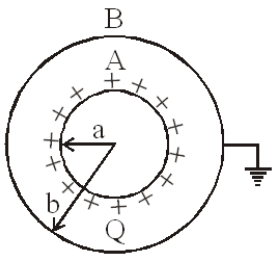
PHYSICS

1) Two spherical conductors A and B of radii a and b (b > a) are placed concentrically in air. A is given a charge +Q while B is earthed. Then the equivalent capacitance of the system is :



(1) $4\pi\varepsilon_0\left(\frac{ab}{b-a}\right)$

(2) $4\pi\varepsilon_0(a+b)$

(3) $4\pi\varepsilon_0 b$

(4) $4\pi\varepsilon_0\left(\frac{b^2}{b-a}\right)$

2) A charge Q is deposited uniformly on a thin spherical layer of radius R. How much energy is stored in it.

(1) $\frac{KQ^2}{4R}$

(2) $\frac{KQ^2}{2R}$

(3) $\frac{2KQ^2}{R}$

(4) $\frac{3KQ^2}{5R}$

3) Find the voltage drop across capacitor connected with resistance and a battery of 50 V in series after a long time :-

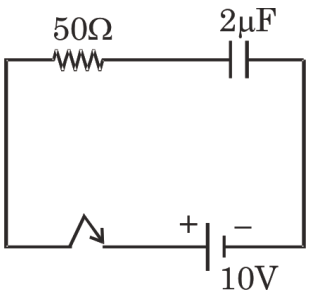
(1) 0 V

(2) 50 V

(3) 30 V

(4) 25 V

4) For the circuit shown in figure at t = 0 switch is closed, the initial current through resistor and



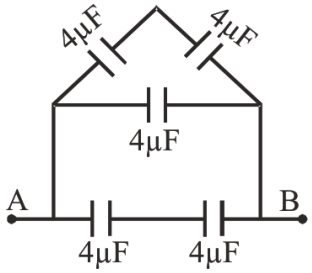
final charge on capacitor at steady state are :

(1) 5A, 5μC
(2) 5A, 20μC
(3) 0.2A, 5μC
(4) 0.2A, 20μC

5) A parallel plate condenser is charged and disconnected from the battery. If the plates of the capacitor are moved further apart by means of insulating handles :-

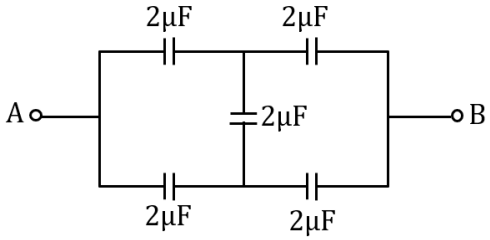
(1) The charge on the capacitor becomes zero
(2) The capacitance becomes infinite
(3) The charge in the capacitor increases
(4) The voltage across the plates increases

6) Equivalent capacitance between A and B is :-



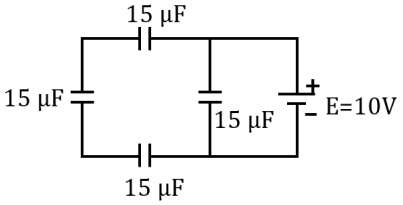
(1) 8 μ F
(2) 6 μ F
(3) 26 μ F
(4) 10/3 μ F

7) In the following circuit, the equivalent capacitance between terminal A and terminal B is :



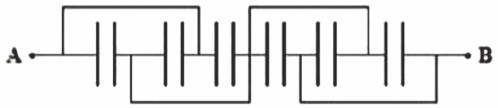
(1) 2μF
(2) 1μF
(3) 0.5μF
(4) 4μF

8) The Charge supplied by the source in the arrangement shown in figure is : -



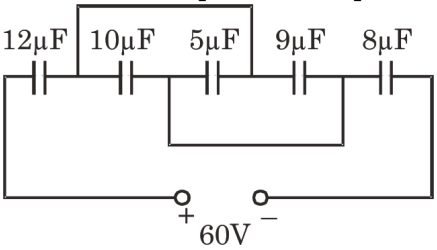
(1) 300 μC
(2) 150 μC
(3) 250 μC
(4) 200 μC

9) All capacitors used in the diagram are identical and each is of capacitance C. Then the effective capacitance between the points A and B is:



(1) 1.5C
(2) 6C
(3) C
(4) 3C

10) Find the equivalent capacitance of circuit and charge on 5μF capacitor :



(1) 4μF, 50μC
(2) 8μF, 25μC
(3) 4μF, 25μC
(4) 8μF, 50μC

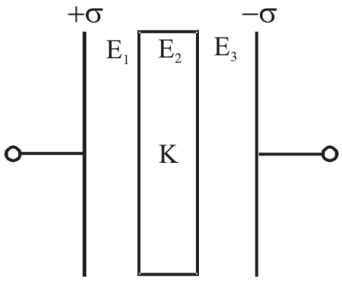
11) A parallel plate capacitor has a capacity C. The separation between the plates is doubled and a dielectric medium is introduced between the plates. If the capacity now becomes 2C, the dielectric constant of the medium is :-

(1) 2
(2) 1
(3) 4
(4) 8

12)

A dielectric slab of dielectric constant K is placed between the plates then compare electric fields E_1,

E_2 and E_3



(1) $E_1 = E_2 = E_3$

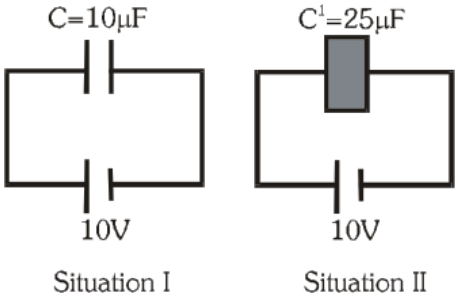
(2) $E_1 = E_3 > E_2$

(3) $E_1 < E_2 < E_3$

(4) $E_1 = E_3 < E_2$

13)

Find the additional charge that flows from battery if the space between the plate is filled with dielectric (see figure) :



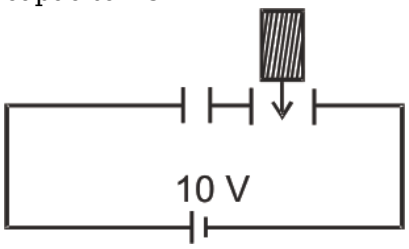
(1) 150 μC

(2) 300 μC

(3) 250 μC

(4) 100 μC

14) A dielectric slab of dielectric constant 4 is inserted between the plates of one of the two identical capacitors as shown in figure to fill the space completely. The potential difference across the other capacitor is



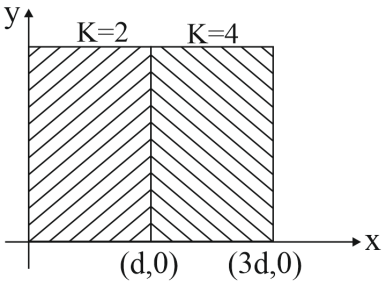
(1) 4 V

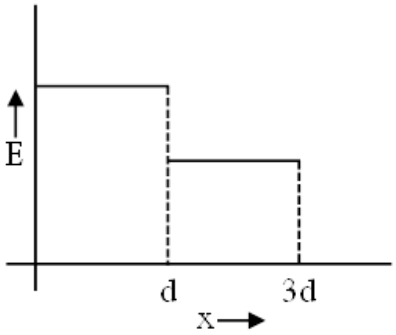
(2) 6 V

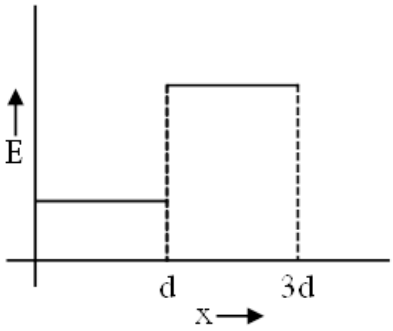
(3) 8 V

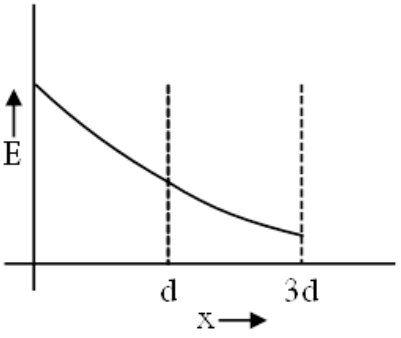
(4) 10 V

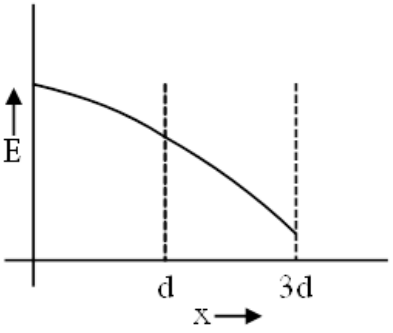
15) A parallel plate capacitor has two dielectric medium as shown in figure. Then the graph which shows variation of electric field intensity (E) with distance from left plate (x) :-



(1)


(2)


(3)


(4)


16) Given below are two statement:
Statement-I: When a capacitor is discharged through a resistance then charge decreases logarithmically.
Statement-II: If resistance and capacitance both are doubled then time constant become double of initial value.
In the light of the above statements. Choose the most appropriate answer form the options given

below.

(1) Both statement I and statement II are incorrect

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

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

(4) Both statement I and statement II are correct

17) A parallel plate capacitor of capacity C_0 is charged by a battery. After charging, battery is disconnected and a dielectric is filled between the plates of capacitor. Column - I represents quantity and Column - II represents the change occurred.

	Column - I		**Column - II**
i.	Potential energy of capacitor	p.	increases
ii.	Potential difference between plates	q.	decreases
iii.	Capacity of capacitor	r.	remains same
iv.	Charge on capacitor	s.	may increase or decrease

Match the columns and choose correct option from the given codes.

(1) i - s ; ii - r ; iii - q ; iv - p

(2) i - q ; ii - q ; iii - p ; iv - r

(3) i - p ; ii - q ; iii - r ; iv - s

(4) i - r ; ii - s ; iii - p ; iv - p

18) A spherical drop of capacitance 1 μF is broken into eight drops of equal radius. The capacitance of each small drop is :-

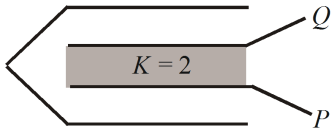
(1) $\frac{1}{2}\mu F$

(2) $\frac{1}{4}\mu F$

(3) $\frac{1}{8}\mu F$

(4) $\frac{1}{16}\mu F$

19) Figure shows each plate has an area A and the spacing between the plate is d. The capacitance of the system between P & Q is



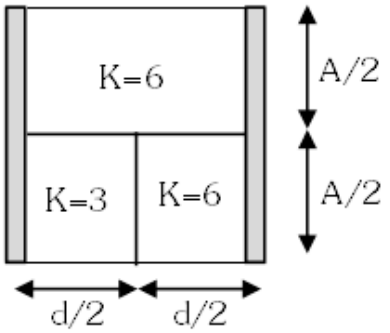
(1) $\frac{3\varepsilon_0 A}{2d}$

(2) $\frac{2\varepsilon_0 A}{3d}$

(3) $\frac{\varepsilon_0 A}{2d}$

(4) $\frac{5\varepsilon_o A}{2d}$

20) Three different dielectrics are filled in a parallel plate capacitor. What should be the equivalent dielectric constant to produce same capacitance :-



(1) 4
(2) 6
(3) 5
(4) 9

21) ***Assertion :-*** A parallel plate capacitor is connected across battery through a key. A dielectric slab of constant K is introduced between the plates. The energy which is stored becomes K times.
Reason :- The surface density of charge on the plate remains constant or unchanged.

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

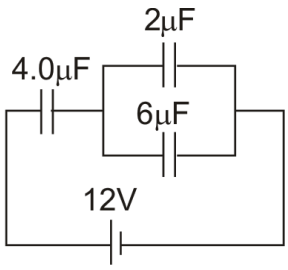
22) **Assertion (A) :** If three capacitors of capacitances $C_1 < C_2 < C_3$ are connected in series and parallel, then $C_{parallel} > C_{series.}$ **Reason (R) :** $C_{series} = C_1 + C_2 + C_3$ and $\frac{1}{C_{parallel}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$

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

23) ***Assertion :*** The capacity of conductor, in case when no change in physical parameters like area of plates and distance between plates is made, remains constant irrespective of the charge present on it.
Reason : Capacity depends on size, shape of conductor and also on the medium between the plates.

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

24) In the circuit shown in the figure, the potential difference across the 4.0 μF capacitor is



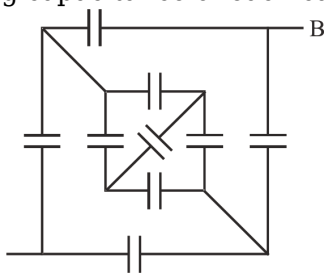
(1) $\frac{8}{3}$ volts

(2) 4 volts

(3) 6 volts

(4) 8 volts

25) In a given network, assuming capacitance of each capacitors equals to C then find the effective capacitance between A and B:



(1) C

(2) $\frac{C}{2}$

(3) $\frac{5C}{8}$

(4) $\frac{3C}{8}$

26) Find the value of time at which velocity is zero. Displacement as a function of time is given as $x = \frac{t^3}{3} - 3t^2 + 9t + 4$

(1) 3 sec

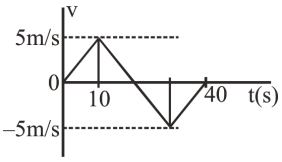
(2) 6 sec

(3) 9 sec

(4) 0

27)

The velocity-time plot is shown in figure. Find the average speed in time interval t = 0 to t = 40 s.



