

12) In a gaseous phase reaction, $\text{A}_{2(\text{g})} \rightarrow 1/2 \text{B}_{(\text{g})} + \text{C}_{(\text{g})}$, the increase in pressure of $\text{B}_{(\text{g})}$ from 100 mm to 120 mm is noticed in 5 minute. The rate of disappearance of A_2 in mm min^{-1} is :-

(1) 4

(2) 8

(3) 16

(4) 2

13) For which of the following reaction temperature gradient or the effect of temperature change upon rate of reaction is highest?

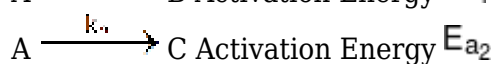
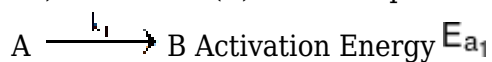
- (1) $A \rightarrow \text{Product}$ ($E_a = 10$)
- (2) $B \rightarrow \text{Product}$ ($E_a = 100$)
- (3) $C \rightarrow \text{Product}$ ($E_a = 1000$)
- (4) $D \rightarrow \text{Product}$ ($E_a = 50$)

14) During decomposition of an activated complex.

- (i) Energy is always released
- (ii) Energy is always absorbed
- (iii) Energy does not change
- (iv) Reactants may be formed

- (1) (i), (ii) and (iii)
- (2) (i) and (iv)
- (3) (ii) and (iii)
- (4) (ii), (iii) and (iv)

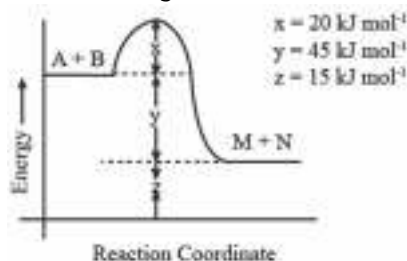
15) A reactant (A) from two products :



If $E_{a2} = 2E_{a1}$ then k_1 and k_2 are related

- (1) $k_2 = k_1 e^{E_{a1}/RT}$
- (2) $k_2 = k_1 e^{E_{a2}/RT}$
- (3) $k_1 = k_2 e^{E_{a1}/RT}$
- (4) $k_1 = 2k_2 e^{E_{a2}/RT}$

16) According to the following figure, the magnitude of the enthalpy change of the reaction A +



$B \rightarrow M + N$ is equal to.....(KJ/mol)

- (1) 20
- (2) 45
- (3) 15
- (4) 65

17) If the temperature of a reaction is increased from 10°C to 100°C then how many times rate of reaction will become?

- (1) 2^8 times
- (2) 2^9 times

(3) 2^{10} times

(4) 2^{11} times

18) The energy of activation for forward and backward change for an endothermic reaction : $x \rightarrow y$ are E_f and E_b respectively. Which of the following is correct?

(1) $E_b < E_f$

(2) $E_b > E_f$

(3) $E_b = E_f$

(4) No relation between them

19) Consider the following statements.

(A) The energy required to form activated complex is known as activation energy.

(B) Area under the curve for the plot of fraction of molecules versus kinetic energy of gas molecules, changes with change of temperature.

(C) In the Arrhenius equation the factor $e^{-E_a/RT}$ corresponds to fraction of molecules which collide with energy less than activation energy.

(D) Activation energy of reaction generally increases with increase in temperature.

The correct statement is :-

(1) A only

(2) B, C and D only

(3) D only

(4) A, B and C only

20) **Assertion** : The probability that more than three molecules taking part in a reaction can collide and react simultaneously is very small.

Reason : For complex reaction, molecularity has no meaning.

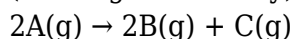
(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

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

(3) Assertion is True but Reason is False.

(4) Both Assertion & Reason are False.

21) The following data were obtained during the first order gaseous reaction at constant volume : (starting with A only)



S.No.	Time(sec.)	Total pressure (atm)
1.	0	2
2.	100	2.5

Calculate the rate constant.

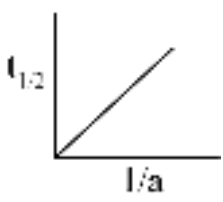
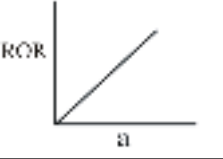
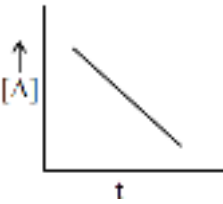
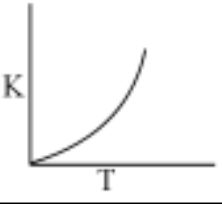
(1) $8 \times 10^{-2} \text{ s}^{-1}$

(2) $7.5 \times 10^{-4} \text{ s}^{-1}$

(3) $6.93 \times 10^{-3} \text{ s}^{-1}$

(4) $6.2 \times 10^{-2} \text{ s}^{-1}$

22) Match the following :-

Column-I		Column-II	
(i)		(P)	Zero order
(ii)		(Q)	First order
(iii)		(R)	Second order
(iv)		(S)	$K = Ae^{-\frac{E_a}{RT}}$

(1) (i)→P, (ii)→Q, (iii)→R, (iv)→S

(2) (i)→S, (ii)→R, (iii)→Q, (iv)→P

(3) (i)→R, (ii)→Q, (iii)→P, (iv)→S

(4) (i)→Q, (ii)→P, (iii)→S, (iv)→R

23) If rate constant is numerically the same for the three reactions of first, second and third order respectively. Assume all the reactions of the kind 'A → products'. Which of the following is correct :

(1) if $[A] = 1$ then $r_1 = r_2 = r_3$

(2) if $[A] < 1$ then $r_1 > r_2 > r_3$

(3) if $[A] > 1$ then $r_3 > r_2 > r_1$

(4) All

24) Which of the following statement is incorrect ?

(1) A catalyst does not alter Gibbs energy, ΔG of a reaction.

(2) A catalyst can catalyses both spontaneous and non-spontaneous reaction.

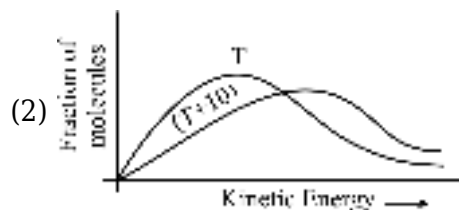
(3) Catalyst does not change the equilibrium constant of the reaction.

(4) Catalyst catalyses the forward and backward reactions to the same extent.

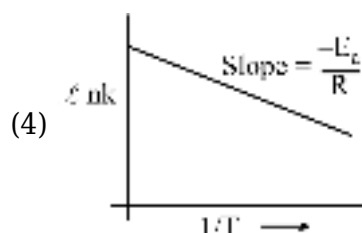
25) According to Arrhenius or Maxwell / Boltzmann

Which is/are incorrect option ?

(1) $\ln k = \frac{-E_a}{RT} + \ln A$



(3) $\log \frac{k_2}{k_1} = \frac{E_a}{2.303R} \left(\frac{1}{T_2} - \frac{1}{T_1} \right)$



26) Which compound have strong affinity towards CO_2

- (1) $\text{Be}(\text{OH})_2$
- (2) KOH
- (3) H_3PO_4
- (4) P_4O_6

27) Which of the following is acidic in nature :-

- (1) MnO_2
- (2) As_2O_3
- (3) TiO_2
- (4) SiO_2

28) In which of the following process maximum energy is released ?

- (1) $\text{N}^-_{(g)} \rightarrow \text{N}_{(g)}$
- (2) $\text{Be}^-_{(g)} \rightarrow \text{Be}_{(g)}$
- (3) $\text{Ne}^-_{(g)} \rightarrow \text{Ne}_{(g)}$
- (4) None of the above

29) Consider the following values of IE(eV) for elements W and X :-

Element	IE ₁	IE ₂	IE ₃	IE ₄
W	10.5	15.5	24.9	79.8
X	8	14.8	78.9	105

Other two elements Y and Z have outer electronic configuration $ns^2 np^4$ and $ns^2 np^5$ respectively. According to given information which of the following compound (s) is/are not possible.

- (a) W_2Y_3 (b) X_2Y_3 (c) WZ_2 (d) XZ_2

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

30) The compound X-O-H is likely to act as a base, if compared to Hydrogen, X has

- (1) Higher Ionisation Potential
- (2) Lower electronegativity
- (3) Lower atomic mass
- (4) Higher electronegativity

31) IE of Be is higher than :-

(A) B (B) Mg (C) Li (D) Al (E) K

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

32) Given that :

IE of F = a kcal/mol

IE of Cl = b kcal/mol

EA of Cl = c kcal/mol

EA of F = d kcal/mol

Then which option is incorrect ?

- (1) $b > a$
- (2) $c > d$
- (3) $a > d$
- (4) $b > c$

33) Which of the following process requires maximum amount of energy ?

- (1) $M_{(g)}^- \rightarrow M_{(g)}$
- (2) $M_{(g)} \rightarrow M_{(g)}^+$
- (3) $M_{(g)}^+ \rightarrow M_{(g)}^{+2}$
- (4) $M_{(g)}^{2+} \rightarrow M_{(g)}^{+3}$

34) Which of the following E.A. order is **not correct**?

