

P38/HSC241/EE/20160518

Time : 3 Hours

Marks : 80

Instructions :

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) Describe flow diagram of sulfonation of benzene. 5
 - b) What is halogenation? Write a short note on liquid phase chlorination. 5
 - c) Discuss reaction mechanism of nitration with an example. 5
 - d) Describe reactor for metallic fluoride fluorination with well labelled diagram. 5
 - e) What is Oxidation? Discuss partial oxidation process. 5

2. Solve any **four** sub-questions.
 - a) What is esterification? Discuss catalysts used in esterification reactions. 5
 - b) Outline synthesis of Furosemide and draw flow diagram for its production. 5
 - c) Write a note on hydrogenation of hydrocarbon. 5
 - d) Describe reaction unit of liquid-phase oxidation by molecular oxygen. 5
 - e) Write a note on material of construction and designing of nitration reactor. 5

3. Solve any **four** sub-questions.
- a) Draw neat labelled flow diagram of continuous production of ethyl acetate. 5
 - b) How will you synthesize aliphatic amines from alcohol? Discuss its reaction with example. 5
 - c) Draw a neat labelled diagram of film reactor and turbo mixer. 5
 - d) What is oxidation? Discuss in short partial oxidation process. 5
 - e) Write a note on azeotropic separation. 5
4. Solve any **four** sub-questions.
- a) What are the advantages of batch and continuous nitration. 5
 - b) What is Hydrogenation? Classify hydrogenation reactions with examples. 5
 - c) Give the synthesis of paracetamol and aspirin. 5
 - d) Discuss steps involved in production of Dimethyl terephthalate. 5
 - e) Write a note on reaction unit of nitration of aromatic compound. 5