(1) zero

(2) 2.5 m/s

(3) 5 m/s

(4) none

28) If a car covers $2/5^{th}$ of the total distance with v_1 speed and $3/5^{th}$ distance with v_2 speed, then average speed is :-

(1) $\frac{1}{2}\sqrt{v_1 v_2}$

(2) $\frac{v_1 + v_2}{2}$

(3) $\frac{2v_1 v_2}{v_1 + v_2}$

(4) $\frac{5v_1 v_2}{3v_1 + 2v_2}$

29) A body starting from rest moves with constant acceleration. The ratio of distance covered by the body during the 5th sec to that covered in 5 sec is :-

(1) 9/25

(2) 3/5

(3) 25/9

(4) 1/25

30) A particle, starting from rest and moving with constant acceleration, covers distances x_1 and x_2 in third and fifth seconds respectively then $\frac{x_1}{x_2}$ is :-

(1) $\frac{3}{5}$

(2) $\frac{3}{7}$

(3) $\frac{5}{7}$

(4) $\frac{5}{9}$

31) When the distance between the charged particles is halved, the force between them becomes :-

(1) One-fourth

(2) Half

(3) Double

(4) Four times

32) The minimum electrostatic force between two charged particles placed at a distance of 1m is :-

(1) 2.3×10^{-28}N

(2) 6.2×10^{-34}N

(3) 1.02×10^{-26}N

(4) 4.2×10^{-27}N

33) Equal charges q are placed at the four corners A, B, C, D of a square of length a. The magnitude of the force on the charge at B will be :-

(1) $\frac{3q^2}{4\pi\varepsilon_0 a^2}$

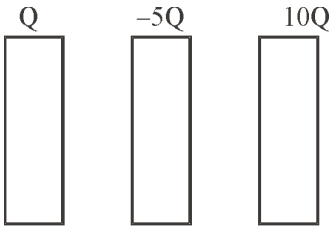
(2) $\frac{4q^2}{4\pi\varepsilon_0 a^2}$

(3) $\left(\frac{1+2\sqrt{2}}{2}\right)\frac{q^2}{4\pi\varepsilon_0 a^2}$

(4) $\left(2+\frac{1}{\sqrt{2}}\right)\frac{q^2}{4\pi\varepsilon_0 a^2}$

34)

The metallic plates of same areas shown in figure, with their charges :-



The final charges on inner and outer surfaces of plate C are respectively given as

(1) +5Q, +5Q

(2) +7Q, + 3Q

(3) +6Q, +4Q

(4) +8Q, + 2Q

35) **Assertion :** Electric lines of force never cross each other
Reason : Electric fields at a point superimpose to give one resultant electric field

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

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

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

(4) Both Assertion & Reason are False.

36) Statement I : A charged body can attract an uncharged body.
Statement II : A charged body can induce charges of opposite signs on uncharged body.
(1) If both Statement I and Statement II are correct, and Statement II is the correct explanation of the Statement I.
(2) If both Statement I and Statement II are correct, but Statement II is not the correct explanation of the Statement I.
(3) If Statement I is correct, but Statement II is incorrect
(4) If Statement I is incorrect, but Statement II is correct.

(1) 1

(2) 2

(3) 3

(4) 4

37) **Assertion (A):** The potential (V) at any axial point, at 2 m distance (r) from the centre of the dipole of dipole moment vector $\vec{P}$ of magnitude, 4×10^{-6}Cm, is $\pm 9 \times 10^{3}$V. (Take: $\frac{1}{4\pi\varepsilon_0} = 9 \times 10^{9}$ SI units)

Reason (R): $V = \pm\frac{2P}{4\pi\varepsilon_0 r^2}$, where r is the distance of any axial point.

(1) Both A and R are true and R is the correct explanation of A.

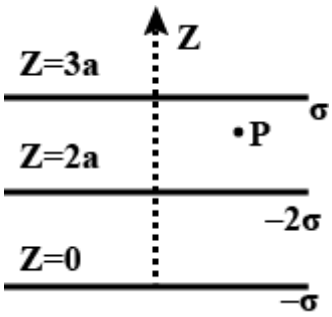
(2) Both A and R are true and R is not the correct explanation of A.

(3) A is true but R is false.

(4) A is false but R is true.

38)

Three infinitely large charged sheets are kept parallel to XY - plane having charge densities as shown in figure. Then, the value of electric field at 'P' is



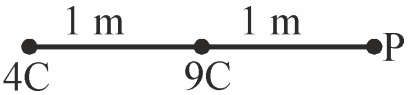
(1) $\frac{-2\sigma}{\varepsilon_0}\hat{k}$

(2) $\frac{2\sigma}{\varepsilon_0}\hat{k}$

(3) $\frac{-4\sigma}{\varepsilon_0}\hat{k}$

(4) $\frac{4\sigma}{\varepsilon_0}\hat{k}$

39) Find net electric field at point P :-

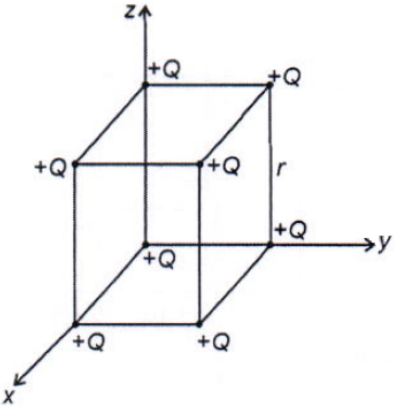


(1) $\frac{5}{4\pi\varepsilon_0}\frac{N}{C}$

(2) $\frac{5}{2\pi\varepsilon_0}\frac{N}{C}$

(3) $\frac{2}{\pi\varepsilon_0}\frac{N}{C}$

(4) $\frac{7}{2\pi\varepsilon_0}\frac{N}{C}$

40) A cube of side length 'r' has point charges +Q placed at each of its vertices as shown in the figure. 

If charge placed at origin is replaced by charge '–Q' then net electric field at centre of the cube will be

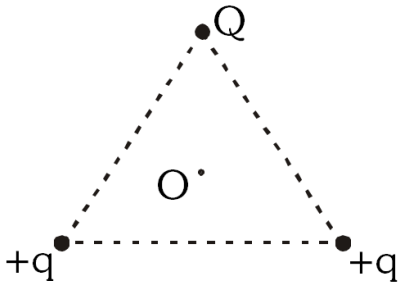
(1) Zero

(2) $\frac{4kQ}{r^2}$

(3) $\frac{8kQ}{3r^2}$

(4) $\frac{2kQ}{\sqrt{3}r}$

41) Three charges are placed at corners of an equilateral triangle as shown in figure. The magnitude of electric field at centre 'O' due to q is E and total field at centre O is 3E then :-



(1) Q = + 4q

(2) Q = – 2q

(3) Q = – 3q

(4) Both (1) & (2) are possible

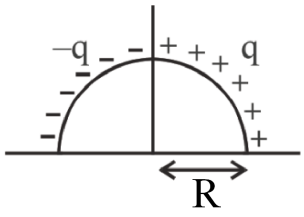
42) Two infinite linear charges are placed parallel to each other at a distance 0.3 m from each other. If the linear charge density on each is 5 μC/m, then the force acting on a unit length of each linear charge will be :-

(1) 1.5 N/m

(2) 3.25 N/m

(3) 4.5 N/m

(4) 7.5 N/m



43) Electric field at center will be:

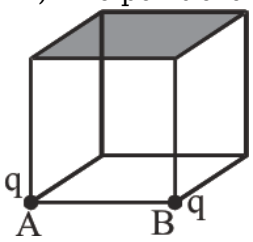
(1) $\frac{4Kq}{\pi R^2}(-\hat{i})$

(2) $\frac{4Kq}{\pi R^2}(-\hat{j})$

(3) $\frac{2\sqrt{2}Kq}{\pi R^2}(\hat{i})$

(4) $\frac{2\sqrt{2}Kq}{\pi R^2}(\hat{j})$

44) Two point charge placed at corners A and B of cube. Flux through shaded face :-



(1) $\frac{q}{8\epsilon_0}$

(2) $\frac{q}{4\epsilon_0}$

(3) $\frac{q}{24\epsilon_0}$

(4) $\frac{q}{12\epsilon_0}$

45)

Two positive ions, each carrying a charge q, are separated by a distance d. If F is the force of repulsion between the ions, then the number of electrons missing from each ion will be (e being the charge on an electron) :-

(1) $\frac{4\pi\epsilon_0 Fd^2}{q^2}$

(2) $\frac{4\pi\epsilon_0 Fd^2}{e^2}$

(3) $\sqrt{\frac{4\pi\epsilon_0 Fe^2}{d^2}}$

(4) $\sqrt{\frac{4\pi\in_0 Fd^2}{e^2}}$

CHEMISTRY

1) Unit of k for the rate law, $R = k[A][B]^{0.5}$ are :-

(1) $mol^{1/2}\ L^{-1/2}\ S^{-1}$

(2) $mol^{1/2}\ L^{1/2}\ S^{-1}$

(3) $mol^{-1/2}\ L^{+1/2}\ S^{-1}$

(4) $mol^{1/2}\ L^{1/2}\ S^{+1}$

2) For the reaction

$3I^- + S_2O_8^{2-} \rightarrow I_3\ominus + 2SO^{2-}_4$

if $-\frac{\Delta\left[S_2O_8^{2-}\right]}{\Delta t} = 1.5 \times 10^{-3}\ M\times s^{-1}$. Then value of $-\frac{\Delta[I^-]}{\Delta t}$ will be :-

(1) $4.5 \times 10^{-3}\ M \times s^{-1}$

(2) $5 \times 10^{-4}\ M \times s^{-1}$

(3) $1.5 \times 10^{-3}\ M \times s^{-1}$

(4) $3 \times 10^{-3}\ M \times s^{-1}$

3) For an imaginary reaction $2X + 3Y \rightarrow$ products

Given : rate with respect to X = r_1

rate with respect to Y = r_2, r_1 and r_2 are related as

(1) $2r_1 = 3r_2$

(2) $3r_1 = 2r_2$

(3) $r_1 = r_2$

(4) $r_1^2 = 4_2^3$

4) Rate of the reaction, which is completed in following steps :-

(i) $A + B \rightarrow X$ ($r_1 = 0.05$)

(ii) $X + B \rightarrow Y$ ($r_2 = 0.89$)

(iii) $Y + A \rightarrow AY$ ($r_3 = 0.001$)

(iv) $AY + B \rightarrow AYB$ ($r_4 = 0.10$)

will be determined by

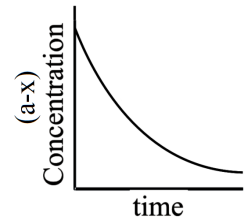
(1) step (i) because the reaction starts with formation of 'x'

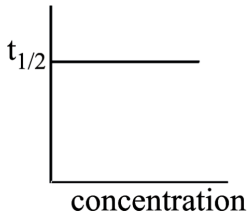
(2) step (ii) because it is fastest step

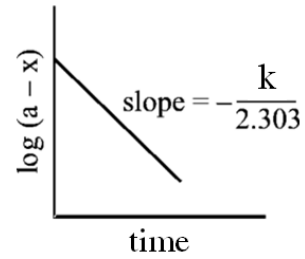
(3) step (iii) because it is the slowest step

(4) step (iv) because it ends the reaction

5) The correct graph regarding first order reaction is–

(1) 

(2) 

(3) 

(4) All of these

6) Thermal decomposition of a compound is of first order. If 50% of a sample of this compound is decomposed in 120 min, then How long will it take 90% of the compound to decompose ?

(1) 240 min.
(2) 180.8 min.
(3) 398.8 min.
(4) 325.6 min.

7) If a I^{st} order reaction is one fifth completed in 40 min, the time required for its 100% completion is :-

(1) 100 min
(2) 200 min
(3) 350 min
(4) Infinite

8) The half life of a first order reaction is 60min. How long will it take to consume 75% of the reactant ?