- (1) $N < O < S$
- (2) $Cl > O > N > C$
- (3) $O < S < F < Cl$
- (4) $B < C < Si < S$

35) Among the following oxoacids, the correct decreasing order of acid strength is :-

- (1) $\text{HClO}_4 > \text{HClO}_3 > \text{HClO}_2 > \text{HOCl}$
- (2) $\text{HClO}_2 > \text{HClO}_4 > \text{HClO}_3 > \text{HOCl}$
- (3) $\text{HOCl} > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}_4$
- (4) $\text{HClO}_4 > \text{HOCl} > \text{HClO}_2 > \text{HClO}_3$

36) Hypervalent compounds is (are) :

- (i) PCl_5 (ii) SF_6
- (iii) BF_3 (iv) ClF_3

Correct option is :

- (1) i, ii, iii
- (2) ii, iii, iv
- (3) i, ii, iv
- (4) All of these

37) Choose the molecules in which exist in the ground state of central atom

- (i) BCl_3 (ii) NH_3 (iii) PCl_3 (iv) BeF_2

The correct answer is -

- (1) i, ii, iv
- (2) i, ii, iii
- (3) ii, iii
- (4) iii, iv

38) In which of the following pair of compounds $p\pi-p\pi$ bonds are present?

- (1) CO_2 and SiO_2
- (2) SiF_4 and SF_4
- (3) CO_3^{-2} and NO_3^-
- (4) C_2H_6 and CCl_4

39) Which of the following combination of orbitals does not form covalent bond (x-axis is internuclear axis):-

- (1) $p_x + d_{xz}$
- (2) $p_y + p_y$
- (3) $d_{xz} + d_{xz}$
- (4) $d_{yz} + d_{yz}$

40) Which of the following molecule is planar :-

- (1) XeF_2
- (2) PCl_3F_2
- (3) PCl_5

(4) SF_4

41) Match the column I and column II

Column-I (Bond)		Column-II (Bond energy (kJ/mol))	
(A)	C-C	(i)	240
(B)	Si-Si	(ii)	260
(C)	Ge-Ge	(iii)	348
(D)	Sn-Sn	(iv)	297

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

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

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

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

42) The atomic orbitals used by 'As' atom in the formation of ' AsF_5 ' are :-

(1) $d_{x^2-y^2}$, d_{z^2} , p_x , p_y , p_z

(2) d_{xy} , s , p_x , p_y , p_z

(3) s , p_x , p_y , p_z , d_{z^2}

(4) s , p_x , p_y , $d_{x^2-y^2}$, d_{z^2}

43) In which of the following compound ionic, covalent and coordinate bond is present?

(1) H_2SO_4

(2) HNO_3

(3) CaCO_3

(4) KI_3

44) Which reaction involves a change in hybridisation in the under lined element ?

(1) $\underline{\text{B}}\text{F}_3 + \text{F}^- \rightarrow \underline{\text{B}}\text{F}_4^-$

(2) $\underline{\text{N}}\text{H}_3 + \text{H}^+ \rightarrow \text{NH}_4^+$

(3) $2 \underline{\text{S}}\text{O}_2 + \text{O}_2 \rightarrow 2 \underline{\text{S}}\text{O}_3$

(4) $\text{H}_2\underline{\text{O}} + \text{H}^+ \rightarrow \text{H}_3\text{O}^+$

45) A σ -bonded molecule MX_3 is T-shaped. The number of lone pairs of electrons around M is :-

(1) Zero

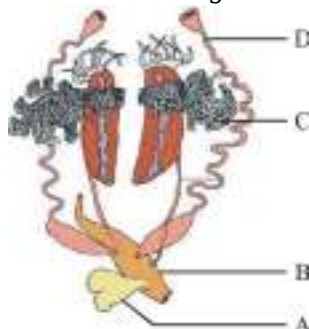
(2) 2

(3) 1

(4) Unpredictable

BIOLOGY

1) Given below is a diagrammatic representation of female reproductive system of frog labelled A, B, C



and D : Find out **incorrect** one :-

- (1) There is functional connection between C and kidney.
- (2) B is small, median chamber that is used to pass faecal matter, urine and ova to the exterior.
- (3) D is one pair arising from the ovaries opens into the cloaca separately.
- (4) A is thin walled urinary bladder is present ventral to rectum which also opens in cloaca.

2) How many pairs of cranial nerves arise from the brain of frog ?

- (1) 12 pairs
- (2) 10 pairs
- (3) 8 pairs
- (4) 9 pairs

3) Match the column-I with column-II

Column-I		Column-II	
(A)	Hibernation	(i)	Winter sleep
(B)	Camouflage	(ii)	The ability to change the colour to hide them from their enemies
(C)	Poikilotherm	(iii)	Cold blooded
(D)	Aestivation	(iv)	Summer sleep

(1)	A-iv	B-ii	C-iii	D-i
(2)	A-i	B-ii	C-iv	D-iii
(3)	A-i	B-ii	C-iii	D-iv
(4)	A-i	B-iii	C-iv	D-ii

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

(4) 4

4) Which one of the following is common in both male and female frog ?

- (1) Urogenital duct
- (2) Vocal sac
- (3) Cloaca
- (4) Copulatory pad

5) Which of the following feature is not found in Indian bull frog ?

- (1) External fertilisation
- (2) Indirect development
- (3) Metamorphosis
- (4) Internal fertilisation

6) Male frog can be distinguished from female frog due to the presence of :-

- (1) Presence of vocal sacs and copulatory pad on the first digit of the forelimb.
- (2) A neck and tail is absent.
- (3) Five digits in hind limbs
- (4) Eyes are bulged and covered by the nictitating membrane.

7) The frog is :-

- (1) Ureotelic animal
- (2) Ammonotellic animal
- (3) Ureotelic animal
- (4) Amminotelic animal

8) Bidder's canal is present in :-

- (1) Testes of frog
- (2) Kidney of male frog
- (3) Kidney of female frog
- (4) Ovary of female frog

9) In frog, the colour of ventral side of body is generally

- (1) Olive green
- (2) Uniform pale yellow
- (3) Dark red
- (4) Spotted pale yellow

10) **Assertion** : Frog show sexual dimorphism

Reason : Only male frog have well-developed vocal sac and copulatory pad

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

11) In frog, the medulla oblongata passes out through the.....(a).... and continues into(b)... (a) and (b) are respectively-

- (1) Spinal cord, foramen magnum
- (2) Spinal cord, vertebral column
- (3) Foramen magnum, Spinal cord
- (4) Vertebral column, spinal cord

12) Which Statement is true (about frogs) :

- (1) Kidney is compact, light red and bean shape structures situated a little posteriorly in the body cavity on only one sides of vertebral column
- (2) Food is captured by the trilobed tongue. Digestion of food takes place by the action of HCl and gastric juices secreted from the walls of the stomach
- (3) Male frogs can be distinguished by the presence of sound producing vocal sacs and also a copulatory pad on the second digit of the fore limbs which are absent in female frogs
- (4) They have the ability of change the colour to hide them from their enemies. This protective coloration is called mimicry.

13) Match the column-I and column-II and select the correct option.

	Column-I		Column-II
(a)	Sensory Papillae	(p)	Hearing
(b)	Nasal epithelium	(q)	Touch
(c)	Test Buds	(r)	Smell
(d)	Tympanum	(s)	Taste

- (1) (a)-q, (b)-r, (c)-s, (d)-p
- (2) (a)-q, (b)-r, (c)-p, (d)-s
- (3) (a)-r, (b)-q, (c)-s, (d)-p
- (4) (a)-q, (b)-s, (c)-q, (d)-p

14) Which of the following statement is correct in reference to frog?

- (I) Eyes are bulged and covered by nictitating membrane
- (II) Membranous tympanum receives the sound signals
- (III) The frog never drinks water
- (IV) A pair of nostrils is present above the mouth

- (1) I and II

- (2) III and IV
 (3) I and IV
 (4) All of these

15) How many statements are **true** in the following?

- (i) Simple epithelium forms lining for body cavities, ducts and tubes.
 (ii) In epithelial tissue, cells are loosely packed with little intercellular matrix.
 (iii) Simple epithelium provide protection against chemical and mechanical stresses.
 (iv) Gap junction perform cementing to keep neighbouring cells together.

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

16) In the given four statements, select the options which includes all the correct ones :-

- (a) Secretory duct is present in endocrine glands and secretes hormones
 (b) Mammary glands are exocrine glands
 (c) Sweat gland is exocrine gland
 (d) Bone has no collagen fibres

Option :-

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

17) Match the column I, II and III :-

	Column-I		Column-II		Column-III
(i)	Fibroblast	(a)	Serotonin	(1)	Scavanger cells
(ii)	Plasma cell	(b)	Largest cell	(2)	Clone of lymphocyte
(iii)	Mast cell	(c)	Cart wheel cell	(3)	Vaso constrictor
(iv)	Macrophages	(d)	Kidney shaped nucleus	(4)	Matrix producing cells

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

18) Read the following (A-D) statements :-

- (A) Connective tissue are most abundant and widely distributed in the body of complex organism.
 (B) Connective tissue helps in linking and supporting other tissue or organs in the body.
 (C) Adipose tissue is a type of dense connective tissue.
 (D) Connective tissue does not secrete its matrix.


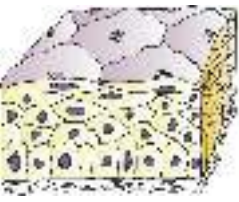
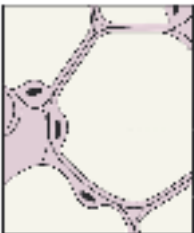

Choose the incorrect statements :

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

19) Ciliated epithelium present in :-

- (1) Fallopian tube
- (2) Pharynx
- (3) Stomach
- (4) Urinary bladder

20) Choose the correct match :-

(1)		Squamous epithelium
(2)		Simple epithelium
(3)		Adipose tissue
(4)		Areolar tissue

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

21) Cells of tubular part of nephrons are?

