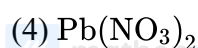
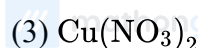
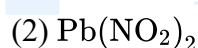
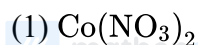


## Questions with Answer Keys

MathonGo

## Q1 (20 July 2021 Shift 1)

An inorganic Compound 'X' on treatment with concentrated  $\text{H}_2\text{SO}_4$  produces brown fumes and gives dark brown ring with  $\text{FeSO}_4$  in presence of concentrated  $\text{H}_2\text{SO}_4$ . Also Compound 'X' gives precipitate 'Y', when its solution in dilute  $\text{HCl}$  is treated with  $\text{H}_2\text{S}$  gas. The precipitate 'Y' on treatment with concentrated  $\text{HNO}_3$  followed by excess of  $\text{NH}_4\text{OH}$  further gives deep blue coloured solution, Compound 'X' is:



## Q2 (22 July 2021 Shift 1)

Methylation of 10 g of benzene gave 9.2 g of toluene. Calculate the percentage yield of toluene (Nearest integer)

## Q3 (25 July 2021 Shift 1)

Consider the complete combustion of butane, the amount of butane utilized to produce 72.0 g of water is  $x \times 10^{-1}$  g. (in nearest integer)

## Q4 (25 July 2021 Shift 2)

The number of significant figures in 0.00340 is

## Q5 (27 July 2021 Shift 1)

The density of  $\text{NaOH}$  solution is  $1.2 \text{ g cm}^{-3}$ . The molality of this solution is m.

(Round off to the Nearest Integer) [Use : Atomic masses: Na : 23.0u O : 16.0u

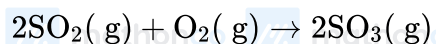
H : 1.0u

Density of  $\text{H}_2\text{O}$  :  $1.0 \text{ g cm}^{-3}$ ]

## Questions with Answer Keys

MathonGo

Q6 (27 July 2021 Shift 2)



The above reaction is carried out in a vessel starting with partial pressure  $P_{\text{SO}_2} = 250$  m bar

$P_{\text{O}_2} = 750$  m bar and  $P_{\text{SO}_3} = 0$  bar. When the

reaction is complete, the total pressure in the reaction vessel is m bar. (Round off of the nearest integer).

Questions with Answer Keys

MathonGo

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**Answer Key**

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**Q1 (3)**

**Q2 (78)**

**Q3 (464)**

**Q4 (3)**

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**Q5 (5)**

**Q6 (375)**

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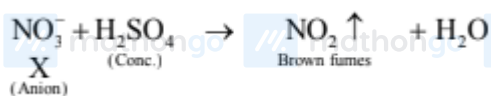
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#MathBoleTohMathonGo

## Hints and Solutions

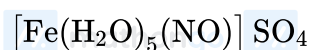
MathonGo

Q1



Sol<sup>n</sup>      conc.      X

↓



(Dark brown ring)  $\text{Cu}^{2+} + (\text{dilHCl} + \text{H}_2\text{S})$

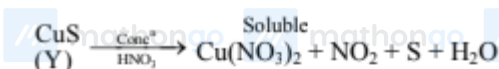
X                      (Group-II reagent)

↓



(Black ppt)

(Y)



Soluble

↓

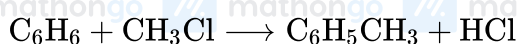
Excess

 $\text{NH}_4\text{OH}$ Sol<sup>n</sup>

Deep blue colour solution.

∴ X →  $\text{Cu}(\text{NO}_3)_2$

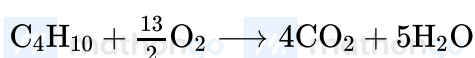
Q2



$$\frac{10}{78} \left( \frac{10}{78} \times 92 \right) \text{ gm} \Rightarrow$$

$$\frac{A_y}{T_y} = \% \text{ yield} = \frac{9.2}{920} \times 78 \times 100 \Rightarrow 78\%$$

Q3



$$\text{Moles of H}_2\text{O} = \frac{72}{18} = 4$$

$$\text{Moles of C}_4\text{H}_{10} \text{ used} = \frac{1}{5} \times 4$$

#MathBoleTohMathonGo

## Hints and Solutions

MathonGo

$$\text{Weight of } C_4H_{10} \text{ used} = \frac{4}{5} \times 58$$

$$= 46.4 \text{ gm}$$

Q4

Number of significant figures = 3

Q5

Consider 1 l solution

$$\text{mass of solution} = (1.2 \times 1000) \text{ g}$$

$$= 1200 \text{ gm}$$

Neglecting volume of NaOH Mass of water = 1000 gm

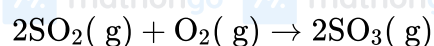
$$\Rightarrow \text{Mass of NaOH} = (1200 - 1000) \text{ gm}$$

$$= 200 \text{ gm}$$

$$\Rightarrow \text{Moles of NaOH} = \frac{200 \text{ g}}{50 \text{ g/mol}} = 5 \text{ mol}$$

$$\Rightarrow \text{molality} = \frac{5 \text{ mol}}{1 \text{ kg}} = 5 \text{ m}$$

Q6



Initial 250 m bar 750 m bar O

(L. R.)

Final -250 m bar -125 m bar 250 m bar 0 625 m bar 250 m bar

$$\therefore \text{Final total pressure} = 625 + 250 = 875 \text{ m bar}$$