(1) 200 min
(2) 300 min
(3) 400 min
(4) 120 min

9) The rate constant of first order reaction depends on the-

(1) Volume of the reaction mixture
(2) Concentration of reactant

(3) Concentration of products

(4) Temperature

10) The reaction

$2AB(g) + 2C(g) \rightarrow A_2(g) + 2BC(g)$

Proceeds according to the mechanism

$2AB \rightleftharpoons A_2B_2$ (fast)

$A_2B_2 + C \rightarrow A_2B + BC$ (slow)

$A_2B + C \rightarrow A_2 + BC$ (fast)

Rate law of the reaction is :-

(1) $r = k[AB]^2[C]$

(2) $r = k[AB][C]^2$

(3) $r = k[AB]^2[C][A_2]$

(4) $r = k[A_2B_2][C]$

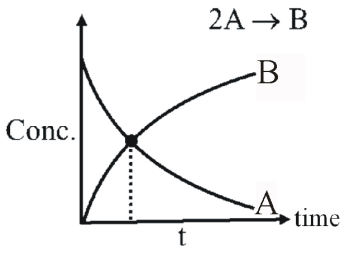
11) The rate of the reaction A + 2B → 3C gets. increased by 72 times when the concentration of A is tripled and that of B is doubled. The order of reaction with respect to A and B are respectively :-

(1) 1,2

(2) 3,2

(3) 2,2

(4) 2,3



12) At point of intersection how much extent of reaction is completed :-

(1) 2/3

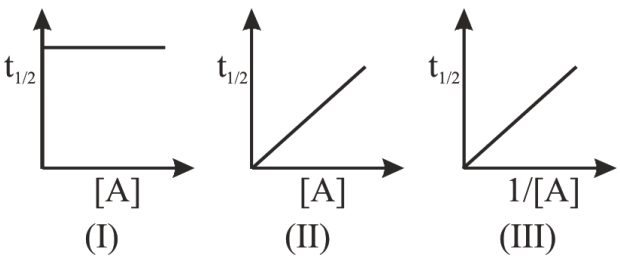
(2) 1/3

(3) 1/2

(4) 3/4

13) Consider the plots, given below, for the types of reaction

$nA \rightarrow B + C$



These plots respectively correspond to the reaction orders:

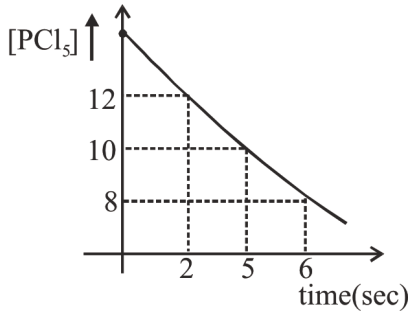
(1) 0, 1, 2

(2) 1, 2, 0

(3) 1, 0, 2

(4) None of these

14) For the reaction $PCl_{5(g)} \rightarrow PCl_{3(g)} + Cl_{2(g)}$
Calculate rate of disappearance of PCl_5 from the graph between 5 to 6 sec :- (ROD = rate of disappearance)



(1) ROD$[PCl_5]$ = 2 mol $L^{-1}s^{-1}$

(2) ROD$[PCl_5]$ = 0.5 mol $L^{-1}s^{-1}$

(3) ROD$[PCl_5]$ = 1 mol $L^{-1}s^{-1}$

(4) ROD$[PCl_5]$ = –2/3 mol $L^{-1}s^{-1}$

15)

For a first order reaction, the value of rate constant for the reaction is :

$A_{(g)} \rightarrow 3B_{(g)} + C_{(g)}$ If here P_0 is the initial pressure of reactant and P_t is pressure of reaction mixture at time t.

(1) $\frac{2.303}{t}\log\left(\frac{3P_0}{3P_0 - P_t}\right)$

(2) $\frac{2.303}{t}\log\left(\frac{P_0}{P_0 - P_t}\right)$

(3) $\frac{2.303}{t}\log\left(\frac{3P_0}{4P_0 - P_t}\right)$

(4) $\frac{2.303}{t}\log\left(\frac{2P_0}{2P_0 - P_t}\right)$

16) The following reaction was carried out in water :
$Cl_2 + 2I^- \rightarrow I_2 + 2Cl^-$
The initial concentration of I^- was 0.25 M and the concentration after 10 min was 0.23 M. Calculate the rate of appearance of I_2.

(1) 2×10^{-3} M min^{-1}

(2) 10^{-3} M min^{-1}

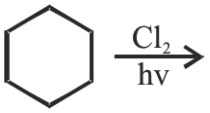
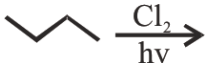
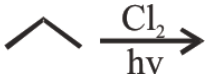
(3) 5×10^{-4} M min^{-1}

(4) 10^{-4} M min^{-1}

17) Reaction of acetone with zinc amulgum in presence of acid gives propane, reaction is named as :-

(1) Mendius Reduction
(2) Clemmensen Reduction
(3) Wolf kischner Reduction
(4) Bouveault-Blanc Reduction

18) In which of the following monochlorination reaction enantiomer pair will form :-

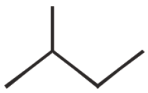
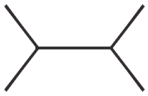
(1) 
(2) 
(3) 
(4) $CH_2{=}CH{-}CH_3 \xrightarrow[h\nu]{Cl_2}$

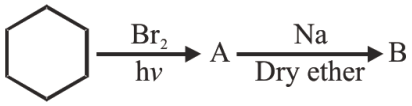
19)

Hydrocarbon (A) reacts with bromine by substitution to form an alkyl bromide which by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms. (A) is

(1) $CH{\equiv}CH$
(2) $CH_2{=}CH_2$
(3) $CH_3{-}CH_3$
(4) CH_4

20) Which of the following alkane cannot be prepared by hydrogenation of alkene ?

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

21) 
B is :-

(1) 

(2) 

(3) 

(4) 

22) $C_6H_5CH_2Br \xrightarrow[2.\ H_3O^+]{1.\ Mg,\ Ether} X$

The product (X) is :-

(1) $C_6H_5CH_2OH$

(2) $C_6H_5CH_3$

(3) $C_6H_5CH_2CH_2C_6H_5$

(4) $C_6H_5CH_2OCH_2C_6H_5$

23) Arrange the following in correct order of reactivity towards $Cl_2/h\upsilon$ –

(A) CH_4

(B) CH_3CH_3

(C) $CH_3CH_2CH_3$

(D) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3$

(1) A > B > C > D

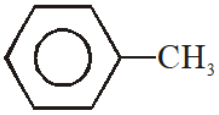
(2) D > C > B > A

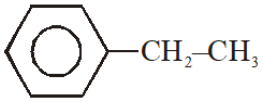
(3) B > C > A > D

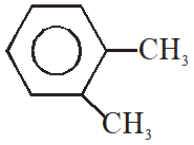
(4) C > B > D > A

24) n-heptane $\xrightarrow[600^oC]{Cr_2O_3 \setminus V_2O_5}$?

(1) 

(2) 

(3) 

(4) 

25) Highest boiling point is observed for

(1) 2-Methylbutane
(2) Pentane
(3) Hexane
(4) 2, 2 - Dimethylpropane

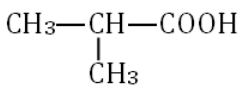
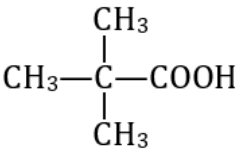
26) The product P is the following reaction is $C_2H_6 + O_2 \xrightarrow[\Delta]{(CH_3COO)_2Mn} P$

(1) CH_3CH_2OH
(2) CH_3CHO
(3) C_2H_4
(4) CH_3COOH

27) ***Assertion :-*** $H_3CCOO^-Na^-(aq) \xrightarrow{\text{Electrolysis}} H_3C-CH_3 + CO_2 + H_2 + NaOH$
Reason :- Ethane & CO_2 formed at Anode while H_2 formed at cathode and pH of reaction medium increases.

(1) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) If both Assertion & Reason are True but Reason. is not a correct explanation of the Assertion.
(3) If Assertion is True but the Reason is False.
(4) If both Assertion & Reason are false.

28) Which of the following compounds is highly reactive towards decarboxylation:

(1) CH_3–CH_2–COOH
(2) CH_3–CO–CH_2–COOH
(3) 
(4) 

29) $B \xleftarrow{Zn/dil\ HCl} CH_3–CH_2–Cl \xrightarrow[dry\ ether]{Na} A$

Identify A & B respectively

(1) $CH_3–CH_3$ and $CH_2=CH_2$

(2) $CH_2=CH_2$ and $CH_3–CH_2–CH_2–CH_3$

(3) $CH_3–CH_2–CH_2–CH_3$ and $CH_3–CH_3$

(4) $CH_3–CH_3$ and $CH_3–CH_2–CH_3$

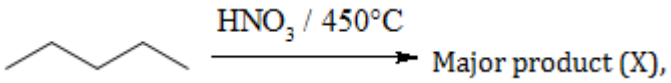
30) **Statement-I :-** Methane can't be obtained by Kolbe's electrolytic method.
Statement-II :- Methane can be obtained by sodalime with carboxylic acids in decarboxylation process.

(1) Statement - 1 is incorrect, statement - 2 is correct.

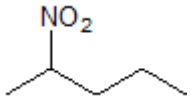
(2) Statement - 1 is correct, statement - 2 is incorrect.

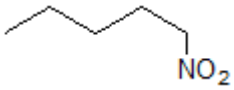
(3) Both statements are correct.

(4) Both statements are incorrect.

31) 

X is-

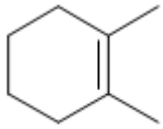
(1) 

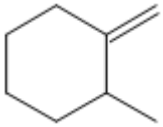
(2) 

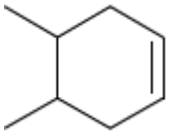
(3) CH_3NO_2

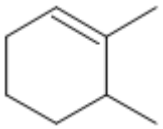
(4) $CH_3 – CH_2 – NO_2$

32) Which of the following is most reactive towards catalytic hydrogenation.

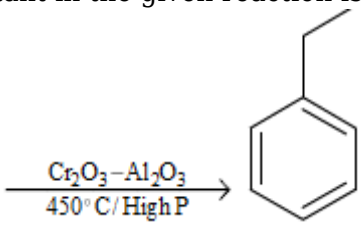
(1) 

(2) 

(3) 

(4) 

33) Reactant in the given reaction is?

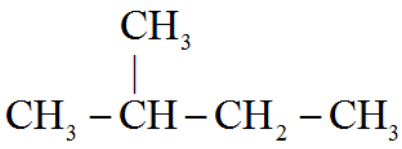
Reactant 

(1) n-Hexane

(2) n-Heptane

(3) n-Pentane

(4) n-Octane

34) In the bromination of  the substitution at

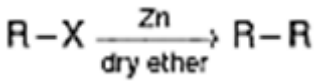
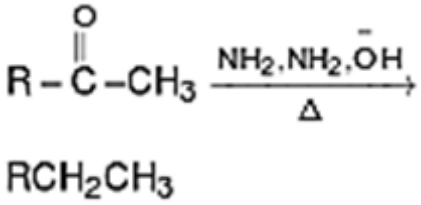
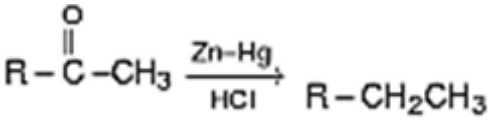
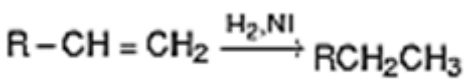
(1) 1º carbon would be fastest

(2) 2º carbon would be fastest

(3) 3º carbon would be fastest

(4) 1º, 2º, 3º carbon atoms all will occur at the same rate.

35) Match the following :-

	Reaction		Name
(a)		(p)	Clemmensen reaction
(b)		(q)	Catalytic hydrogenation
(c)		(r)	frankland reaction
(d)		(s)	Wolf-kishner reaction

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

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

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

(4) a-s, b-p, c-r, d-p

36) Match the column-

	Column-I		**Column-II**
(I)	CH_3–I → CH_3–CH_3	(P)	NaOH + CaO
(II)	CH_3–COONa→CH_4	(Q)	Cu/523K 100 atm
(III)	$2CH_4 + O_2 \rightarrow CH_3$–OH	(R)	Zn-Hg/HCl
(IV)	R–CHO → R–CH_3	(S)	Na/Ether

(1) (I-P), (II–Q), (III–R), (IV–S)

(2) (I-S), (II–P), (III–Q), (IV–R)

(3) (I-S), (II–P), (III–R), (IV–Q)

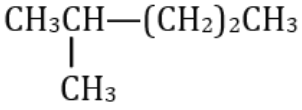
(4) (I-P), (II–S), (III–R), (IV–Q)

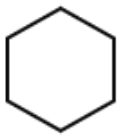
37) In the following reaction 'X' is

$$CH_3(CH_2)_4CH_3 \xrightarrow[HCl,\Delta]{\text{Anhy. } AlCl_3} \underset{\text{Major product}}{'X'}$$

(1) $CH_3(CH_2)_4CH_2Cl$

(2) Cl–CH_2–$(CH_2)_4$–CH_2–Cl

(3) 

(4) 

38) Which of the following statement is false for the given reaction ?

$$CH_3CH_2COONa \xrightarrow[\text{Electrohysis}]{H_2O} CH_3–CH_2–CH_2–CH_3 + CO_2 + NaOH + H_2$$

(1) Reaction is known as kolbe's electrolysis

(2) $\dot{C}H_2—CH_3$ is formed during the reaction

(3) CO_2 gas is liberated at anode

(4) pH level of solution decreases in the reaction

39) The rate constant is numerically the same for three reactions of first, second and third order respectively. 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 of these

40) Which one of the following statements for the order of a reaction is incorrect ?