- (1) Columnar

- (2) Cuboidal
- (3) Flat
- (4) Squamous

22) Histamine is meant for :

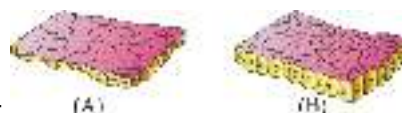
- (1) Vasodilation
- (2) Lowering B.P.
- (3) Regulation of B.P.
- (4) All of these

23) Which is not made up of elastic cartilage :

- (1) Epiglottis
- (2) Ear pinna
- (3) Larynx
- (4) Eustachian tube

24) PCT of nephron is lined by :-

- (1) Pseudostratified epithelium
- (2) Stratified cuboidal epithelium
- (3) Brush border cuboidal epithelium
- (4) Non ciliated stratified columnar epithelium



25) Select the correct option about given diagram:-

- (1) B = columnar epithelium - for protection and cover the dry surface of the skin
- (2) B = squamous epithelium - found in tubular part of nephron
- (3) A = squamous epithelium - found in wall of blood vessels
- (4) A = cuboidal epithelium - found in air sac of lungs

26) How many of the following has compound epithelium-stomach, Alveoli, Bowman's capsule, inner lining of buccal cavity, secretory duct of sweat gland.

- (1) one
- (2) two
- (3) three
- (4) four

27) Which one is the wrong statement about the "bones" ?

- (1) The bone-marrow in some bones is the site of production of blood-cells.
- (2) Bones have solid and pliable ground substance.

- (3) Matrix of bones is rich in Ca^{+2} salts and collagen fibres.
 (4) Bone cells are present in the spaces called lacunae.

28) Tissue present beneath the skin is/are ?

- (1) Dense regular connective tissue
 (2) Areolar tissue
 (3) Adipose tissue
 (4) Both (2) and (3)

29) Tendon is made up of

- (1) yellow fibrous connective tissue
 (2) modified white fibrous connective tissue
 (3) areolar tissue
 (4) adipose tissue

30) The epithelium found in walls of blood vessels and air sacs is :-

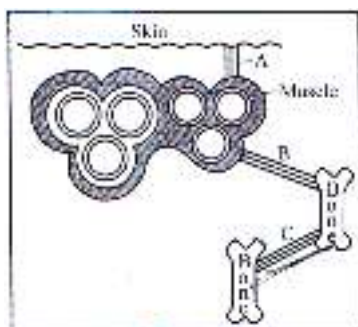
- (1) Columnar epithelium
 (2) Squamous epithelium
 (3) Ciliated squamous epithelium
 (4) Ciliated cuboidal epithelium

31) If the inner lining of cheeks are scratched with forcep, then which type of cells are visible in microscope ?

- (1) Cuboidal
 (2) Columnar
 (3) Squamous
 (4) Ciliated squamous

32)

Identify the tissues A, B and C :



	A	B	C
--	----------	----------	----------

(1)	Areolar connective tissue	Ligament	Tendon
(2)	Areolar connective tissue	Tendon	Tendon
(3)	Adipose connective tissue	Tendon	Ligament
(4)	Areolar connective tissue	Tendon	Ligament

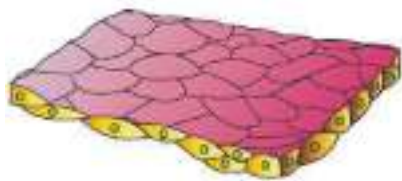
- (1) 1
 (2) 2
 (3) 3
 (4) 4

33) In which of the following simple epithelium is present :-

- (A) Lining of body cavities
 (B) PCT
 (C) Lining of blood vessels
 (D) Walls of alveoli of lungs
 (E) Pancreatic duct

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

34) Identify the type of epithelial tissue shown below as well as the related right place of its occurrence in our body along with its correct function and select the correct option for the two



together ?

	Type of epithelial Tissue	Occurance & its function
(1)	Simple squamous Epithelium	- Found in wall of blood vessels and air sacs of lungs. - Function-forming a diffusion boundary

(2)	Simple cuboidal epithelium	- Found in wall of ducts of gland - Function-diffusion and excretion
(3)	Simple columnar epithelium	- Found in wall of nephrones and wall of ducts of glands - Function-secretion and Absorption
(4)	Simple squamous epithelium	- Found in wall of stomach and intestine - Function-absorption and secretion

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

35) In cockroach a ring of 6-8 blind tubules called hepatic or gastric caeca is present at the junction of :-

- (1) Foregut and Hindgut
 (2) Hindgut and midgut
 (3) Midgut and foregut
 (4) All of the above

36) Which of following is not a part of male cockroach ?

- (1) Titillator
 (2) Phallomeres
 (3) Collateral glands
 (4) Pseudopenis

37) In cockroach, the ootheca is formed by the secretion of :-

- (1) Phallic gland
 (2) Uricose gland
 (3) Collateral gland
 (4) Mushroom gland

38) Choose the statement which is not correct for cockroach?

- (1) Blood vascular system of cockroach is a closed type.
 (2) The abdomen in both males and females consists of 10 segments.
 (3) On an average female produce 9-10 oothecae.
 (4) Malpighian tubules help in excretion.

39) Arthrodial membrane in cockroach is associated with :

- (1) Sclerites
- (2) wall of gizzard
- (3) ventral septum and connect the septum with heart and legs.
- (4) tracheal chamber

40) Spiracles found in cockroach are :-

- (1) 2 pairs in thorax and 8 pairs in abdomen
- (2) 2 pairs in thorax and 10 pairs in abdomen
- (3) 8 pairs in thorax and 2 pairs in abdomen
- (4) 2 pairs in thorax and 4 pairs in abdomen

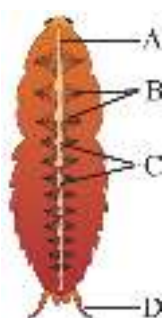
41) How many are **correct** statements about cockroach?

- (A) The abdomen in both males and females consists of 10 segments
- (B) Cockroach is nocturnal and omnivorous animal
- (C) Anal cerci present in both males and females
- (D) Hepatic caecae are the excretory organs of cockroach
- (E) Anal styles are present in both males and females

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

42)

In the diagram given below, identify the parts labelled as A, B, C & D and select the right option about them.



	Part-A	Part-B	Part-C	Part-D
(1)	Anterior aorta	Heart chambers	Alary muscles	Anal cerci
(2)	Anal cerci	Alary muscles	Heart chambers	Anterior aorta
(3)	Anterior aorta	Alary muscles	Heart chambers	Anal cerci

(4)	Heart chambers	Anal cerci	Anterior aorta	Alary muscles
-----	----------------	------------	----------------	---------------

(1) 1

(2) 2

(3) 3

(4) 4

43) **Statement-I :-** In frog, eyes and internal ears are well organised structures.

Statement-II :- Sensory papillae, taste buds and nasal epithelium are cellular aggregation around nerve endings.

(1) Both statement I and statement II are incorrect

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

(3) Statement I is incorrect but statement II is correct

(4) Both statement I and statement II are correct

44) **Statement - I :** Cockroach eyes consist of several ommatidia. So they receive several images of an object.

Statement - II : Mosaic vision is present in cockroach with more sensitivity but less resolution.

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

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

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

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

45) **Statement-I :** Connective tissue which is found in tendon have fibroblasts present in rows between many parallel bundles of fibers

Statement-II : In dense regular connect tissue fibers and fibroblasts are oriented differently
Select the correct option -

(1) Statement-I is correct and statement-II is incorrect

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

(3) Both statement-I and statement-II are correct

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

46)

Multicellular chlorophyll bearing, autotrophic, simple thalloid mostly aquatic organism are placed in :

(1) Algae

(2) Bryophyta

(3) Pteridophyta

(4) Angiosperm

47) Isogamy with non-flagellated gametes is observed in:

- (1) *Ectocarpus*
- (2) *Porphyra*
- (3) *Spirogyra*
- (4) *Ulothrix*

48) Which of the following is not correctly matched?

- (1) *Ectocarpus*: Simple branched filamentous brown algae
- (2) *Fucus*: Multicellular brown algae in which fertilization occurs inside oogonium
- (3) *Chlorella*: Unicellular algae classified in Kingdom Protista by Linnaeus
- (4) *Volvox*: Colonial green algae



49) Which of the following is true regarding the given figure?

- (1) It shows oogamy with flagellated male gametes
- (2) It produces zoospore during sexual reproduction
- (3) Due to pre dominance of r- phycoerythrin its thallus is red in colour
- (4) 1 and 2 both

50) Chlorophyll a, chlorophyll c and fucoxanthin is commonly present in :

- (1) Green algae
- (2) Brown Algae
- (3) Red algae
- (4) Blue green algae

51) **Assertion (A)** : Bryophytes are of great ecological importance

Reason (R) : Mosses along with the lichens are the first organism to colonise rocks and decompose rocks making substrate suitable for the growth of higher plants

- (1) A and R both are true and R explain A
- (2) A is true but R is false
- (3) A and R both are true and R does not explain A
- (4) A and R both are false

52) Archegonium and antheridium in Pteridophyta are:

- (1) Multicellular and jacketless
- (2) Unicellular and jacketed
- (3) Multicellular and Jacketed
- (4) Unicellular and jacketless

53) The second stage of gametophyte in *Sphagnum* is :

- (1) Primary protonema
- (2) Leafy gametophyte
- (3) Dorsiventral thalloid
- (4) Underground rhizome

54) Which of the following is true regarding gemma?

