

P38/HSC251/EE/20160518

Time : 3 Hours

Marks : 80

Instruction :

1. All Questions are Compulsory.
2. Each Sub-question carry 5 marks.
3. Each Sub-question should be answered between 75 to 100 words. Write every questions answer on separate page.
4. Question paper of 80 Marks, it will be converted in to your programme structure marks.

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1. Solve any **four** sub-questions.
 - a) Define the following terms : 5
 - i) Mole
 - ii) Molarity
 - iii) Molecular Weight
 - iv) Atomic Weight
 - v) Normality
 - b) How many gram of KOH are in 5 mole and toluene in 3 mole? 5
 - c) Write short note on Energy balance. 5
 - d) 18 gm of cinnamic acid can be synthesized from 21 gm of benzaldehyde using following reagent (i) Acetic Anhydride = 30 gm (ii) Potassium acetate = 12 gm water 100 ml. 5
 - e) Which principal used for separation of Benzene and toluene explain in detail. 5
 2. Solve any **four** sub-questions.
 - a) 50 gm of benzoylacetone required to synthesize 60 gm of acetophenone using following reagents
Dry ethyl acetate = 200 ml.
How many moles of acetophenone required to synthesized 450 gm of benzoylacetone? 5
 - b) Give in detail importance of Recycling and Bypassing operation. 5
 - c) How will you prepare 0.1 N NaOH, 3N KOH, 6NH₂SO₄, 1M H₂SO₄ and 1NHCl? 5
 - d) Give classification of material balance problem and explain method of solving material balance. 5
 - e) What is material balance? Explain detail material balance involving chemical reaction. 5

3. Solve any **four** sub-questions.
- Discuss in detail on Heating capacity. 5
 - How will you prepare 900 ml 0.5 N Oxalic acid from 3N oxalic acid? 5
 - What will be the quantity of 6 moles of Na_2SO_4 and 2.5 moles of KMnO_4 ? 5
 - The available carbon in glycerol sample and acetaldehyde is 35% and 69% (by wt) respectively. Find the actual glycerol and acetaldehyde content in the sample. 5
 - Draw a flow diagram of extraction of acetic acid and absorption of CO_2 in aqueous MEA solution. 5
4. Solve any **four** sub-questions.
- How will you prepare 30% 700 ml H_2SO_4 solution from 50% stock solution? 5
 - What is material balance? Give classification of material balance problem and explain in detail process flow sheet. 5
 - Solve the following : 5
 - KCl weighing 400 kg is mixed with 300 kg NaCl composition of mix in find (1) weight % (2) mole %
 - NaOH weighing 300 kg is mixed with 300 kg of KOH find (1) weight % (2) mole%
 - 42 gm of O-chlorobenzoic acid can be synthesized from 50 gm of O-chlorotoluene using following reagent.
Potassium Permanganate
 - $\text{KMnO}_4 = 75 \text{ gm}$
 - $\text{HCl} = 75 \text{ ml}$
 How many moles of O-chlorotoluene will be required to synthesize 294 gm of O-chlorobenzoic acid? 5
 - 35 gm nitrobenzene can be synthesized from 26 gm (30 ml) benzene by nitration reaction using following reagent.
 - Conc. $\text{HNO}_3 = 50 \text{ gm}$
 - Conc. $\text{H}_2\text{SO}_4 = 74 \text{ gm}$
 - $\text{CaCl}_2 = 5 \text{ gm}$
 Then how many mole of benzene will be required for synthesis of 175 gm of nitrobenzene. 5