(1) Order can be determined experimentally

(2) Order is not influenced by stoichiometric coefficient of the reactants

(3) Order of elementary reaction is sum of power to the concentration terms of reactants to express the rate of reaction

(4) Order of reaction is always whole number

41) What is order of reaction A → B from following data :-

Pressure of A (mm)	200	180	120	100
time (sec)	0	5	20	25

(1) First order

(2) zeroth order

(3) Third order

(4) fourth order

42)

A second order reaction between A and B is an elementary reaction, A + B \(\rightarrow\) products. Rate law expression for this reaction is :

(1) Rate = k [A][B]

(2) Rate = k $[A]^0[B]^2$

(3) Rate = k $[A]^2[B]^0$

(4) Rate = k $[A]^{3/2}[B]^{1/2}$

43) For the reaction A + B → C. The following data has been given for rate of reaction :-

Sr. No.	**[A] (M)**	**[B] (M)**	**ROR (Ms^{-1})**
(1)	0.5	0.5	1.6×10^{-2}
(2)	0.5	1	3.2×10^{-2}
(3)	1	1	6.4×10^{-2}
(4)	1	0.5	3.2×10^{-2}

The rate law of the reaction is

(1) r = $k[A]^2[B]$

(2) r = k[A][B]

(3) r = $k[A][B]^2$

(4) r = $k[A]^0[B]^2$

44) **Assertion :** For a zero order reaction the rate of reaction is independent of initial concentration of reactant.
Reason : Zero order reactions are relatively uncommon.

(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) Both assertion and reason are false.

45) A certain zero order reaction has k = 0.025 M s^{-1} for the disappearance of A. What will be the concentration of A after 15 seconds if the initial concentration is 0.5 M ?

(1) 0.5 M

(2) 0.32 M

(3) 0.12 M

(4) 0.06 M

BIOLOGY

1) Select true and false for Chromosome characteristics features
I. Occur in pair
II. Segregates at gamete formation and only one of each pair is transmitted to a gamete.
III. Independent pair segregate independently of each other.
IV. A pair can align at telophase.

(1) I, II, III are true, IV is false

(2) I , II False, III is false

(3) II, III are true, I, IV is false

(4) I, , III are true, II, IV is false

2) Bacteriophage lambda has _____ base pairs in nucleic acid (genetic material).

(1) 48205

(2) 5386

(3) 48502

(4) 45802

3) If a double stranded DNA has 30% of Guanine, what will be the percentage of Adenine and thymine base pair.

(1) 20%

(2) 30%

(3) 40%

(4) 60%

4) When a phosphate group is linked to 5'OH of deoxyadenosine by phosphoester linkage, a corresponding nucleotide is formed which is

(1) Adenosine

(2) Adenylic acid

(3) Adenine

(4) Deoxy adenylic acid

5) Select the incorrect statement from the following.

(1) The family pedigree of queen Victoria shows a number of haemophilic descendent as she was carrier of the diseases.

(2) Haemophilia is sex linked recessive diseases, which shows the transmission from affected carrier female to some male progeny.

(3) The possibility of a female becoming a haemophilic is extremely rare.

(4) It is sex linked recessive trait.

6) _____ is present in DNA only and _____ is present in RNA only

(1) Cytosine, thymine

(2) Thymine, uracil

(3) Uracil, thymine

(4) Thymine, cytosine

7) A single human cell has approximatelly ..... long thread of DNA distributed among its ..... chromosomes

(1) 2 cm , 46

(2) 2.2 metre, 46

(3) 2 cm, 23

(4) 2 metre, 23

8) Maternal inheritance is due to genes present in

(1) Nucleus

(2) Ribosomes

(3) Mitochondria

(4) Nucleoplasm

9) Which of the salient features of double helical structure of DNA is correct
(i) It is made up of two polynucleotide chain
(ii) Two chains are anti parallel, one chain has polarity 5’ - 3’ and other has 5’ - 3’
(iii) Two chains are coiled in right handed fashion
(iv) Bases in two strands are joined by phosphoester bonds
(v) Pitch of the helix is 3.4 nm

(1) i, ii, iii are correct

(2) i, iii and v are correct

(3) ii, iv , v are correct

(4) i, ii, iv, v are correct

10) What confers additional stability to double helix model of DNA apart from the H-bond.

(1) One base pair provides inductive effect to the other

(2) One base pair is stacked over the other

(3) One base pair is perpendicular to another

(4) One base pair interacts with another base pair via steric hindrance

11) A sample of extracted DNA has Adenine (25%) Guanine (30%), Cytosine (30%), Thymine (15%), The sample might have been extracted from :

(1) Virus

(2) Yeast

(3) E.coli

(4) Pea plant

12) A single nucleotide, do not have

(1) Phospho ester bond

(2) Hydrogen bond

(3) b-glycosidic bond

(4) Covalent bond

13) Match the column :

	Column - I		Column - II
A.	ϕ -174	1	3.3×10^9 bp
B.	λ –phage	2	48502 bp
C.	E. coli	3	5386 Nucleotides.
D.	Human genome	4	4.6×10^6 bp

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

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

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

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

14) An RNA nucleotide can differs from DNA nucleotide in having
A. An additional -OH group
B. b-Glycosidic bond
C. Methylated Purine
D. Non Methylated Pyrimidine.

(1) A and B

(2) A and C

(3) B and C

(4) A and D

15) Ribonucleotide backbone is formed due to

(1) Ribose sugar

(2) Ribose sugar and phosphate

(3) Ribose sugar, Phosphate and Nitrogenous bases.
(4) Ribose sugar and Nitrogenous bases.

16) One of the hallmarks of Watson and Crick was

(1) Presence of nucleotide
(2) Phosphoester bond
(3) Base pairing
(4) Covalent bond

17) In which nitrogen base, two rings are present

(1) Cytosine
(2) Uracil
(3) Thymine
(4) Adenine

18) What is the main reason of constant distance between two polynucleotide chains in DNA ?

(1) Structure of phosphate
(2) Structure of Pentose sugar
(3) Structure of Nitrogen bases
(4) Phosphodiester bond

19) What is the nature of the 2 strands of DNA duplex.

(1) Identical and complimentary
(2) Antiparallel and complimentary
(3) Dissimilar and non complimentary
(4) Antiparallel and non complimentary

20) Select the incorrect statement from the following.

(1) DNA act as the genetic material in most of the organisms.
(2) 5 – methyl uracil is the chemical name for thymine.
(3) RNA is always double stranded molecule.
(4) There is uniform distance between two strands of DNA.

21) Select the incorrect match from the following.
i) Colourblindness – X Linked recessive
ii) Sickle cell anaemia – X Linked recessive
iii) Haemophilia – X linked recessive
iv) Phenylketonuria – Autosomal dominant
v) Thalassemia – Autosomal recessive
vi) Klinefelter's syndrome – Y linked.

(1) ii, iii, iv

(2) i, ii, iv

(3) ii, iv, vi

(4) i, ii, iii, iv

22) If 75% of the offspring show dominant character, the parents are

(1) Both hybrids

(2) One dominant and one recessive

(3) Both recessive

(4) Both dominant

23) Which of the following have equal number of chromosomes

(1) Klinefelter's syndrome, Turner's syndrome

(2) Klinefelter's syndrome, Down's syndrome

(3) Klinefelter's syndrome, Cri – du – chat syndrome

(4) Down's syndrome, Turner's syndrome

24) 1 : 1 : 1 : 1 ratio of progenies can be obtained if the plants employed for crossing are
(A) TTRR × ttRR
(B) TtRr × ttrr
(C) TtRR × ttrr
(D) Ttrr × ttRr

(1) A, C and D

(2) A, B, C and D

(3) B and D

(4) A and B

25) **Assertion** – Drosophilia melanogaster is suitable for the study of sex linked inheritance.
Reason – It completes its life cycle in 2 weeks and single mating produces a large number of progeny flies.

(1) Both assertion and reason are correct and reason is correct explanation of assertion

(2) Both assertion and reason are true but reason is not correct explanation of assertion

(3) Both assertion and reason are incorrect

(4) Assertion is true but reason is incorrect

26) (a) Alleles and chromosomes segregates during mitosis
(b) A haploid nucleus contains one set of chromosomes and one allele for each gene
(c) The gene which affect many traits is called pleotropic gene
(d) Garden pea reproduces asexually in nature
(e) In incomplete dominance one gene (dominant) is mixed with the other gene (recessive).
How many of the following statement are incorrect.

(1) 2

(2) 3

(3) 4

(4) 5

27) Select the incorrect statement

(1) Male child may become haemophilic, if his mother is carrier of haemophilia

(2) Sickle cell anaemia is a classic example of chromosomal mutation

(3) Gynaecomastia develops in klinefelter's syndrome

(4) Trisomy of chromosome 21 results in Down syndrome

28) **I.** The segregation of alleles is a random process and there is a 50% chance of a gamete containing either allele.
II. During mitosis, the alleles of a pair separate from each other and only one allele is transmitted to each gamete.
III. By looking at the phenotype of a dominant trait, it is not possible to know the genotype.

(1) Only I is correct

(2) Only II is correct

(3) I and II are correct

(4) I and III are correct

29) **Assertion (A) : 2' OH** group present at every nucleotide in RNA is a reactive group and makes RNA labile and easily degradeable.
Reasion (R): RNA is also known to be catalytic, hence more reactive than DNA.

(1) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.

(2) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.

(3) If the assertion is true but the reason is false.

(4) If both the assertion and reason are false.

30) Select the incorrect statement from the following.

(1) Friedrich Miescher Identified DNA as an acidic substance and named it 'Nuclein' in 1869.

(2) Erwin Chargaff found that Ratio of adenine - guanine is constant and Thymine cytosine is constant.

(3) DNA has two strands which are complementary to each other.

(4) The backbone of DNA double helix consists of Sugar-Phosphate.

31) DNA being more stable is preferred as genetic material. This stability is due to all of the following features, except

(1) Lack of free 2'OH

(2) Slow mutation rate

(3) Presence of 5 – methyl Uracil at the place of Uracil.

(4) Presence of heterocyclic purines.

32) In a given nucleic acid G + A is not equal to C + T content. This indicates that the sample is :

(1) AT rich
(2) GC rich
(3) ss DNA
(4) ds DNA

33) Consider the following genetic disorders : Haemophilia, sickle cell anaemia, cystic fibrosis, thalassemia, phenylketonuria, polydactyly, kleinfelter's syndrome, turners syndrome.
How many of the above disorders are mendelian autosomal disorders?

(1) 1
(2) 2
(3) 5
(4) 6

34) A diploid organism is heterozygous for four loci. number of gametes produced

(1) 4
(2) 8
(3) 16
(4) 32

35) Read the following statements :
(A) PKU is inborn error of metabolism
(B) Inheritable mutations can not be studied by generating a pedigree of a family
(C) Down’s syndromic & Turner’s syndromic persons have 45 chromosomes instead of 46.
(D) All characters show true dominance
How many of the above statement are correct?

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

36) Given below are two statements:
Statement I: In α Thalassemia, production of α globin chain is affected due to mutation or deletion of one or more of the four genes controlled by two closely linked genes HBA1 and HBA2 on chromosome 16.
Statement II: Thalassemia is a qualitative problem of synthesising an incorrectly functioning globin, similar to sickle-cell anaemia.

(1) Statement I is false but Statement II is true.
(2) Both Statement I and Statement II are true.
(3) Both Statement I and Statement II are false.
(4) Statement I is true but Statement II is false.

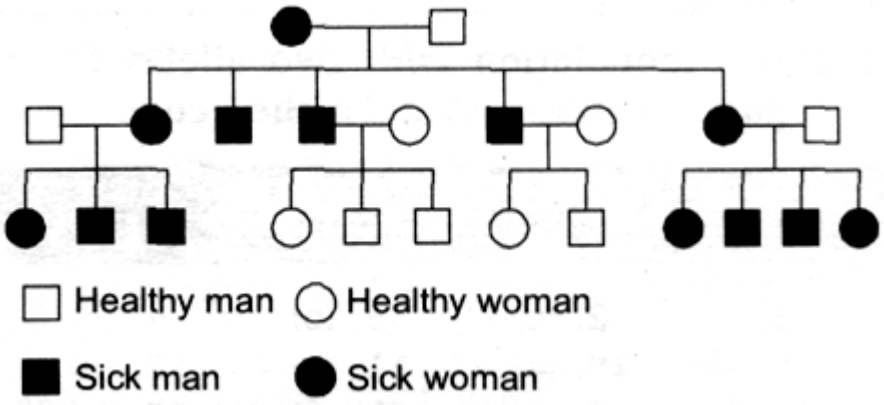
37) Given below are two statements:
Statement I: Colour Blindness is a sex-linked recessive disorder due to a defect in the genes present on the X chromosome, affecting the ability to discriminate between red and green colours.
Statement II: Colour Blindness occurs in about 8 per cent of females and only about 0.4 per cent of males.
In the light of the above statements, choose the correct answer from the options given below:

(1) Statement I is false but Statement II is true.
(2) Both Statement I and Statement II are true.
(3) Both Statement I and Statement II are false.
(4) Statement I is true but Statement II is false.

38) Which of the following occurs due to presence of an extra X – chromosome in males.
(i) Tall height
(ii) Feminine characters
(iii) Protruding tongue
(iv) Webbed neck
(vi) Overall masculine development

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

39) The pedigree (see figure) shows an inheritance of a rare trait,



The disease is probably caused by a mutation on one locus which is :

(1) recessive, autosomal
(2) dominant, atuosomal
(3) recessive, related to the X-chromosome
(4) situated in the mitochondrial genome

40) A marriage between normal vision man and colorblind woman will produce which of the following types of offspring?