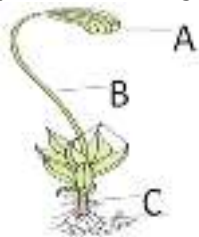
- (1) Unicellular
- (2) Green non photosynthetic
- (3) Observed in *Marchantia*
- (4) Sexual bud

55) **Statement A:** Spore producing gametophyte is the main plant body of bryophytes

Statement B: Main plant body of Bryophyta produces spore by the mitosis

- (1) Statement A and B both are false
- (2) Only statement A is true
- (3) Only Statement B is true
- (4) Statement A and B both are true

56) Study the following diagram carefully and identify the structure which produces spores by



meiosis:

- (1) A: Capsule
- (2) B: Seta
- (3) C: Stem
- (4) B: capsule

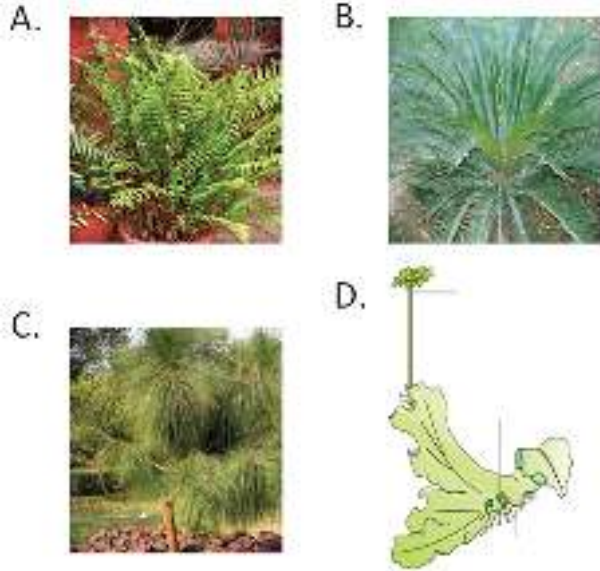
57) Which of the following is heterosporous fern?

- (1) *Selaginella*
- (2) *Salvia*
- (3) *Salvinia*
- (4) *Adiantum*

58) The leaves of Pteridophyta are microphylls as in ...a...or macrophylls as inb..

- (1) A: *Selaginella*; B *Lycopodium*
- (2) A: *Selaginella*; B *Salvia*
- (3) A: *Selaginella*; B Ferns
- (4) A: Ferns; B *Selaginella*

59) Which of the following do not require water for fertilization?



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

60) Following fertilization, the zygote produce embryo in :

- (1) *Polysiphonia*
- (2) *Chara*
- (3) *Porphyra*
- (4) *Marchantia*

61) The highly reduced male gametophyte in Gymnosperm is known as :

- (1) Pollen grain
- (2) Male gamete
- (3) Antherozoid
- (4) Ovule

62) Few stages of life cycle of moss is given below. Arrange these events in correct order starting from sex organ bearing structure and select the correct option from option given below

- A: Protonema B: Leafy gametophyte
C: Spore formation D: Spore germination

E: Fertilization F: Sporophyte

- (1) $B \rightarrow A \rightarrow C \rightarrow D \rightarrow E \rightarrow F$
- (2) $B \rightarrow E \rightarrow D \rightarrow C \rightarrow A \rightarrow F$
- (3) $A \rightarrow B \rightarrow E \rightarrow F \rightarrow C \rightarrow D$
- (4) $B \rightarrow E \rightarrow F \rightarrow C \rightarrow D \rightarrow A$

63) Match the Column I with Column II

Column I		Column II	
A.	<i>Cedrus</i>	P.	Gymnosperm
B.	<i>Polytrichum</i>	Q.	Bryophyta
C.	<i>Psilotum</i>	R.	Pteridophyta
D.	<i>Chara</i>	S.	Algae

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

64) Prothallus is

- a. Multicellular
- b. Gametophyte
- c. Usually heterotrophic
- d. Usually dioecious

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

65) Male and female gametophyte do not have independent existence in :

- (1) *Ginkgo*
- (2) *Funaria*
- (3) *Pteris*
- (4) *Polytrichum*

66) Male gametes in typical gymnosperms are released at mouth of archegonia by :

- (1) Water
- (2) Air
- (3) Pollen tube
- (4) All of the above

67) Precursor events to seed habit is observed in :

- (1) *Salvinia*
- (2) *Selaginella*
- (3) *Marchantia*
- (4) 1 and 2 both

68) Which of the following is not associated with naked seed plant?

- (1) fruit formation
- (2) Heterospory
- (3) Seed formation
- (4) Archegonia

69) Archegonia and antheridium both are present in:

- (1) Algae and Bryophyta
- (2) Bryophyta and Pteridophyta
- (3) Bryophyta, Pteridophyta and Gymnosperm
- (4) Algae, Bryophyta and Pteridophyta

70) Which of the following is a dioecious Bryophyta?

- (1) *Marchantia*
- (2) *Funaria*
- (3) *Sphagnum*
- (4) *Pteris*

71) **Assertion (A)** : *Cycas* is a dioecious plant while *Pinus* is a monoecious plant

Reason (R) : Male cone and female cone are present on same tree in *Pinus* while male cone and female cone is present on different tree in *Cycas*

- (1) A and R both are true and R explain A
- (2) A is true but R is false
- (3) A and R both are true and R does not explain A
- (4) A and R both are false

72) Study the following table carefully and identify the correct match and select the correct option from options given below :

	Plant group	Life cycle	Meiosis
A	Bryophyta	Haplodiplontic	Sporic
B	Gymnosperm	Diplontic	Gametic
C	Algae	Haplontic	Gametic
D	Gymnosperm	diplontic	Sporic

- (1) A, B and C

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

73) Which of the following statement is true regarding gymnosperm?

- (1) Gymnosperms are usually herb and medium to large sized tree
(2) One cell of nucellus modifies in megaspore mother cell and produce megaspore tetrad after mitosis
(3) Two or more archegonia is present in female gametophyte present inside the ovule
(4) Male and female gametophyte have their independent existence

74) Match the column I with column II and select the correct option from options given below :

Column I		Column II	
A.	<i>Sphagnum</i>	P.	Agar-agar
B.	<i>Gracillaria</i>	Q.	Food
C.	<i>Chlorella</i>	R.	Used by Space travellers
D.	<i>Sargassum</i>	S.	Trans-shipment of living specimen

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

75) **Two statements 1 and 2 are given below :**

Statement 1 : Fungi, and members of the Monera and Protista having cell walls have now been excluded from Plantae, though earlier classification given by Whittaker placed them in the same kingdom

Statement 2 : The earliest systems of scientific classification were based mainly on vegetative characters or on the androecium structure. Such systems were artificial and separated the closely related species.

- (1) Statement 1 and 2 both are false
(2) Only statement 1 is true
(3) Only Statement 2 is true
(4) Statement 1 and 2 both are true

76) Rhizoids of *Funaria* are :

- (1) Unicellular and unbranched
(2) Multicellular and branched
(3) Multicellular and unbranched
(4) Unicellular and branched

77) Which of the following is not a moss?

- (1) *Funaria*
- (2) *Polytrichum*
- (3) *Marchantia*
- (4) *Sphagnum*

78) Pinnately compound leaf containing unbranched stem is observed in :

- (1) *Cycas*
- (2) *Cedrus*
- (3) *Gingko*
- (4) 1 and 3 both

79) All of the following have motile male gametes except :

- (1) *Adiantum*
- (2) *Funaria*
- (3) *Fucus*
- (4) *Gracillaria*

80) Ovule of gymnosperm is equivalent to:

- (1) Archegonia
- (2) Endosperm
- (3) Microsporangia
- (4) Megasporangia

81) Cilia and flagella are completely absent in life cycle of :

- (1) Red algae
- (2) Bryophyta
- (3) Pteridophyta
- (4) Red algae and Pteridophyta

82) Most common type of asexual spore in algae is

- (1) Zoospore
- (2) Aplanospore
- (3) Zygote
- (4) Antherozoid

83) Pyrenoids in algae contains:

- (1) proteins besides fats
- (2) Proteins besides starch
- (3) Lipids besides starch
- (4) Lipid, proteins and starch

84) Dominant diploid generation is common feature of:

- (1) Bryophyta
- (2) Bryophyta and Pteridophyta
- (3) Bryophyta, Pteridophyta and Gymnosperm
- (4) Pteridophyta, Gymnosperm and Angiosperm

85) Which of the following is not associated with brown algae :

- (1) Presence of two lateral flagella in male gametes
- (2) Fusion of gametes occur in water or inside archegonium
- (3) Some of the members form massive plant body
- (4) Some members are used as food

86) Evolutionary first plants to have vascular tissues are:

- (1) Bryophyta
- (2) Pteridophyta
- (3) Gymnosperm
- (4) Algae

87) Antheridium and archegonium in Bryophyta and Pteridophyta are present on:

- (1) Gametophyte and sporophyte respectively
- (2) Sporophyte and sporophyte respectively
- (3) Gametophyte and gametophyte respectively
- (4) Sporophyte and gametophyte respectively

88) How many of the following plants show oogamy?

