

SECTION A

Q. No.	(a)	(b)	(c)	(d)	Q. No.	(a)	(b)	(c)	(d)
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	16	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17	Question dropped			
3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	19	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	20	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	25	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	27	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	28	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	29	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	30	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

One mark have been allotted to every candidate for question no 17.

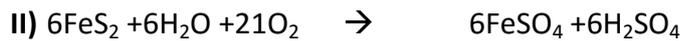
All alternative solutions have been given due consideration**SECTION B****QUESTION 31****A.**

- I. Total fluid if 70 % of body weight i.e. 70% of 70Kg = 49 Kg
 Blood is 8% of the total fluid i.e. 8% of 49 kg = 3.92 kg
 Converting kg into volume- $3920/1060 = \mathbf{3.698 \text{ litres}}$
- II. DNA in White blood cells: $7000 \times 1000 \times 1000 \times 3.69 \times 46$
- III. Weight of albumin = 7% of 3.92 = 0.2744 x 58% = .159kg
 $66000 \text{ g} = 1 \text{ mole}$
 $159 \text{ g} = 159/66000 \text{ moles}$

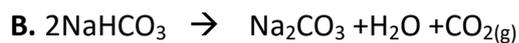
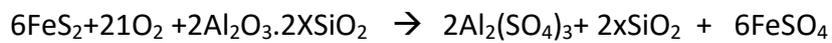
B.

Label	Composition of blood (choose between oxygenated or deoxygenated)	Direction of flow (choose between away from or towards the heart)
1	Oxygenated	Away from
2	Deoxygenated	Away from
3	Oxygenated	towards
4	Deoxygenated	towards

QUESTION 32



..... Or



2x84

22.4 L

Amt of NaHCO_3 equivalent to 56 mL of CO_2 at NTP = $(56 \times 168) / 22400 = 0.42\text{g}$

Equivalent of NaHCO_3 present = $0.42 / 84 = 0.005$ or 5 milli eq.

The amt. of HCl consumed by NaHCO_3 and Na_2CO_3 in the mixture = 30.5 mL of 1N HCl = 0.0305 equivalents or 30.5 milli eq.

The amt. of HCl consumed by $\text{Na}_2\text{CO}_3 = 30.5 - 5 = 25.5$ m.e.

Hence the amt. of Na_2CO_3 present = $25.5 \times 53 \times 10^{-3} \text{g} = 1.35 \text{g}$

Thus amt. of NaCl in 3g of the mixture = $3 - 0.42 - 1.35 = 1.23$

% Of NaCl = $41\% = (1.23 \times 100) / 3$

QUESTION 33

I) Sample 1) $2\text{mg of CaSO}_4 = 2 \times 10^{-3} \text{ g of CaSO}_4 = 2 \times 10^{-3} / 136 = 1.5 \times 10^{-5} \text{ mol of CaSO}_4$
 $1 \text{ mol of CaSO}_4 = 1 \text{ mol of CaCO}_3 = 100 \text{ g of CaCO}_3$

Therefore $1.5 \times 10^{-5} \text{ mol of CaSO}_4 = 1.5 \times 10^{-5} \times 100 = 1.5 \times 10^{-3} \text{ g of CaCO}_3$

Thus, $1000 \text{ g of water contains CaSO}_4$ equivalent to $1.5 \times 10^{-3} \text{ g of CaCO}_3$

$10^6 \text{ g (one million) of water contains} = [(1.5 \times 10^{-3}) / 1000] \times 10^6 = 1.5 \text{ g of CaCO}_3$

Or $[(2 \times 100) / 136] = 1.5 \text{ g of CaCO}_3$ (direct method)

$0.5 \text{ mg of MgCl}_2 = 5 \times 10^{-4} \text{ g of MgCl}_2 = 5 \times 10^{-4} / 95 = 0.053 \times 10^{-4} \text{ mol of MgCl}_2$

$1 \text{ mol of MgCl}_2 = 1 \text{ mol of CaCO}_3 = 100 \text{ g of CaCO}_3$

$0.053 \times 10^{-4} \text{ mol of MgCl}_2 = 0.053 \times 10^{-4} \times 100 = 0.053 \times 10^{-2} \text{ g of CaCO}_3$

$10^6 \text{ g (one million) of water contains} = [(0.053 \times 10^{-2}) / 1000] \times 10^6 = 0.53 \text{ g of CaCO}_3$

Or $[(0.5 \times 100) / 95] = 0.53 \text{ g of CaCO}_3$ (direct method)

Hence degree of hardness of sample 1 is $1.5 + 0.53 = 2.03 \text{ ppm}$

Sample 2) $3 \text{ mg of MgSO}_4 = 3 \times 10^{-3} \text{ g of MgSO}_4 = 3 \times 10^{-3} / 120 = 2.5 \times 10^{-5} \text{ mol of MgSO}_4$

$1 \text{ mol of MgSO}_4 = 1 \text{ mol of CaCO}_3 = 100 \text{ g of CaCO}_3$

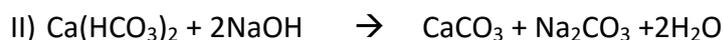
Therefore $2.5 \times 10^{-5} \text{ mol of MgSO}_4 = 2.5 \times 10^{-5} \times 100 = 2.5 \times 10^{-3} \text{ g of CaCO}_3$

Thus, $1000 \text{ g of water contains MgSO}_4$ equivalent to $2.5 \times 10^{-3} \text{ g of CaCO}_3$

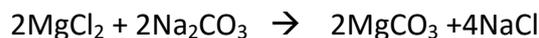
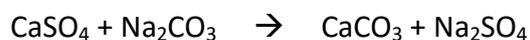
$10^6 \text{ g (one million) of water contains} = [(2.5 \times 10^{-3}) / 1000] \times 10^6 = 2.5 \text{ g of CaCO}_3$

Hence degree of hardness of sample 2 = 2.5 ppm

Or $[(3 \times 100) / 120] = 2.5 \text{ g of CaCO}_3$ (direct method)



(Any one reaction either with Calcium or Magnesium)



(Any two reactions either with sulphate or chloride of Calcium or Magnesium)