(1) Normal sons and carrier daughters
(2) Colourblind sons and carrier daughter

(3) Colourblind sons and 50% carrier daughters

(4) 50% colourblind sons and 50% carrier daughters

41) A human female with Turner's syndrome

(1) Has 45 chromosomes with XO.

(2) Has one additional X-chromosome.

(3) Exhibits male characters.

(4) Is able to produce children with normal husband.

42) How many of the following symptoms are associated with Down’s syndrome ?
Deep palm crease, Big & wrinkled tongue, Accumulation of phenylalanine, Mewing cry, congenital heart disease.

(1) One

(2) Two

(3) Three

(4) Four

43)

	Column-I		**Column-II**
A	Sex-linked	1	Baldness
B	Sex influenced	2	Haemophilia
C	Sex limited	3	Beard in man
		4	Colourblindness
		5	Milk glands in females

(1) A-4, B-2, 1, C-3, 5

(2) A-2, B-1,3, C-4, 5

(3) A-2, B-1,4, C-3, 5

(4) A-2, 4, B-1, C-3, 5

44) Two heterozygous parents are crossed. If the two loci are linked, what would be the distribution of phenotypic feature in F1 generation of this dihybrid cross

(1) 1 : 1

(2) 3 : 1

(3) 9 : 3 : 3 : 1

(4) 1 : 1: 1: 1

45) Pleiotropy occurs when a gene has

(1) A complementary gene elsewhere

(2) A small effect on only one trait

(3) Reversible effects on the phenotype, depending on age.

(4) Many phenotype effects

46) Which is not a curable STD?

(1) AIDS
(2) Henital herpes
(3) Hepatitis B
(4) All of the above

47) Identify the contraceptive device shown below as well as the related right place of its

implantation into a woman and select the correct option together :

	Contraceptive device	**Site of implant**
(1)	LNG – 20	Fallopian tube
(2)	Lippes loop	Uterine wall
(3)	Copper–T	Uterine cavity
(4)	Multiload 375	Oviduct

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

48) Which of the following are natural contraceptive methods?
(A) Periodic abstinence
(B) Coitus interruptus
(C) Lactational amenorrhoea
(D) M.T.P.

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

49) Which may be a complication problem of STD, when it is not timely detected–

(1) PID

(2) Still Birth
(3) Infertility
(4) All of these

50) Cu ions released from copper–releasing intra uterine devices (IUDs) helps in :-

(1) Prevent ovulation
(2) Block the uterus
(3) Increase phagocytosis of ovum
(4) Suppress sperm motility

51)

Match the following :

(A)	Non-medicated IUDs	(a)	CuT
(B)	Copper releasing IUDs	(b)	Saheli
(C)	Hormone releasing IUDs	(c)	Lippes loop
(D)	Non-steroidal pill	(d)	LNG-20

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

52) Which of the following method of contraception is effective only upto a maximum period of six months following parturition ?

(1) Coitus interruptus
(2) Lactational Amenorrhoea
(3) Cu T
(4) Condoms

53) Identify the chemical method of contraception:

(1) LNG-20
(2) Spermicidal jellies
(3) Progestasert
(4) Lippe's Loop

54) Find the incorrect statement about vasectomy.

(1) It is sterlization technique for male
(2) Vasa efferentia are cut and tied up
(3) The two vasa deferentia are cut and tied up

(4) Passage of sperm is blocked

55) Which of the following are the type of barrier method used exclusively for female ?

(1) Condom, Cervical cap, Vaults
(2) Condom, Cervical cap, Vaults, and Diaphragm
(3) Cervical cap, Vaults, and Diaphragm
(4) Nirodh, Diaphragm and Cervical cap

56)

Identify the correct match.

(1) Saheli – Non steroidal pill
(2) Female condom – Injectables.
(3) Multiload 375 – Non-medicated IUD
(4) Progestasert – Copper releasing IUD

57) Statutory raising of marriageable age of the female to _____ years and that of males to _____ years, measure taken to tackle the problem (population).

(1) 21, 18
(2) 18, 21
(3) 21, 28
(4) 16, 21

58) Administration of progestogens or progestogen-estrogen combinations or IUDs within _____ of coitus have been found to be very effective as emergency contraceptives.

(1) 72 hours
(2) 36 hours
(3) 48 hours
(4) 12 hours

59) Lactational amenorrhoea, is a natural way of birth spacing. It is due to the high level of

(1) FSH and LH hormones
(2) Estrogen
(3) Prolactin
(4) Progesterone

60) Which of the following is an incorrect statement for periodic abstinence?

(1) The couple should abstain from coitus from day 10 to 17 of the menstrual cycle when ovulation could be expected
(2) 10^{th} to 17^{th} day of the cycle is fertile period, when the chances of fertilisation are high
(3) This prevents the chances of union of male and female gametes

(4) In this method, the ovum and sperms are prevented from physically meeting with the help of barriers

61) In which technique, fertilisation occurs inside the body of female ?

(1) Z.I.F.T
(2) I.U.T.
(3) I.C.S.I
(4) G.I.F.T

62) Which of the following contraceptive method has its additional benefit of protecting the user from contracting STD's and AIDS ?

(1) IUD
(2) Condom
(3) Hormonal Oral pill
(4) Implant

63) Which method of contraception has high failure rate ?

(1) Natural method
(2) Intra uterine devices
(3) Barrier method
(4) Hormonal method

64) Which of the following contraceptive devices in inserted by doctor or trained nurses in the uterus through the vagina ?

(1) Diaphragm
(2) Vault
(3) Cu-T
(4) Implants

65) Which of the following has been used for emergency contraception ?

(1) Diaphragm
(2) Daily tablets
(3) Saheli
(4) High progesterone and estrogen combination

66) Match the following :

A	Non- medicated IUDs	a	Multiload 375	i	Uterus unsuitable for implantation
B	Copper Releasing IUDs	b	Saheli	ii	Phagocytosis of sperm

C	Hormone Releasing IUDs	c	Lippes loop	iii	Suppress sperm motility
D	Weekly oral pill	d	LNG-20	iv	Anti-estrogenic activity

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

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

67) The cervical cap has approximately the same effectiveness as the :-

(1) Mini-Pill
(2) Combination Pill
(3) Diaphragm
(4) CuT

68) In which of the following contraceptive methods chances of failure are high ?

(1) Withdrawal
(2) IUDs
(3) Oral contraceptives
(4) Condoms

69)

How many of the contraceptive methods in the list given below have almost no side effects ?

Condoms, Diaphragm, Lactational amenorrhea, Cervical Cap, Pills, IUD, Periodic abstinence, Coitus interruptus, Depoprovera, Norplant.

(1) Six
(2) Three
(3) Four
(4) One

70) .....are also essential in certain cases where continuation of pregnancy could be harmful or even fatal either to the mother or to the foetus or both:-

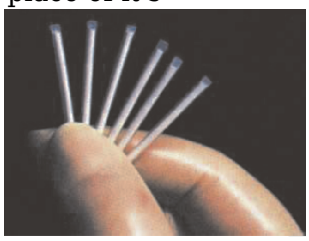
(1) MTPs
(2) IUDs
(3) Contraceptive pill
(4) Female condom

71) In vitro fertilization is a technique that involves transfer of which one of the following into the

fallopian tube ?

(1) Either zygote or early embryo upto 8 cell blastomers
(2) Embryo of 32 Blastomers
(3) Zygote only
(4) Embryo only up to 8 blastomers

72) Identify the contraceptive device shown below as well as the related right place of it's implantation into a woman and select the correct option for the two together:



	Contraceptive device	Site of implant
(1)	LNG – 20	Fallopian tube
(2)	Lippes loop	Vagina
(3)	Implants	Subcutanceous
(4)	Multiload 375	Uterine wall

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

73) Consider the statements given below regarding contraception and answer as directed there after :-
(A) Medical termination of pregnency (MTP) during first trimester is generally safe.
(B) Generally chances of conception are nil until mother breast feeds the infant up to two year.
(C) Intrauterine devices like copper T are effective contraceptive.
(D) Chances of fertilisation are very high during first 7 days of menstruation cycle.
Which two of above statements are correct?

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

74) True for AIDS and hepatitis B infections :-

(1) Both are chronic infections and ultimately fatal
(2) Both can be transmitted through sexual contact or infected blood
(3) Both are non curable
(4) All

75) _____ methods blocks gamete transport and prevent conception.

(1) Surgical method
(2) Oral contraceptive
(3) Implants
(4) Natural method

76) Match the following and give the answer for correct match :

A	ZIFT	i	More than 8 blastomere stage is transferred into the uterus
B	AI	ii	Zygote or early embryo with upto 8 blastomere could be transferred in to fallopian tube
C	IUT	iii	Semen collected from husband or healthy donor is introduced in to the vagina
D	GIFT	iv	Transfer of an ovum collected from a donor into the fallopian tube of another female

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

77) **Statement-I :** Amniocentesis is a test based on the chromosomal pattern in the amniotic fluid surrounding the developing embryo.
Statement-II : If couples are unable to produce children inspite of unprotected sexual cohabitation up to 2 year this is called infertility. It is prevented by assisted reproductive technologies (ART)

(1) Both Statement-I and 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 II are correct

78) **Statement-I :** Surgical intervention blocks gamete transport and thereby prevent conception.
Statement-II : Emergency contraceptive can be used upto 8 days of unprotected sexual inter course.

(1) Statement I and II both are correct
(2) Statement I and II both are incorrect
(3) Only Statement I is correct
(4) Only Statement II is correct

79) **Statement-I :** Government of India ligalised MTP in 1971 with some strict conditions to avoid misuse.

Statement-II : MTP is considered safe up to Eighteen weeks of pregnancy.

(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.

80) **Statement-I :-** If male is unable to inseminate then IUI is performed. **Statement-II :-** IUI can also be done if sperm count is less than normal.

(1) Statement-I & II both are correct
(2) Statement-I & II both are incorrect
(3) Statement-I is correct but II is incorrect
(4) Statement-I is incorrect but II is correct

81) Two statements given below :
Statement I : Due to very low sperm count in the ejaculation could be corrected by artificial insemination (AI).
Statement II : Artificial insemination (AI) is the example of in-vivo fertilization.
Choose the most appropriate answer from the option given below :

(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 correct

82) **Assertion (A) :** Contraceptive methods are useful in prevention of unwanted pregnancy.
Reason (R) : An ideal contraceptive should be user friendly, cheap, with least or no side effects, easily available and effective.

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

83) **Assertion A:** The 'Reproductive and Child Health Care (RCH) programmes' in India aim to create a reproductively healthy society by providing necessary facilities and support.
Reason R: The RCH programmes were initiated in 1951 to improve awareness and cover wider reproduction-related areas.

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

84) **Assertion :** Steroidal contraceptive pills inhibit ovulation.
Reason : The combination of estrogen and progestogen prevent surge of FSH and LH secretion

from posterior pituitary.
Read the above statements and select the correct answer from the options given below :-

(1) Both assertion and reason are correct and reason is the correct explanation of assertion.
(2) Both assertion and reason are correct and reason is not the correct explanation of assertion.
(3) Assertion is correct but reason is incorrect.
(4) Both assertion and reason are incorrect.

85) **Assertion :** Surgical method / Terminal methods also called sterilisation.
Reason : Surgical intervention blocks gamete transport and thereby prevent conception.

(1) Assertion and Reason both are correct but Reason is not the correct explanation of Assertion.
(2) Assertion is correct but Reason is not correct.
(3) Assertion is not correct but Reason is correct.
(4) Assertion and Reason both are correct and Reason is correct explanation of Assertion.

86) How many technologies in the list given below are showing invitro fertilisation :-
GIFT, ZIFT, IUT, AI, IUI

(1) Six
(2) Three
(3) Two
(4) One

87)

People in the age group of _____are more vulnerable to STI's.

(1) 15-24 years
(2) 12-15 years
(3) 18-30 years
(4) 60-70 years

88) In a female undergoing tubectomy, which one of the following event will not occur?

(1) Menstruation cycle
(2) Ovulation
(3) Fusion of sperm and ovum
(4) Formation of graafian follicle

89)

'Saheli' an oral contraceptive was developed in

(1) CDRI, Lucknow
(2) TIFR, Mumbai
(3) CFTRI, Mysore

(4) WHO, Geneva

90) Which of the following sexually transmitted infection isn’t completely curable?

(1) Trichomoniasis
(2) Gonorrhoea
(3) Genital herpes
(4) Genital warts

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.	1	2	2	4	4	1	1	4	1	1	3	2	1	3	1	1	2	1	4	3
Q.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A.	3	2	1	4	1	1	2	4	1	4	4	1	3	2	2	1	3	1	2	3
Q.	41	42	43	44	45															
A.	4	1	1	4	4															

CHEMISTRY

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

BIOLOGY

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

PHYSICS

1) Potential difference between the spheres

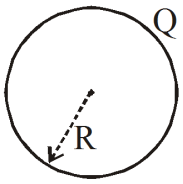
$$V = \left(\frac{Q}{4\pi\varepsilon_0 a} - \frac{Q}{4\pi\varepsilon_0 b}\right) - 0$$

–Q charge is induced on inner surface of outer sphere.

$$\therefore V = \frac{Q}{4\pi\varepsilon_0}\left[\frac{1}{a} - \frac{1}{b}\right]$$

$$\Rightarrow Q = \frac{4\pi\varepsilon_0 abV}{(b-a)} V$$

$$\therefore C = \frac{4\pi\varepsilon_0 ab}{(b-a)}$$



2)

Energy = self energy of hollow sphere

$$= \frac{kQ^2}{2R}$$

3)

50 V

After a long time i = 0

So, v = 50 V

4) At t = 0,

$$i = \frac{V}{R} = \frac{10}{50} = 0.2A$$

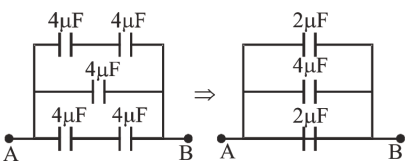
$q = CV = 2 \times 10^{-6} \times 10 = 20\ \mu C$

5)

Since battery is disconnected, charge remain constant on increasing seperations, C decrease.