Volvox, Ulothrix, Pteris, Pinus, Fucus, Chara, Ectocarpus, Funaria, Cedrus, Eudorina, Sargassum

- (1) Eight
- (2) Seven
- (3) Nine
- (4) Four

89) The female gametophytes are retained on parental sporophyte for variable time period in :

- (1) *Equisetum*
- (2) *Marchantia*
- (3) *Selaginella*
- (4) *Chara*

90) Coralloid roots with nitrogen fixing cyanobacteria are present in :

- (1) *Cycas*

- (2) *Pinus*
- (3) *Cedrus*
- (4) *Gingko*

ANSWER KEYS

PHYSICS

Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A.	2	1	1	1	3	3	3	3	4	2	4	3	4	1	1	3	1	1	1	2
Q.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A.	4	4	2	4	2	1	2	2	4	3	1	1	1	4	2	2	3	2	2	2
Q.	41	42	43	44	45															
A.	1	1	3	1	3															

CHEMISTRY

Q.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
A.	1	2	2	3	2	1	2	1	4	2	1	2	3	2	3	2	2	1	1	2
Q.	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
A.	3	3	4	2	3	2	4	3	2	2	4	1	4	2	1	3	3	3	1	1
Q.	86	87	88	89	90															
A.	3	3	4	1	2															

BIOLOGY

Q.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
A.	1	2	3	3	4	1	1	2	2	2	3	4	1	4	4	2	1	3	1	3
Q.	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
A.	2	4	3	3	3	2	2	4	2	2	3	4	2	1	3	3	3	1	1	1
Q.	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
A.	3	3	4	4	1	1	3	3	1	2	1	3	2	3	1	1	3	3	2	4
Q.	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170
A.	1	4	1	2	1	3	4	1	2	1	2	4	3	2	3	2	3	1	4	4
Q.	171	172	173	174	175	176	177	178	179	180										
A.	1	1	2	4	2	2	3	1	3	1										

SOLUTIONS

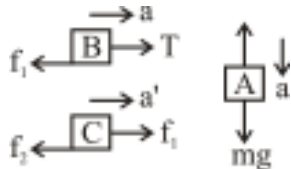
PHYSICS

1) For A & B

$$20 - T = 2a$$

$$T - 8 = 2a$$

$$\Rightarrow a = 3 \text{ m/s}^2$$



For C $f_1 = 8\text{N}$

$$f_1 - f_2 = ma^1 \quad f_2 = 4\text{N}$$

$$8 - 4 = 2a^1$$

$$\Rightarrow a^1 = 2 \text{ m/s}^2$$

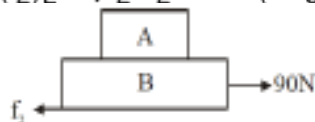
$$2) \frac{g \sin \theta}{g \sin \theta - \mu g \cos \theta} = \frac{2}{1}, \theta = 45^\circ$$

$$\frac{1}{1 - \mu} = \frac{2}{1} \Rightarrow \mu = 0.5$$

Hence option (1)

3) **Step 1:** Draw the FBD of the combined blocks system.

$$(f_2)_L = \mu_2 N_2 = 0.2 (25g) = 50\text{N} (\because N_2 = 25g)$$



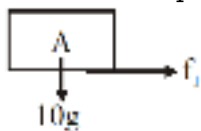
Since $90 \text{ N} > 50\text{N}$, net unbalanced forces appear and hence movement begins.

Step 2: Assuming that both the blocks move together, their combined acceleration is

$$a_c = \frac{90 - 50}{25} = 1.6 \text{ m/s}^2$$

Draw the FBD of block A (on which externally applied force does not act).

The force required is $f_1 = m_A a_c = 10 \times 1.6 = 16 \text{ N}$



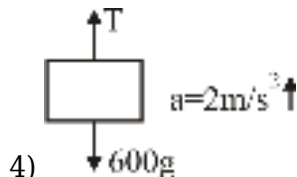
$$\text{Now, } (f_1)_L = m_1 N_1 = 0.4 (10g) = 40 \text{ N.}$$

Clearly, $f_1 < (f_1)_L$

□ The frictional force is strong enough to support the combined motion.

□ Common acceleration is $a_c = 1.6 \text{ m/s}^2$ and

$$f_1 = 16 \text{ N and } f_2 = 50 \text{ N}$$



4)

$$T - 6000 = 600 \times 2$$

$$T \approx 6000 + 1200 \approx 7200$$

5) $ma = \mu_s mg$
 $\mu_s = 0.5$

6) If man slides down with some acceleration then its apparent weight decreases. For critical condition rope can bear only $\frac{2}{3}$ of his weight. If a is the minimum acceleration then, Tension in the rope $= m(g - a) = \text{Breaking strength}$

$$\Rightarrow m(g - a) = \frac{2}{3}mg \Rightarrow a = g - \frac{2g}{3} = \frac{g}{3}$$

7) For given condition we can apply direct formula $\ell_1 = \left(\frac{\mu}{\mu + 1} \right) \ell$

8) 1. Question Explanation

A block is subjected to frictional force when an external force is applied. Given different values for friction force, we need to determine the correct force acting on the block

2. Concept-Based

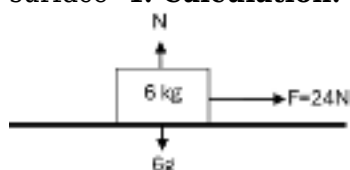
The problem is based on frictional force, which opposes motion. The friction force is given by Friction = Normal Force x Coefficient of Friction (static or kinetic, depending on motion).

3. Formula Used:

$$F_f = \mu N$$

Where: F_f = Friction force μ = Coefficient of friction N = Normal force (mg) for a horizontal surface

4. Calculation:



$$N = 6g = 60\text{N}$$

$$\text{So limiting friction } F_f = \mu_s N = 0.6 \times 60 = 36$$

□ Applied force is less than limiting f , so block will not move and friction will equal to applied force

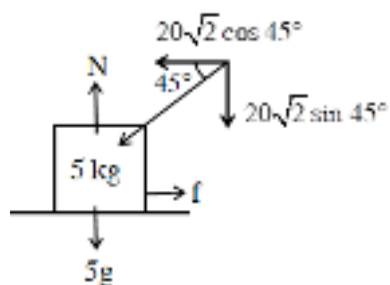
$$\text{so, } f = 24\text{ N}$$

Correct answer (3)

9)

$f_L > mg \sin\theta$, so tension in string is zero.

10)

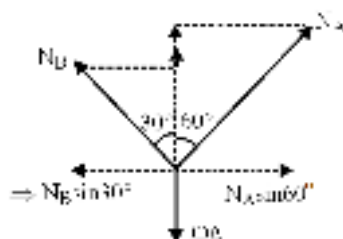
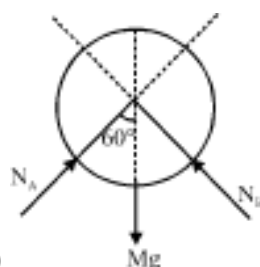


$$N = 5g + 20\sqrt{2} \sin 45^\circ = 70$$

$$f_0 = \mu N = 0.5 \times 70 = 35 \text{ N}$$

$$\text{as } 20\sqrt{2} \cos 45^\circ < f_\ell$$

thus the block remains at rest.



11)

$$N_A \sin 60^\circ = N_B \sin 30^\circ$$

$$N_A \cdot \frac{\sqrt{3}}{2} = N_B \cdot \frac{1}{2}$$

$$\sqrt{3}N_A = N_B$$

$$\boxed{\sqrt{3}N_A = N_B}$$

12)

$$6g - T = 6a \quad \dots(i)$$

$$T = 4a \quad \dots(ii)$$

$$\square 6g = (6 + 4)a$$

$$\square a = \frac{6g}{10} = \frac{6 \times 10}{10} = 6 \text{ ms}^{-2}$$

$$13) a = \frac{(m_1 - m_2)g}{m_1 + m_2} = \frac{(5 - 3)g}{5 + 3} \Rightarrow g/4$$

$$\begin{aligned} & \begin{array}{|c|c|c|} \hline s & t & t \\ \hline 3 \text{ m/s} & 4.5 \text{ m/s} & 7.5 \text{ m/s} \\ \hline \end{array} \\ & \quad \quad \quad \underbrace{\hspace{10em}} \\ & \quad \quad \quad v = \frac{4.5 + 7.5}{2} = 6 \text{ m/s} \\ & \quad \quad \quad \underbrace{\hspace{10em}} \\ & 14) \quad v_{cm} = \frac{2(3)(6)}{4+6} = \frac{36}{9} = 4 \text{ m/s} \end{aligned}$$

$$15) \quad \vec{S} = 40\hat{j} + 30\hat{i} + 30\sqrt{2} \left(\frac{-\hat{i} - \hat{j}}{\sqrt{2}} \right)$$

$$= (10\hat{j}) \text{ m}$$

□ Displacement = 10 m, North

16)

$$\because 2\pi r \times N = v \times t$$

$$\therefore 2\pi \times 5 \times N = 7\pi \times 5$$

$$\square N = 3.5 \text{ rev.}$$

$$\text{So, } v_{\text{avg}} = \frac{\text{displacement}}{\text{time}} = \frac{2r}{7\pi} = \frac{10}{7\pi} \text{ m/s}$$

$$17) \sqrt{x} = t + 1$$

$$x = (t + 1)^2$$

$$v = \frac{dx}{dt} = 2(t + 1)$$

Velocity increases with time.

$$18) \vec{r} = (t^2 - 4t + 6)\hat{i} + t^2\hat{j}$$

$$\vec{v} = \frac{d\vec{r}}{dt} = (2t - 4)\hat{i} + 2t\hat{j}$$

$$\vec{a} = \frac{d\vec{v}}{dt} = 2\hat{i} + 2\hat{j}$$

$$\vec{a} \cdot \vec{v} = 0$$

$$4t - 8 + 4t = 0$$

$$t = 1 \text{ sec}$$

$$19) x = 9t^2 - t^3$$

Position when maximum speed means acceleration is zero.

$$V = \frac{dx}{dt} = 18t - 3t^2$$

$$a = \frac{dV}{dt} = 18 - 6t$$

$$\text{For } a = 0, 18 - 6t = 0, t = 3$$

At $t = 3$ s speed is maximum

$$\text{then position } x = 9 \times 3^2 - 3^3 = 54 \text{ m}$$

20)

$$x = t^2 - 3t + 4$$

$$V = \frac{dx}{dt} = 2t - 3$$

for rest

$$V = 0$$

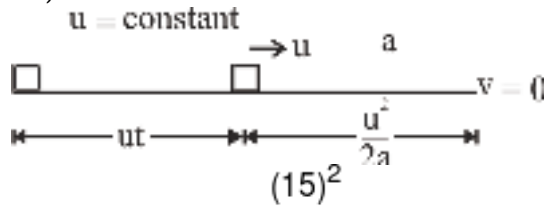
$$2t - 3 = 0$$

$$t = 3/2 \text{ sec}$$

$$a = \frac{dv}{dt} = 2 \text{ m/s}^2$$

Acceleration does not depend on time.

21) Reaction time = 0.4 sec



$$s = (15)(0.4) + \frac{(15)^2}{2 \times 5} = 28.5 \text{ m}$$



22)

$$v = u + at$$

$$0 = 50 - 25 t$$

$$t = 2 \text{ sec}$$

$$d = 100 \text{ m}$$

$$d = 2 \left(\frac{50+0}{2} \right) \times 2 = 100 \text{ m}$$

$$23) P = \frac{dQ}{dt} = kA \frac{\Delta T}{\ell}$$

$$1000 = \frac{0.2(5)(T-25)}{4 \times 10^{-2}}$$

$$T-25 = \frac{4 \times 10}{0.2 \times 5} = 40$$

$$T = 65^\circ \text{C}$$

24) **Explanation :**

We need to determine the ratio of heat flow I_A / I_B for two rods with thermal conductivities in the ratio 1:2 in the following configurations:

- Configuration A: The rods are in series (Rod of conductivity K and rod of conductivity $2K$).
- Configuration B: The rods are in parallel (Rod of conductivity K and rod of conductivity $2K$).

Concept

Based on Thermal Conductivity in Series and Parallel Heat Flow

Formula Used

- For series connection

$$\frac{2}{K_{eq}} = \left[\frac{1}{K} + \frac{1}{2K} \right]$$

- For parallel connection

$$K_{eq} = K + 2K$$

- Heat flow equation

$$Q = \frac{KA(T_1 - T_2)}{L}$$

Calculation

- For series configuration A :

$$\frac{2}{K_{eq}} = \frac{1}{K} + \frac{1}{2K} = \frac{2+1}{2K} = \frac{3}{2K}$$

$$K_{eq} = \frac{2K}{3}$$

$$I_A = \frac{\left(\frac{2K}{3}\right) A (T_1 - T_2)}{L}$$

- For parallel configuration B :

$$K_{eq} = 3K$$

$$I_B = \frac{(3K)A (T_1 - T_2)}{L}$$

- Ratio of heat flow :

$$\begin{aligned} \frac{I_A}{I_B} &= \frac{\frac{2K}{3}A (T_1 - T_2) / L}{3KA (T_1 - T_2) / L} \\ &= \frac{2K}{3} \times \frac{1}{3K} = \frac{2}{9} \end{aligned}$$

Alternative solution:

$$R_{th} = \frac{1}{K} \frac{\rho}{A} \Rightarrow R \propto \frac{1}{K}$$

For two rods (dimensions being same)

$$\text{If } R_A = R, \quad R_B = \frac{R}{2}$$

$$\text{In first combination } R_{eq1} = \frac{3R}{2}$$

In second combination

$$R_{eq2} = \frac{(R)(R/2)}{R + R/2} \Rightarrow R_{eq2} = \frac{R}{3}$$

$$\text{Heat flow} \propto \frac{1}{R}$$

Heat flow

$$\frac{I_A}{I_B} = \frac{R_{eq2}}{R_{eq1}} = \frac{R}{3} \frac{2}{3R}$$

$$\frac{I_A}{I_B} = \frac{2}{9}$$

$$25) \Rightarrow -\frac{dT}{dx} = \frac{T_1 - T_2}{L}$$

$$80 = \frac{30 - T_2}{0.5}$$

$$T_2 = -10^\circ\text{C}$$

26)

$$T_A = 327 + 273 = 600 \text{ K}, \quad T_B = 627 + 273 = 900 \text{ K}$$

$$\text{Area} \propto T^4$$

$$\square \quad \frac{T_B}{T_A} = \left(\frac{900}{600}\right)^4 = \left(\frac{3}{2}\right)^4 = \frac{81}{16}$$

$$27) Q = \sigma AT^4 t$$

$$Q \propto R^2 T^4$$

$$\frac{(Q)_1}{(Q)_2} = \frac{R^2}{10^4 R^2} \times \frac{T^4}{T^4} \times 16$$

$$Q_2 = \frac{10^4}{16} Q = 625Q$$

$$28) \frac{94 - 86}{2} = K \left(\frac{94 + 86}{2} - 20 \right)$$

$$4 = K(70) \quad \dots(1)$$

$$\text{and } \frac{71 - 69}{t} = K \left(\frac{71 + 69}{2} - 20 \right)$$

$$\frac{2}{K \cdot 50} = t$$

$$\text{or } t = \frac{2 \times 70}{4 \times 50} \times 60$$

$$= 42 \text{ sec.}$$

$$29) E = \sigma T^4$$

$$R = \sigma \left(\frac{b}{\lambda_m} \right)^4$$

$$\left(\frac{R}{\sigma} \right)^{1/4} = \frac{b}{\lambda_m}$$

$$\lambda_m = b \left(\frac{\sigma}{R} \right)^{1/4}$$

$$30) PV = \mu RT$$

V & T are constant

$$\frac{P}{\mu} = \text{constant}$$

$$\mu_1 = \mu_{N_2}$$

$$\frac{P_1}{\mu_1} = \frac{P_2}{\mu_2} \Rightarrow \frac{6}{\frac{35000}{28}} = \frac{9}{\mu_2}$$

$$\mu_2 = \frac{35000}{28 \times 6} \times 9$$

$$\mu_2 = \mu_{N_2} + \mu_{O_2} = \frac{35 \times 9}{28} \times 10^3 \times 6$$

$$\mu_{O_2} = \frac{35 \times 9 \times 10^3}{28 \times 6} - \frac{35 \times 10^3}{28}$$

$$\frac{M}{M_w} = \frac{35 \times 10^3}{28} \times \left(\frac{3}{6} \right)$$

$$M = 32 \times \frac{35 \times 10^3}{28} \times \frac{1}{2} = 20 \times 10^3 \text{ gm} = 20 \text{ kg}$$

$$31) \frac{P}{\rho} = \frac{RT}{M_w}$$

$$P = \frac{RT}{M_w} \rho$$

$$y = mx$$

$$\text{Slope} \propto T$$

$$m_1 > m_2 \Rightarrow T_1 > T_2$$

$$32) V_{r.m.s.} \propto \sqrt{T}$$

$$\frac{v_2}{v_1} = \sqrt{\frac{1200}{300}}$$

$$v_2 = 2v_1$$

$$33) E \propto T(k)$$

$$\frac{E}{2E} = \frac{205}{T}$$

$$T = 410 \text{ K}$$

$$= 137^\circ$$

34) Since $W = 0$ So process Isochoric

$$\Delta Q = \mu C_v dT$$

$$= 4 \times \frac{5}{2} \times 50$$

$$= 500 \text{ R}$$

35) Work done = Area

$$= \frac{1}{2} \times 3 \times 300 = 450 \text{ J}$$

36) Heat is rejected by gas

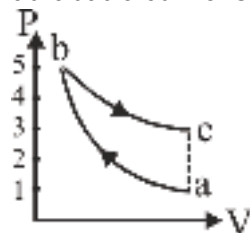
$$Q = W \quad (\text{for isothermal process } \Delta U = 0)$$

when gas compressed $V \downarrow$, $\Delta V = -ve$

$$W = -ve$$

$$Q = -ve \text{ (heat rejected)}$$

37) First of all, the air is compressed adiabatically, it is represented by curve ab in the figure. bc represents the isothermal expansion to its original volume. It is to be noted that the adiabatic curve is steeper than the isothermal curve.