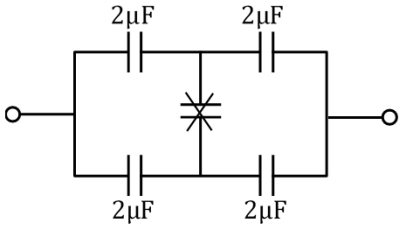
Since Q = CV

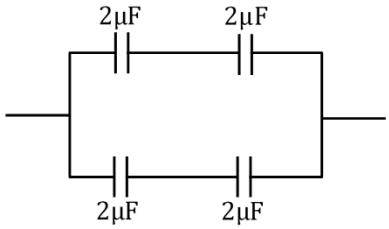
Voltage increases

6) 

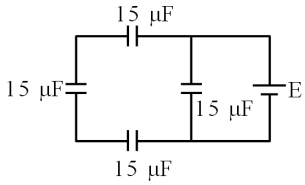
⇒ CAB = 8 μF

7) Balanced wheat stone bridge





C_{eq} = 2μF



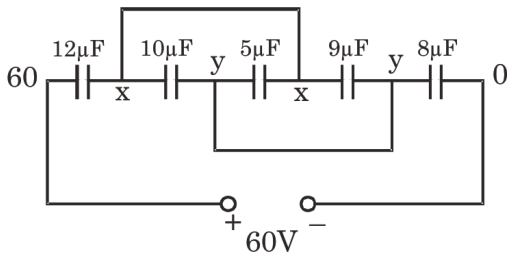
8)

C_{eq} = 5 + 15 = 20μF

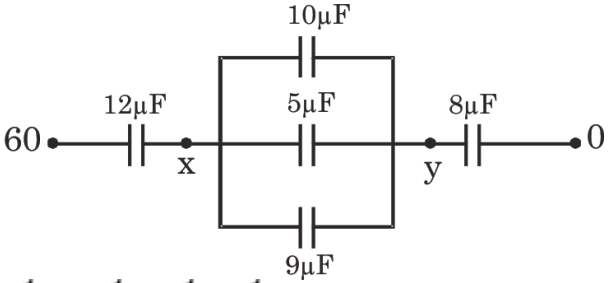
Q = C_{eq} E = 200 μC

9)

CORRECT ANSWER (1)



10)



$$\frac{1}{C_{eq}} = \frac{1}{12} + \frac{1}{24} + \frac{1}{8}$$

C_{eq}= 4μF

$$q_{5\mu F} = \frac{240}{24} \times 5 = 50\mu C$$

11)

Concept
Capacitance with Dielectric-Electrostatics
Formula
• Original: $C = \frac{\varepsilon_0 A}{d}$
• New: $C' = \frac{K\varepsilon_0 A}{2d} = 2C$
Calculation :
From formula:
$\frac{K\varepsilon_0 A}{2d} = 2.\frac{\varepsilon_0 A}{d} \Rightarrow \frac{K}{2} = 2 \Rightarrow K = 4$
Answer-3 (4)

12) $E_m = \frac{E_0}{K}$
So
$E_1 = E_3 > E_2$

13) $Q = CV = (10 \times 10^{-6})\ 10 = 100\ \mu C$
$Q' = C'V = (25 \times 10^{-6})\ 10 = 250\ \mu C$
Additional charge = $Q' - Q = 150\ \mu C$

14) $P.D. = \frac{4}{5} \times 10\ V$

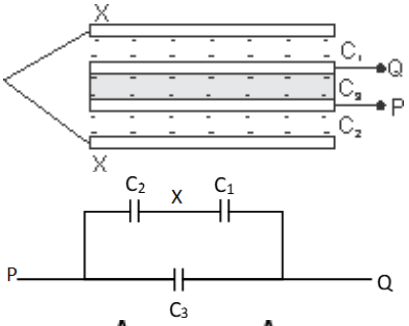
15) $E = \frac{\sigma}{K\in_0}$
inside a dielectric

16) Both the statements are incorrect

17) As battery is disconnected, Q remains same.
$C' = \frac{\varepsilon_0 KA}{d} = KC \Rightarrow$ C increases
Now, $V' = \frac{Q'}{C'} = \frac{Q}{KC} = \frac{V}{K}$
 Potential difference decreases
Now $U' = \frac{1}{2} C'V'^2 = \frac{1}{2} KC \times \frac{V^2}{K^2} = \frac{U}{K}$
 Potential energy is also reduced

18) $C' = n^{1/3} \times C$
$C = \frac{C'}{n^{1/3}} = \frac{1\mu F}{(8)^{1/3}} = \frac{1}{2}\mu F$

19) **Calculation :**



$C_1 = \frac{\varepsilon_0 A}{d}, C_2 = \frac{\varepsilon_0 A}{d}$

$C_3 = \frac{k\varepsilon_0 A}{d} = \frac{2\varepsilon_0 A}{d}$

$\because$ C_1 & C_2 in series

$C_{eq} = \frac{C_1 C_2}{C_1 + C_2} = \frac{\varepsilon_0 A}{2d}$

$\because$ C_{eq} & C_3 in parallel

$C_{eq} = C_{eq} + C_3 = \frac{\varepsilon_0 A}{2d} + \frac{2\varepsilon_0 A}{d} = \frac{5\varepsilon_0 A}{2d}$

20) $C_1 = \frac{A/2\ \varepsilon_0}{d} 6 = 3C$

$C_2 = \frac{A/2\ \varepsilon_0}{d/2} 3 = 3C$

$C_3 = \frac{A/2\ \varepsilon_0}{d/2} 6 = 6C$

$C_{eq.} = \frac{C_2\ C_3}{C_2 + C_3} + C_1 = 2C + 3C = 5C$

21)

$U = \frac{1}{2} CV^2$

$\Rightarrow$ V is constant

$\Rightarrow$ $U \propto C$

on inserting dielectric slab.

C becomes K times $\left(\text{as } C = \frac{\in_0 A}{d}\right)$

So U will also become K times.

Now $\sigma = \frac{Q}{A} = \frac{CV}{A}$

$\Rightarrow$ V and A are constants.

$\therefore \sigma \propto C$

On inserting dielectric slab, C becomes K times

So, σ will also become K times.

22)

$C_{parallel} = C_1 + C_2 + C_3$ and $\frac{1}{C_{series}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$

23)

(1) capacitance does not depend on charge on capacitor and also not depend on potential difference unit .
(2) It depends on shape size and medium between the plates of capacitance.
As it is clear from Assertion -reason that assertion correct and reason incorrect explanation of assertion.

Conclusion

Hence, opton (1) is correct

24) p.d. across 4.0 μF = $\frac{8}{8+4} \times 12$ = 8 volts

25) It is a balanced wheatstone bridge. Effective capacity between A and B comes out C.

26) ● Given displacement equation: $x = \frac{t^3}{3} - 3t^2 + 9t + 4$

● Differentiate to get velocity:

$v = \frac{dx}{dt} = \frac{d}{dt}\left(\frac{t^3}{3} - 3t^2 + 9t + 4\right)$

$v = t^2 - 6t + 9$

● To find h time when velocity is zero set v = 0:

$0 = t^2 - 6t + 9$

● Factor the quadratic equation:

$0 = (t-3)^2$

t = 3 seconds

Thus the time at which velocity is zero is 3 seconds.

27) Distance covered $D = 2\left[\frac{1}{2} \times 20 \times 5\right] = 100\,m$

Average speed = $\frac{100}{40}$ = 2.5 m/sec

28) $v_{avg} = \frac{d}{\frac{2d}{5v_1} + \frac{3d}{5v_2}}$

$v_{avg} = \frac{5v_1v_2}{2v_2 + 3v_1}$

29)

$S_{5th} = \frac{a}{2}(2 \times 5 - 1)$

$= \frac{9}{2}a$

$S_5 = \frac{1}{2}a \times 5^2$

$= \frac{25}{2}a$

$\frac{S_{5th}}{S_5} = \frac{9}{25}$

30) $\underset{1^{st}\,sec}{x}\ \underset{2^{nd}\,sec}{3x}\ \overbrace{5x}^{x_1}\ 7x\ \overbrace{9x}^{x_2}\ \underset{5^{th}\,sec}{}$

$\frac{x_1}{x_2} = \frac{5x}{9x} = \frac{5}{9}$

31) $F \propto \frac{1}{r^2} \quad \because r' = \frac{r}{2} \Rightarrow F' = 4F$

32)

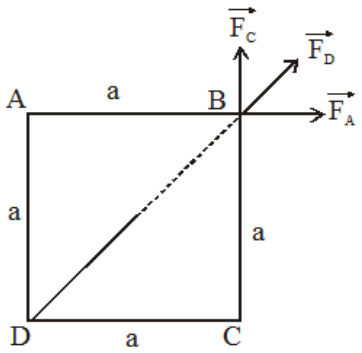
Assume smallest charges as elementary charge: $e = 1.6 \times 10^{-19}$ C.
Use Coulomb's law with $r = 1$ m and $k = 9 \times 10^9$:

$F = \frac{9 \times 10^9 \times [1.6 \times 10^{-19}]^2}{1^2} = 23.04 \times 10^{-29}$ N

$F = 2.3 \times 10^{-28}$ N.

e =

33)



Total force on charge at B is

$\vec{F}_B = \vec{F}_A + \vec{F}_C + \vec{F}_D$

$|\vec{F}_A| = |\vec{F}_C| = \frac{1}{4\pi\varepsilon_0}\frac{q^2}{a^2}$

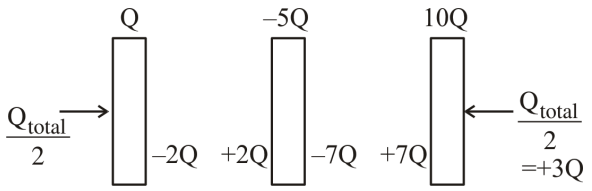
$|\vec{F}_D| = \frac{1}{4\pi\varepsilon_0}\frac{q^2}{(a\sqrt{2})^2}$

$|\vec{F}_A + \vec{F}_C| = \frac{\sqrt{2}q^2}{4\pi\varepsilon_0 a^2}$

$\vec{F}_A + \vec{F}_C$ is along $\vec{F}_D$

so $F_B = \frac{\sqrt{2}q^2}{4\pi\varepsilon_0 a^2} + \frac{q^2}{4\pi\varepsilon_0(2a^2)}$

34)



$Q_{total} = Q - 5Q + 10Q = 6Q$

35)

If electric lines of force crossed, there would be multiple electric field directions at a point, which contradicts the principle that electric field lines, that shows the direction of net electric field along the tangent to the field lines, which has only one specific direction at a point.
therefore
Option 2 is Correct.