38) Given $TV^x = \text{constant}$

$$\text{From AD : } TV^{x-1} = \text{constant}$$

$$\text{On comparing } \gamma - 1 = x \quad (\gamma = \frac{7}{5} \text{ for diatomic})$$

$$X = \frac{7}{5} - 1 = \frac{2}{5}$$

$$39) \omega = \sqrt{\text{coefficient of } x \div \text{coefficient of } \frac{d^2x}{dt^2}}$$

$$\omega = \sqrt{320/4} \text{ so, } \omega = \sqrt{80}$$

40)

$$y = a \sin(2\omega t)$$

$$\frac{2\pi}{T} = 2\omega$$

$$T = \frac{\pi}{\omega}$$

SHM

41)

Acceleration should be proportional to the displacement and should be in opposite direction of displacement.

$$42) y_1 = 6 \cos\left(6\pi t + \frac{\pi}{6}\right)$$

$$A_1 = 6 \text{ \& } \omega_1 = 6\pi$$

$$y_2 = 3 \left[\sqrt{3} \sin(3\pi t) + \cos(3\pi t) \right]$$

$$y_2 = 3 \times 2 \left[\frac{\sqrt{3}}{2} \sin(3\pi t) + \frac{1}{2} \cos(3\pi t) \right]$$

$$y_2 = 6 \sin\left(3\pi t + \frac{\pi}{6}\right)$$

$$\Rightarrow A_2 = 6 \text{ \& } \omega_2 = 3\pi$$

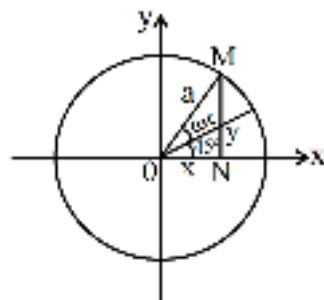
$$\frac{A_1}{A_2} = 1$$

$$\frac{(V_{\max})_1}{(V_{\max})_2} = \frac{A_1 \omega_1}{A_2 \omega_2} = 2$$

$$\frac{a_1}{a_2} = \frac{A_1 \omega_1^2}{A_2 \omega_2^2} = 4$$

43) SHM is periodic function of unique frequency and finite amplitude

44) General equation for oscillatory motion, $a \propto -(x - B)^n$
where $n = \text{odd number}$



45)

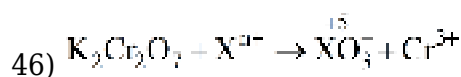
In $\triangle OMN$

$$\cos(\omega t + 45^\circ) = \frac{x}{a}$$

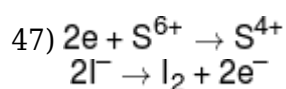
$$x = a \cos(\omega t + 45^\circ)$$

$$x = a \cos\left(\frac{2\pi t}{4} + \frac{\pi}{4}\right)$$

CHEMISTRY



$$6 \times 10^{-3} \times 6 = (5 - n) \times 9 \times 10^{-3}$$



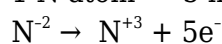
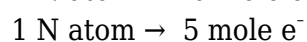
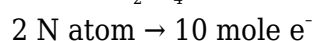
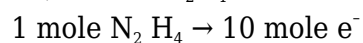
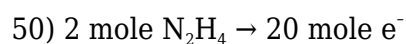
48) Br_2 as O.A. $E = \frac{M}{2}$

Br_2 as R.A. $E = \frac{M}{10}$ $E(\text{Br}_2) = \frac{M}{2} + \frac{M}{10}$

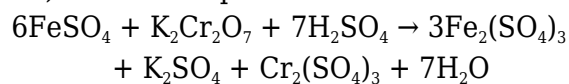
49)

$$0.1 \times V \times 5 = 100 \times 0.5 \times 1$$

$$V = 100 \text{ ML}$$



51) Balanced equation



52) $n = [1 + 5 \times 2]$

Eq. weight of $\text{FeS}_2 = \frac{M}{11}$

53) NCERT Pg. No. # 244 (2025-2026) edition

54) CO_2 cannot be oxidised.

55) (1) xyz

$$+3 - 5 + 1 \neq 0$$

(2) xyz_2

$$+3 - 5 + 1 \times 2 = 0$$

(3) x_2yz

$$3 \times 2 - 5 + 1 \neq 0$$

(4) $(\text{xy})_2\text{z}$

$$(+3 - 5) \times 2 + 1 \neq 0$$

56) **Explaining** : The activation energy for forward reaction is asked when the overall enthalpy change and activation energy of reverse reaction is given.

Concept : This Question is based on Collision theory.

Solution : $\Delta H = 100 \text{ KJ/mol}$ $E_a(f) = ?$

$$E_a(b) = 200 \text{ KJ/mol}$$

$$E_a(f) - E_a(b) = \Delta H$$

$$E_a(f) = 100 + 200$$

$$= 300 \text{ KJ/mol}$$

Final Answer : (1)

57) **Asking** :

Rate of disappearance

Concept :

Rate law exp.

Solution :

$$R_B = \frac{\Delta B}{\Delta t} = \frac{120 - 100}{5} = 4 \text{ mm/min}$$

$$\frac{R_B}{V_2} = \frac{R_C}{1}$$

or

$$R_C = 2R_B = 2 \times 4 = 8 \text{ mm/min}$$

58) Theory based

59)

Activated complex convert into product energy released.

60) $K_1 = Ae^{-\frac{E_{a1}}{RT}}$ $K_2 = Ae^{-\frac{E_{a2}}{RT}}$

$$\Rightarrow \frac{K_1}{K_2} = e^{\frac{E_{a2} - E_{a1}}{RT}} = e^{\frac{E_{a1}}{RT}}$$

$$\Rightarrow K_1 = K_2 e^{\frac{E_{a1}}{RT}}$$

61)

$$\Delta H = E_p - E_R = y$$

So $y = +45 \text{ kJ/mol}$

$$62) \frac{K_2}{K_1} = 2^{\frac{T_2 - T_1}{10}}$$

$$= 2^{\frac{100 - 10}{10}} = 2^9 \text{ times}$$

63) For endothermic reaction

$$\Delta H = E_f - E_b > 0$$

$$E_f > E_b$$

64) (B) Area under the curve for the plot of fraction of molecules versus kinetic energy of gas molecules remains the same with temperature.

(C) In the Arrhenius equation the factor $e^{-E_a/RT}$ corresponds to fraction of molecules that have kinetic energy greater than activation energy.

(D) Activation energy of reaction does not depends upon temperature.

65)

Reason is correct because molecularity is defined only for simple reaction but not explained assertion.

66)

$$\begin{array}{cccc} & 2A & \rightarrow & 2B + C \\ t = 0 & 2 \text{ atm} & & 0 \quad 0 \\ t = 100 \text{ s} & 2-2x & & 2x \quad x \\ \text{total pressure} & = 2-2x + 2x + x & & \\ & 2.5 = 2+x & & \\ & x = 0.5 \text{ atm} & & \end{array}$$

$$k = \frac{2.303}{t} \log \left(\frac{P_0}{P_0 - 2x} \right)$$

$$k = \frac{2.303}{100} \log \left(\frac{2}{2 - 2(0.5)} \right)$$

$$= \frac{2.303}{100} \log 2$$

$$= 0.693 \times 10^{-2}$$

$$k = 6.93 \times 10^{-3} \text{ s}^{-1}$$

67) **A: Question Explanation**

Match kinetics graphs/formulas with the correct order or equation.

B: Concept

Order of reaction and Arrhenius equation

C: Reasoning

(i) **$t_{1/2}$ vs $1/a$** : For a second-order reaction, $t_{1/2} = 1/(k \cdot a)$, where a is the initial concentration. This shows that $t_{1/2}$ is directly proportional to $1/a$, matching the linear graph through the origin. So, **(i) matches with (R)**

(ii) **Rate $\propto [A]^1$** is the definition of a **first-order reaction**. So, **(ii) matches with (Q)**

(iii) **$[A]$ vs t** : The integrated rate law for a zero-order reaction is $[A] = -kt + [A]^0$. This is the equation of a straight line ($y = mx + c$) for a plot of $[A]$ vs. t with a negative slope ($-k$). So,

(iii) matches with (P) (iv) **K vs T** : The graph shows that the rate constant (K) increases exponentially as temperature (T) increases. This relationship is described by the **Arrhenius equation**, $K = Ae^{(-E_a/RT)}$. So, **(iv) matches with (S)**.

D: Final Answer

(i) \rightarrow R, (ii) \rightarrow Q, (iii) \rightarrow P, (iv) \rightarrow S

\Rightarrow **Option 3**

68) $r_1 = K[A]^1$

$r_2 = K[A]^2$

$r_3 = [A]^3$

CASE-1 $[A] = 1$ CASE-2 $[A] < 1$ CASE-3 $[A] > 1$

$r_1 = r_2 = r_3$ $r_3 < r_2 < r_1$ $r_3 > r_2 > r_1$

69)

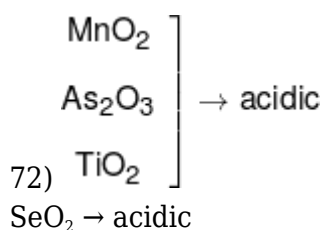
NCERT Pg No # 82

Catalyst use only for spontaneous reaction

70) $\log \frac{K_1}{K_2} = \frac{E_a}{2.303R} \left(\frac{1}{T_2} - \frac{1}{T_1} \right)$

71)

CO_2 is acidic while K_2O is strongly basic



73)

In process $Ne^- \rightarrow Ne$

maximum energy is absorbed

74) Valency of W = 3, Valency of X = 2

75) x must be metals so its EN will be low.

76) I.E. $\propto Z_{\text{eff}} \propto \frac{1}{\text{Size}}$, $ns^2 > ns^2 np^1$

77)

down the group IP decreases

78) $\boxed{\text{I.P.} \propto Z_{\text{eff}} \propto \frac{\oplus \text{ve charge}}{\ominus \text{ve charge}}}$

79) EA : Cl > O > C > N
 $\Delta H_{\text{eg}1}$ of N is positive

80)

In oxoacids for same central atom generally.
Acidic strength \propto Oxidation state

81) **Explanation -**

The question asks which of the given compounds (PCl_5 , SF_6 , BF_3 , ClF_3) are hypervalent, meaning they have more than an octet of electrons.

Concept - (Octet Rule)

Hypervalent compounds exceed the octet rule, having more than eight electrons around the central atom. PCl_5 , SF_6 , and ClF_3 all exhibit this characteristic. BF_3 , conversely, is hypovalent, possessing fewer than eight electrons. Therefore, the hypervalent compounds are (i) PCl_5 , (ii) SF_6 , and (iv) ClF_3 .

Final Answer : (3)

82)

Electronic configuration of boron in ground state is $1s^2 2s^2 2p^1$.

83)

Explanation

- A. Isostructural compounds have the same shape and arrangement of atoms (same molecular geometry), regardless of the elements involved. This is determined by the number of bond pairs and lone pairs of electrons around the central atom (VSEPR theory).

Concept

A. Analyze the structure of each pair:

A. CO_2 and SO_2 :

A. CO_2 : Central C has 2 bond pairs and 0 lone pairs \rightarrow Linear shape.

B. SO_2 : Central S has 2 bond pairs and 1 lone pair \rightarrow Bent (V-shaped) shape.

C. Not isostructural.

B. SiF_4 and SF_4 :

A. SiF_4 : Central Si has 4 bond pairs and 0 lone pairs \rightarrow Tetrahedral shape.

B. SF_4 : Central S has 4 bond pairs and 1 lone pair \rightarrow See-saw shape (distorted tetrahedron).

C. Not isostructural.

C. XeF_2 and I_3^- :

A. XeF_2 : Central Xe has 2 bond pairs and 3 lone pairs \rightarrow Linear shape.

B. I_3^- : Central I has 2 bond pairs and 3 lone pairs \rightarrow Linear shape.

C. Isostructural.

D. SF_6 and XeF_6 :

A. SF_6 : Central S has 6 bond pairs and 0 lone pairs \rightarrow Octahedral shape.

B. XeF_6 : Central Xe has 6 bond pairs and 1 lone pair \rightarrow Distorted octahedral (or capped octahedron) shape.

C. Not isostructural.

Answer option 3, (XeF_2 and I_3^-).

84) Explanation

● Covalent bonds form by the overlap of atomic orbitals. For a sigma (σ) bond, the overlap is along the internuclear axis. For a pi (π) bond, the overlap is perpendicular to the internuclear axis.

Concept

● $s + p_y$: The s orbital is spherical. The p_y orbital has lobes along the y-axis. With the x-axis as the internuclear axis, there will be no net overlap leading to bond formation. The positive and negative overlaps will cancel out.

● $p_y + p_y$: With the x-axis as the internuclear axis, the p_y orbitals will overlap sideways, forming a pi (π) bond.

● $dxz + dxz$: With the x-axis as the internuclear axis, the dxz orbitals can overlap sideways, forming a pi (π) bond.

● $p_x + p_x$: With the x-axis as the internuclear axis, the p_x orbitals will overlap head-on, forming a sigma (σ) bond.

Answer option 1, ($s + p_y$).

85) **Generated by Allie**

Problem Statement: The question asks which of the given molecules is planar, meaning all the atoms in the molecule lie in the same flat plane. You need to analyze the shape of each molecule to determine if it is planar or not.

Underlying Concept: This problem uses the Valence Shell Electron Pair Repulsion (VSEPR) theory, which predicts the three-dimensional arrangement of atoms around a central atom based on regions of electron density (bonding and lone pairs). The molecular geometry determines whether the molecule is planar or non-planar.

Tips and Tricks: Remember that linear and trigonal planar geometries are planar; however, geometries like trigonal bipyramidal and see-saw often have atoms out of plane due to lone pairs or axial positions.

Common Mistakes: Ignoring lone pairs can lead to incorrect geometry and molecular shape predictions. Also, assuming all molecules with the same number of atoms are planar is incorrect.

Why Other Options Are Incorrect?: Molecules like PCl_5 , SF_6 , and PCl_5 ,... have trigonal bipyramidal geometry, which is not planar because some atoms are above or below the equatorial plane. SF_6 has a see-saw shape due to a lone pair causing non-planarity. Only XeF_2 is linear and planar.

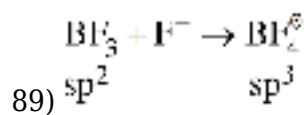
86) Bond strength is directly related with size of overlapping orbitals

87)

AsF_5 has sp^3d hybridisation and atomic orbital used are
 $S + p_x + p_y + p_z + d_z^2$

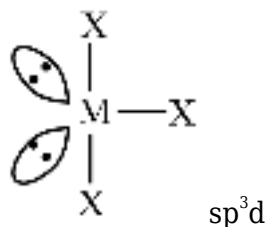
88)

In KI_3 , K^+ , I_3^- ions are present



90)

MX_3 - T shape
 $(3\sigma + 2\pi p)$



BIOLOGY

91) Pg. No. 119 NCERT 2022 - 2023 Edition

92) **10 pairs of cranial nerves** emerge, each serving specific sensory and motor functions. These nerves are responsible for various activities like vision, hearing, taste, smell, and muscle control.ans-2

93)

NCERT Pg#80,81

94) **Cloaca:** The cloaca is a single opening used for excretion, reproduction, and elimination of waste in both males and females.ans-3

95) **Internal Fertilization:** Frogs do not have internal fertilization.ans-4

96)

NCERT Pg. No. # 81

97)

NCERT Pg. No. # 83

98)

NCERT Pg. No. # 83

99)

NCERT Pg. No. # 80

100)

NCERT Pg. No. # 81

101)

NCERT Pg. No. # 83

102)

NCERT Pg. No. # 80

103)

NCERT Pg. No. # 82

104)

NCERT Pg. No. # 80, 81

105) **Question Explanation:** True statement about epithelial tissue ?

Concept : Epithelial tissue

Solution : Let's analyse each statement

(i) Simple epithelium forms lining for body cavities, ducts and tubes. - true

(ii) In epithelial tissue, cells are loosely packed with little intercellular matrix. - False, because cells are tightly packed.

(iii) Simple epithelium provide protection against chemical and mechanical stresses. - false because. It is function of compound epithelium.

(iv) Gap junction perform cementing to keep neighbouring cells together. - false, because cementing is function of Adhering junction.

Final Answer : option (4). One

106) Module-5, Page#95,99

107) Module, Pg. # 98,99,100

108) NCERT (XI) Pg. # 102, 103

109)

NCERT Pg. No. # 101

110) NCERT (XIth) Pg.#102,103-Fig.-7.2(a), 7.3, 7.4(b), 7.5(a)

111)

NCERT Pg. No. # 101

112)

Histamine cause vasodilation, lowering B.P. and regulate B.P.

113)

Larynx is made up of hyaline cartilage.

114) NCERT Pg. # 101, para 2

115)

NCERT Page # 101

116) NCERT Pg. # 102

117) NCERT XI (E), Page No. 104

118)

NCERT XI, Pg. # 103

119) The correct answer is **2. modified white fibrous connective tissue.** • **Tendons:** These are tough, rope-like structures that connect muscles to bones. • **Composition:** Tendons are primarily composed of dense regular connective tissue, which is a type of white fibrous connective tissue. This tissue is characterized by a high density of collagen fibers arranged in parallel bundles, providing great tensile strength in the direction of the fibers.

120)

NCERT Pg. No. # 101

121)

NCERT Pg. No. # 102

122) • **Tissue A:** This tissue is located beneath the skin and appears to be areolar connective tissue.

- **Tissue B:** This tissue connects muscle to bone. This is a defining characteristic of a **tendon**.
 - **Tissue C:** This tissue connects bone to bone. This is a defining characteristic of a **ligament**.
- Therefore, the correct answer is Option 4**

123)

NCERT Pg. # 101

124)

NCERT Pg. No. # 101

125)

Midgut and foregut

126) Collateral glands

127) NCERT (XI) Pg. # 114

128)

NCERT (XIth) Pg. # 113

129) NCERT XI, Page # 111

130) NCERT XIth P.No. 113

131)

NCERT Pg. No. # 112

132) NCERT Pg#113, Para-7.4.2

133) NCERT Pg.# 83

134) NCERT-XI Pg. # 112

135)

NCERT Pg # 103

136) NCERT XI PAGE 24

137) NCERT XI PAGE 26

138) NCERT XI 13, 24, 26, 27

139) NCERT XI PAGE 27

140) NCERT XI PAGE 26

141) NCERT XI 29

142) NCERT XI PAGE 29

143) NCERT XI PAGE 30

144) NCERT XI page 29

145) NCERT XI PAGE 29

146) NCERT XI 28

147) NCERT XI 32

148) NCERT XI PAGE 32

149) NCERT-XI, Pg # 34,37,39

150) NCERT XI 29

151) NCERT XI page 33

152) NCERT XI Pg 30

153) NCERT XI pg.26, 30, 32

154) NCERT XI PAGE 32

155) NCERT XI 33

156) NCERT XI 33

157) NCERT XI page 32

158) NCERTXI 33

159) NCERT XI 28,30

160) NCERT XI page 29

161) NCERT-XI, Pg # 33

162) NCERT XI Old 42 and 43

163) NCERT XI 32,33

164) NCERT XI pg. 27,29

165) NCERT XI 23

166) NCERT XI 30

167) NCERT XI 29,30

168) NCERT XI 32

169) NCERT XI 28

170) NCERT XI 33

171) NCERT XI 28,29 32

172) NCERT XI 34 summary

173) NCERT XI 26

174) NCERT XI 31,33,34

175) NCERT XI 26,27

176) NCERT XI 32

177) NCERT XI 29,32

178) *Volvox, Pteris, Pinus, Fucus, Chara, Funaria, Cedrus, Sargassum*

179) NCERT XI 32

180) NCERT XI 32