36)

conceptual

37) $V_{Axial} = \frac{KP}{r^2}$

38)

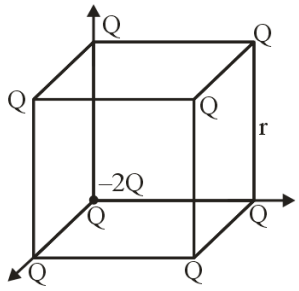
The electric field due to an infinite plane sheet of charge is uniform that is distance independent. So, at point P, by principle of superposition of electric field,

$\vec{E}_P = \frac{\sigma}{2\varepsilon_0}(-\hat{k}) + \frac{2\sigma}{2\varepsilon_0}(-\hat{k}) + \frac{\sigma}{2\varepsilon_0}(-\hat{k})$ or $\vec{E}_P = -\frac{2\sigma}{\varepsilon_0}\hat{k}$

39) $E_p = \frac{1}{4\pi\varepsilon_0}\frac{4}{(2)^2} + \frac{1}{4\pi\varepsilon_0}\frac{9}{1^2}$

$= \frac{5}{2\pi\varepsilon_0}$ N/C

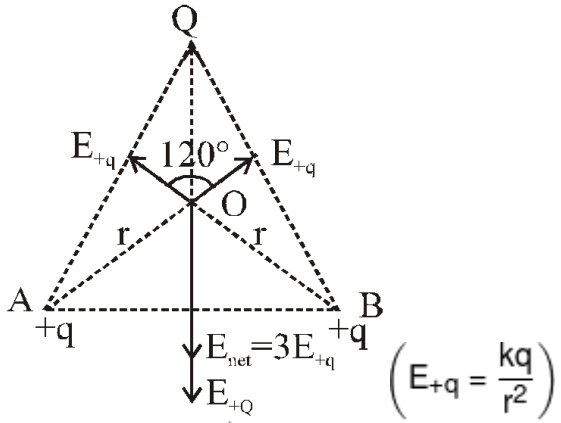
40)



If charge +Q is replaced by –Q then it will identical to that a charge –2Q place on cube at origin w.r.t initial system.
Hence, field at centre is only due to charge –2Q (E_{net}, initial = 0)
Distance of centre from corner = $\sqrt{3}r/2$

$$E = \frac{K(2Q)}{(\sqrt{3}r/2)^2} = \frac{8KQ}{3r^2}$$

41) If Q is +ve



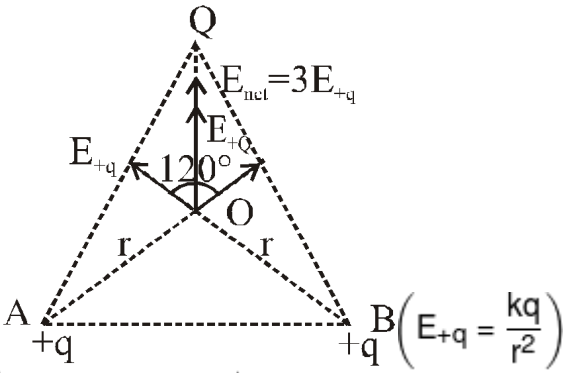
$\left(E_{+q} = \frac{kq}{r^2}\right)$

$$\left|\vec{E}_{+Q} + \vec{E}_{+q} + \vec{E}_{+q}\right| = 3E_{+q}$$

$$\Rightarrow \frac{kQ}{r^2} - \frac{kq}{r^2} = \frac{3kq}{r^2}$$

$\Rightarrow$ Q = + 4q

If Q is –ve



$\left(E_{+q} = \frac{kq}{r^2}\right)$

$$\left|\vec{E}_{+Q} + \vec{E}_{+q} + \vec{E}_{+q}\right| = 3E_{+q}$$

$$\Rightarrow \frac{kQ}{r^2} + \frac{kq}{r^2} = \frac{3kq}{r^2}$$

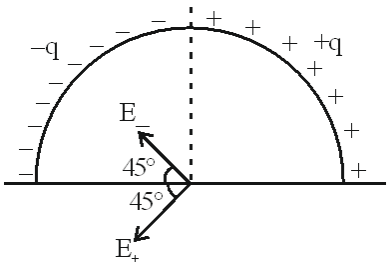
$\Rightarrow$ Q = – 2q

42) Force between two line charges = $\frac{2K\lambda}{r} \times \lambda$

On a unit length = $\frac{2 \times 9 \times 10^9 \times \left(5 \times 10^{-6}\right)^2}{0.3}$ = 1.5 N/m

Hence [1].

43)



$$E_+ = \frac{2k\lambda}{R}\sin\left(\frac{90}{2}\right)$$
$$E_- = \frac{2k\lambda}{R}\sin\left(\frac{90}{2}\right)$$
$$E_{net} = \left(\frac{2k\lambda}{R}\sin 45^0\right)\sqrt{2}$$
$$= 2\sqrt{2}\frac{k\lambda}{R}\frac{1}{\sqrt{2}}$$
$$= \frac{2k\lambda}{R}$$
$$= \frac{2k}{R}\frac{q}{\left(\frac{\pi R}{2}\right)}$$
$$= \frac{4kq}{\pi R^2}$$

44)

For given surface flux per corner charge
$\phi = \frac{q}{24\varepsilon_0}$

For two corner - $\phi_{net} = 2\phi = \frac{q}{12\varepsilon_0}$

45)

conceptual

CHEMISTRY

46)

A: Question Explanation:
The question asks us to determine the unit of the rate constant (k) for the given rate law, R = $k[A][B]^{0.5}$.

B: Given Data

A. Rate law: R = $k[A][B]^{0.5}$.

C: Concept: Unit of (K)

Solution:
The units of the rate constant (k) depend on the overall order of the reaction.

A. **Units of rate (R):**

A. the unit of R is mol L^{-1} s^{-1}.

B. **Units of concentration:**

A. Concentration is expressed in mol L^{-1}.

C. **Rearrange the rate law to solve for k:**

A. $k = R / ([A][B]^{0.5})$

D. **Substitute the units:**

A. $k = (\text{mol } L^{-1} s^{-1}) / ((\text{mol } L^{-1})(\text{mol } L^{-1})^{0.5})$

B. $k = \text{mol}^{(1-1.5)} L^{(-1 - (-1.5))} s^{-1}$

C. $k = \text{mol}^{-0.5} L^{0.5} s^{-1}$

Final Answer:

The unit of k is **(3) $\text{mol}^{-1/2} L^{1/2} s^{-1}$**.

Hence, the correct answer is option (3).

47)

ROR = $-\frac{\Delta S_2O_8^{2-}}{\Delta t} = -\frac{\Delta I^-}{\Delta t} \times \frac{1}{3}$

48)

Concept :- stoichiometry coefficient inversely proportional to rates of change.
Solution :- 2x + 3y → products

$r = \frac{1}{2}\left(-\frac{d[x]}{dt}\right) = \frac{1}{3}\left(-\frac{d[y]}{dt}\right)$

$\frac{1}{2}r_1 = \frac{1}{3} \times r_2$

$3r_1 = 2r_2$

Answer 2

49)

Concept :- Rate determining step : slowest elementary reaction dictates overall reaction rate

Solution :- The rate of multi step reaction is determined by the slowest step that is 3rd step (r_3 = 0.001)
Option :- 3
step (iii) because it is the slowest step

50)

A: Question Explanation
The question asks us to identify the correct graph(s) that represent characteristics of a first-order reaction.

C: Concept

A. **First-Order Reaction:** The rate of the reaction is directly proportional to the concentration of one reactant.
B. **Half-Life ($t_{1/2}$):** $t_{1/2} = 0.693/k$.

Analysis:

A. **Graph 1:** Concentration (a-x) vs. time
    A. This graph shows an exponential decay curve.
    B. From the integrated rate law, we know that concentration decreases exponentially with time: $A = A_0e^{(-kt)}$.
    C. Therefore, this graph is correct.
B. **Graph 2:** Half-life ($t_{1/2}$) vs. concentration
    A. This graph shows a horizontal line, indicating that the half-life is constant.
    B. For a first-order reaction, $t_{1/2} = 0.693/k$, which is independent of concentration.
    C. Therefore, this graph is correct.
C. **Graph 3:** log(a-x) vs. time
    A. This graph shows a straight line with a negative slope.
    B. From the integrated rate law, $\log(A) = (-k/2.303)t + \log(A_0)$, which is a linear equation ($y = mx + c$).
    C. The slope of the line is -k/2.303.
    D. Therefore, this graph is correct.
D. **Option 4:** All of these.
    A. Since all the individual graphs are correct, "All of these" is also correct.

E: Final Answer
The correct option is 4 (All of these).

51) $K = \frac{\frac{0.693}{t_{1/2}}}{\frac{2.303}{t_{90\%}}\log} = \frac{0.693}{120} = 5.775 \times 10^{-3}\text{min}.$

$t_{90\%} = \frac{2.303}{5.775 \times 10^{-3}}\log_{10} = 398.8 \text{ min}$

52) **A. Question Explanation**
We are told a first-order reaction is 1/5 completed in 40 minutes.

That means 4/5 of the reactant is still unreacted.
We are to find the time for 100% completion of the reaction. **B. Given Data**

A. Reaction order: First-order
B. Time for 1/5 completion = 40 min
C. Remaining fraction of reactant = 4/5 = 0.8
D. We need to find time for 100% completion

C. Concept
For a first-order reaction, the integrated rate law is:
$\ln\left(\frac{[A]_o}{[A]}\right) = kt$
We know: • First-order reactions never truly reach 100% completion because the concentration asymptotically approaches zero.
• So time for 100% completion = ∞ This is a conceptual point in first-order kinetics.

D. Mathematical Calculation (Just for insight)
Let's check time for 1/5 completion:
$\mathbf{\ln\left(\frac{[A]_o}{[A]}\right) = \ln\left(\frac{1}{0.8}\right) = \ln(1.25) \approx 0.2231}$
So, $\mathbf{k = \frac{0.2231}{40} \approx 5.577 \times 10^{-3}\ min^{-1}}$
Now, to find **t for 100% completion**, we'd need **[A] → 0**,
and since **ln(1/0) = ∞, time t → ∞**

E. Final Answer Option 4: Infinite

53)

CORRECT ANSWER (4)

54)

CORRECT ANSWER (4)

55) **Asking :**
Rate law exp.

Concept :
Mechanism of reaction based rate law.

Solution :
Step 1 (fast and rev.)

$\Rightarrow \quad K_c = \frac{[A_2B_2]}{[AB]^2}$

or $[A_2B_2] = K_c\,[AB]^2$ .....(1)

Step 2 (Slow and R.D.S.)

$R = K'\,[A_2B_2]\,[C]$ .....(2)

by 1st and 2nd equation

$R = b\ K'K_c'\ [AB]^2\ [C]$
$R = K\ [AB]^2\ [C]$

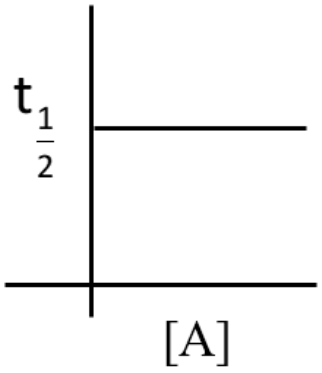
Correction option is : 1
$r = k[AB]^2[C]$

56)

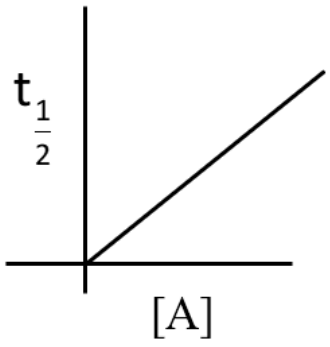
$r^1 = K[3]^2[2]^3$
$r^1 = 72\ r$

57) $x = \frac{2a}{3}$

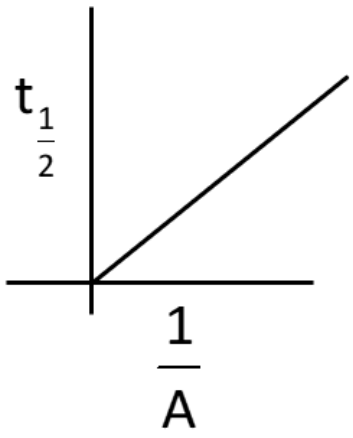
58) **Asking About :-** Order of Reaction
Concept :- Half life curves for different order Rx^n.
Sol^n / Explanation :-

(A) 

$t_{\frac{1}{2}} \times [A]^0$ ® 1st order

(B) 

$t_{\frac{1}{2}} \times [A]' \rightarrow$ Zero order



(B) $t_{\frac{1}{2}} \times [A]^{-1} \rightarrow$ second order.

Correct Answer :- Option (3) 1, 0, 2

59) **Question is Asking About:**

Rate of disappearance of PCl_5

Concept:

Rate of Reaction

Solution/Explanation/Calculation:

By curve

$\Delta T = 6 - 5 = 1$

and $\Delta c = 10 - 12 = -2$ mole L^{-1} sec^{-1}

$$R_{PCl_5} = \frac{\Delta [PCl_5]}{\Delta t}$$

$$= \frac{-(-2)}{1} = 2 \text{ mole } L^{-1} s^{-1}$$

Hence, option (1) is correct.

60)

$$A_{(gas)} \rightarrow 3B_{(gas)} + C_{(gas)}$$

P_0	0	0
P_0-P	$3P$	P

$P_t = P_0 - P + 3P + P$

$P_t = P_0 + 3P$

$3P = P_t - P_0$

$$P = \frac{P_t - P_0}{3}$$

then $$P_0 - P = P_0 - \frac{(P_t - P_0)}{3}$$

$$P^0 - P = \frac{4P_0 - P_t}{3}$$

so $$K = \frac{2.303}{t} \log \left(\frac{P_0}{P_0 - P} \right)$$

$$= \frac{2.303}{t} \log \left(\frac{3P_0}{4P_0 - P_t} \right)$$

61) ROD (I^-) = $\frac{0.02}{10} = 0.002\ M\ min^{-1}$

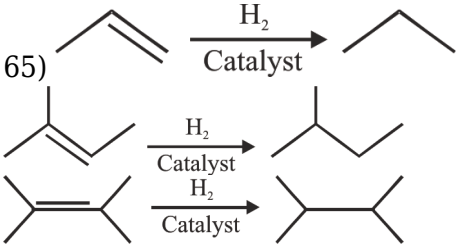
ROA (I_2) = $\frac{ROD(I^-)}{2} = 0.001\ M\ min^{-1}$

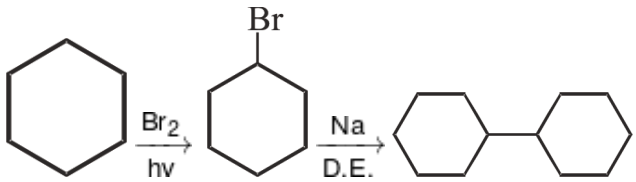
62) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow{Zn-Hg/HCl} CH_3-CH_2-CH_3$

Clemmensen Reduction

63) Compound containing only OH chiral centre exist in enantiomeric form.

64) $CH_4 \xrightarrow[h\nu]{Br_2} CH_3-Br \xrightarrow[ether]{Na} CH_3-CH_3$ (less than four 'C')

65) 

66) 

67) $C_6H_5-CH_2-Br \xrightarrow[Ether]{Mg} C_6H_5-CH_2-MgBr \xrightarrow{H_3O^+} C_6H_5-CH_3$

68) Rate $\propto$ stability alkyl free radical.

69) It is example of aromatisation reaction

70) Answer (3)

Boiling point increases with increase in molecular mass. For molecules with same molecular mass, more branching decreases the boiling point.

71) Answer (4)

$$2CH_3CH_3 + 3O_3 \xrightarrow[\Delta]{(CH_3COO)_2Mn} 2CH_3COOH + 2H_2O$$

72) $$R-\underset{\underset{O}{\|}}{C}-\overset{\ominus}{O}\overset{\oplus}{Na}/\overset{\oplus}{K} \xrightarrow{\text{electrolysis}} \underbrace{R-R+\overset{\star}{C}O_2}_{\text{at anode}} + \underbrace{NaOH/KOH + \overset{\star}{H}_2}_{\text{at cathode}}$$

73) $$CH_3-\overset{\overset{O}{\|}}{C}-CH_2-COOH$$

β – keto acid is highly reactive for decarboxylation

74) $$CH_3-CH_2-Cl \xrightarrow[\text{dry ether}]{Na} CH_3-CH_2-CH_2-CH_3$$
$$CH_3-CH_2-Cl \xrightarrow{Zn/\text{dil HCl}} CH_3-CH_3$$

75) Alkane preparation

76) Rate of nitration depend on the stability of free radical.

77) $$\text{Rate} \propto \frac{1}{\text{steric hindrance}}$$

78) Aromatization Reaction

79)

NCERT XI Page No. # 380

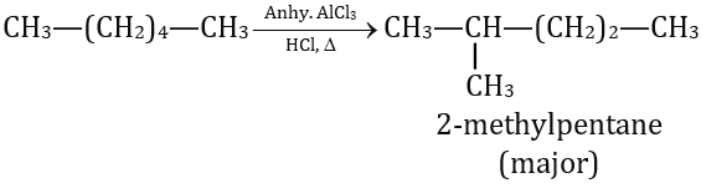
80)

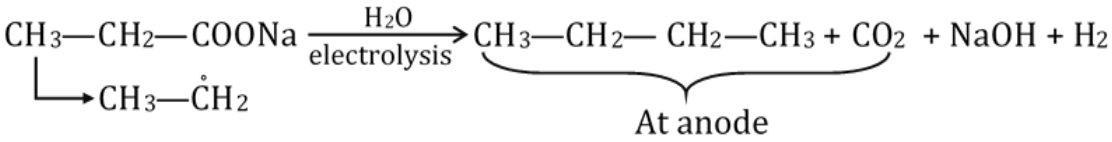
CORRECT ANSWER (1)

81)

CORRECT ANSWER (2)

82) n-alkanes on heating in this presence of anhydrous $AlCl_3$ and hydrogen chloride gas isomerise to branched chain alkanes. The major product has one methyl side chain.





83)
pH level of solution **increases** due to increase in concentration of base NaOH.

84) **Concept :** First, Second, Third order reaction.

Solution:
For different order reactions, the rate of reaction r is related to the concentration of the reactant [A] and the rate constant k as follow :
• First order reaction $r_1 = k[A]$
• Second order reaction $r_2 = k[A]^2$
• Third order reaction $r_3 = k[A]^3$
We can compare the rates at different concentrations of A to determine the relationship

Calculation :
• If [A] – 1:
r_1 – k(1) – k, r_2 – $k(1)^2$ –k, r^3 –$k(1)^3$–k
Therefore , r^1 - r^2 and option 1 is correct
• If [A] < 1 :
In this case, the rate depends on the power of A. Since r_1 - k[A], r_2-$k[A]^2$, and r_3 - $k[A]^3$, for smaller values of [A] the rates will be in the order $r_1 > r_2 > r_3$.
• If [A] > 1 :
As [A] increases, the rates follow $r_3 > r_2 > r_1$, because the rate for the third order depends on the cube of [A] while the second order depends on the square, and the first order is directly proportional to [A]

Final Answer:
Option (4): All of these

85) **Explanation**
Order of a reaction is the sum of the exponents of reactant concentrations in the **rate law equation**, determined **experimentally.**
Concept :- Order of reaction
Solution:
Order can be determined experimentally Correct
Order of Rx^n is experimentally value, & Independent on stoichiometric coefficient of the Reactants. and in elementary Rx^n order is equal to sum of molecules participate is Rx^n and It may be fractional, whole no or zero value.
Answer Option 4 So that incorrect statement is option .

86)

If we calculate $\frac{\Delta P}{\Delta t}$ for two time interval we observe that it is constant which means rate of reaction is constant. That means zeroth order.

for 0–5 sec $\Rightarrow \left|\frac{\Delta P}{\Delta t}\right| = \left|\frac{20}{5}\right| = 4$

5–20 sec $\Rightarrow \left|\frac{\Delta P}{\Delta t}\right| = \left|\frac{60}{15}\right| = 4$

87)

For elementary reaction, stoichiometric coefficient will be order of reaction.

88)

$r = k[A]^{\alpha}[B]^{\beta}$

$\frac{1.6}{3.2} = \left(\frac{0.5}{1}\right)^{\beta}$

$\beta = 1$

$\frac{1.6}{3.2} = \left(\frac{0.5}{1}\right)^{\alpha}$

$\alpha = 1$

$r = k[A]^{1}[B]^{1}$

89)

NCERT-XII, Pg. # 104, Part-1, 2017 Edition

90)

$x = kt = 0.025 \times 15 = 0.375$ M

Remaining conc. = 0.5 – 0.375 = 0.125 M

BIOLOGY

91)

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92)

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93)

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94)

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95)

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100)

NCERT PAGE NO. 82

101)

NCERT PAGE NO. 80

102)

NCERT PAGE NO. 80

103) Hint : NCERT - XII/Page - 96

104)

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105)

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106)

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107)

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108)

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109)

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110)

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111)

NCERT PAGE NO. 73

112)

NCERT PAGE NO. 58

113)

NCERT PAGE NO. 30

114)

NCERT PAGE NO. 62

115)

NCERT PAGE NO. 18

116)

NCERT PAGE NO. 60

117)

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118)

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134)

NCERT PAGE NO. 57

135)

NCERT PAGE NO. 69

136)

NCERT Pg.No. 145

137)

Question Asking About:

Identify the device:
Identify the implantation site:

Solution Explanation:

Correct Implantation Site: Copper-T IUDs are inserted into the **uterine cavity**.

Correct Answer: Option (3)

138)

Final Answer: (3) **A, B, C**
Periodic abstinence, coitus interruptus, and lactational amenorrhoea are all **natural contraceptive methods**, while MTP is not.

139)

NCERT XII PAGE NO.63

140) **Question Asking About:**
The question asks you to identify the mechanism by which copper ions released from copper-releasing IUDs contribute to contraception.

Solution AND CORRECT ANSWER:

4. Suppress sperm motility:
This is the primary mechanism. Copper ions are toxic to sperm and suppress their motility, making it difficult for them to reach and fertilize the egg.

Therefore, the correct answer is **4. Suppress sperm motility.**

141)

The correct answer is **Option 3: A-c, B-a, C-d, D-b**

142)

Solution:
Lactational Amenorrhoea:
This method is based on the natural infertility that occurs during exclusive breastfeeding. It is effective **only for up to six months** following childbirth, as long as the mother is exclusively breastfeeding and has not resumed menstruation. After six months or when breastfeeding frequency decreases, the effectiveness significantly decreases.

Final Answer: (2) Lactational Amenorrhoea

143)

CORRECT ANSWER (2)

144) **Vasa efferentia are cut and tied up**: This is an incorrect statement. In a vasectomy, the vas deferens (not the vasa efferentia) are cut and tied or sealed. The vasa efferentia are small ducts that carry sperm from the testes to the epididymis, while the vas deferens carries sperm from the epididymis to the urethra.
Therefore, the incorrect statement about vasectomy is option 2. The vasa deferentia, not the vasa efferentia, are the tubes that are cut and tied.

145) NCERT, #Reproductive Health, Page 44, 1st para

146)

NCERT, # Reproduction Health, Page 44,45

147) NCERT, # Reproduction Health, Page 43, 3rd para

148) NCERT, # Reproduction Health, Page 45, 3rd para

149) High level of prolactin inhibits the release of gonadotropins.

150) Periodic abstinence is a natural method, not a barrier method.

151)

What the Question Is Asking:

A. Asks which assisted reproductive technology (ART) technique involves fertilization occurring within the female's body.

Solution/Explanation:

A. GIFT is the only option where the gametes (sperm and ovum) are placed into the fallopian tubes, allowing fertilization to occur naturally within the female's reproductive tract

B. **Correct Answer is option (4)**

C. Therefore the correct answer is option 4: G.I.F.T.

Difficulty Level: Easy.

152)

Solution:
Condoms are the only contraceptive method listed that provide protection against sexually transmitted diseases (STDs) and AIDS (HIV). They form a physical barrier that prevents the exchange of bodily fluids, reducing the risk of transmission of these infections.
Final Answer: (2) Condom

153) **Question Asking About:**

The question seeks to identify the contraceptive method with the highest likelihood of resulting in unintended pregnancy, indicating a high failure rate.Solution AND CORRECT ANSWER:

A. 1. Natural method:
    A. These methods, such as the rhythm method or withdrawal, rely on predicting ovulation or avoiding intercourse during fertile periods. They are highly dependent on accurate tracking and self-control, making them prone to errors.
B. Therefore, the method with the highest failure rate is the natural method.
C. The correct answer is 1. Natural method.

154) NCERT (XII) Pg. # 60

155)

NCERT XII Pg. # 61

156)

What the Question Is Asking:

match the types of contraceptives listed in column A. with their specific examples and mechanisms of action in column B.

Solution AND CORRECT ANSWER:

A. **Non-medicated IUDs:(** Lippes loop) They can cause a mild inflammatory reaction facilitate Phagocytosis of sperm.
B. **Copper Releasing IUDs:(**Multiload 375) Copper ions released by these IUDs suppress sperm motility.
C. **Hormone Releasing IUDs:** (LNG-20) These IUDs release hormones like progestin,.primarily work by making the uterus unsuitable for implantation.
D. **Weekly Oral Pill (Saheli):** This pill contains a non-steroidal compound that has anti-estrogenic activity, preventing ovulation.

Therefore, the correct matching is:

(3) A-c-ii, B-a-iii, C-d-i, D-b-iv Difficulty Level: Medium

157)

NCERT XII Pg. # 60

158)

NCERT (XIIth) Pg. # 60

159) **Question Is Asking:**

A. To identify and count the contraceptive methods that are characterized by minimal to no adverse side effects on the user's health.

Solution Explanation:

A. **Lactational amenorrhea:** Natural method; generally few side effects, but dependent on consistent breastfeeding.
B. **Periodic abstinence:** Natural method; no direct physical side effects.
C. **Coitus interruptus:** Natural method; no direct physical side effects.

B. Methods with "almost no side effects":
   A. Lactational amenorrhea
   B. Periodic abstinence
   C. Coitus interruptus

Answer:
The correct answer is option 2: THREE.

160) NCERT XIIth Pg. 52

161)

NCERT-XII, Pg. # 48

162) Norplant is implanted subcutaneously and it works up to 5yrs approx.

163) NCERT XIIth Pg # 60, 62

164) NCERT XII Pg. # 162

165) NCERT (XII) Pg. # 61

166)

NCERT Pg # 64

167)

Amniocentesis is preferred between 14 to 16 weeks to detect chromosomal abnormalities.

168) NCERT XI Pg # 61

169) NCERT-XII Pg. # 46

170) NCERT-XII, Pg. # 23

171)

NCERT-XII Pg. # 48

172) NCERT, Pg. # 43

173) The assertion is true as the RCH programmes in India indeed aim to create awareness and provide support for a reproductively healthy society. However, the reason is false because the RCH programmes were not initiated in 1951; it was the 'family planning' programmes that were initiated in 1951. The RCH programmes are improved versions of the earlier family planning programmes and cover a wider range of reproductive health aspects. Therefore, A is true, but R is false.

174) NCERT Pg. # 61

175) NCERT XII, Pg. # 61

176) **Solution :**

A. ZIFT (Zygote Intra Fallopian Transfer) and IUT (Intra Uterine tranfer) involve in vitra fertilization, where fortilization occurs outside the body. GIFT, AI and IUI involve in vivo methods.

Final Answer : option (3) **Two**

177) NCERT XII, Page # 64

178)

Explanation:

A. (1) Menstruation cycle: Menstruation will continue after tubectomy because the ovaries still function and release eggs, but they cannot travel to the uterus.
B. (2) Ovulation: Ovulation still occurs after tubectomy, as the ovaries continue to release eggs.
C. (4) Formation of Graafian follicle: The formation of Graafian follicles still occurs in the ovaries as part of the regular menstrual cycle.

However, (3) Fusion of sperm and ovum will not occur because the fallopian tubes are blocked or cut during tubectomy, preventing the sperm from reaching the egg.

So, the correct answer is (3) . Fusion of sperm and ovum.

179)

NCERT Pg No. 58

180)

NCERT XII Pg. # 63/70(H)Para:4.4