B.TECH/CHE/5TH SEM/CHEN 3132/2016

PETROCHEMICAL TECHNOLOGY
(CHEN 3132)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) First petrochemical industry in India is
(a) ethylene based (b) propylene based
(c) butidiene based (d) napthene based.

(ii) Steam reforming operation of naptha or natural gas produces
(a) synthesis gas (b) methane
(c) propanaldehyde (d) none of these.

(iii) Raw materials for cumene production are
(a) propylene + benzene (b) propylene + oxygen
(c) benzene + naptha (d) none of these.

(iv) CO is converted into CO_2 through
(a) shift conversion (b) methanator
(c) CO_2 absorber (d) stripper.

(v) Fischer-Tropsch synthesis process converts synthesis gas into
(a) olefins (b) ethylene
(c) SBR (d) PVC.

(vi) LDPE can be produced from ethylene through
(a) chlorination (b) polymerization
(c) alkylation (d) none of the above.

(vii) Ethylene dichloride production is a
(a) gaseous phase reaction (b) solid phase reaction
(c) liquid phase reaction (d) gaseous-liquid phase reaction.

(viii) Which catalyst is used during VAM production?
(a) Palladium chloride (b) Alumina
(c) Silver (d) Nickel.

(ix) Dowtherm is used to control
(a) the reaction pressure (b) the reaction temperature
(c) both (a) and (b) (d) none of these.

(x) Which reactor is being used during KBS production
(a) PFR (b) CSTR
(c) packed bed (d) none of these route.

Group – B

2. Write short notes on *any four* of the following: **(4 × 3) = 12**
(i) Production and consumption pattern of petrochemicals in India
(ii) Purification of the feedstock in petrochemical industry
(iii) Propionaldehyde production (with block diagram)
(iv) Liquid phase technology of methanol production (with block diagram)
(v) Effect of system parameters on steam reforming operation.

3. (a) With the help of flow diagram discuss the manufacturing process of synthesis gas from methane.

(b) What is oxo-synthesis method?

8 + 4 = 12

Group – C

4. Discuss the manufacturing process of ethylene via steam cracking of naptha with flow diagram. Name two naphtha cracker plant in India.

(10 + 2) = 12

5. Discuss with neat flow sheet the process for the production of vinyl chloride monomer. What is the main use of vinyl chloride?

(10 + 2) = 12

Group – D

6. Attempt *any six* of the following: **6 × 2 = 12**
(i) How do switch condensers help in generating crude phthalic anhydride (solid)?

(ii) For production of phthalic anhydride, spray of liquid feed is used in case of fluidized bed reactor whereas in packed bed reactor, the feed is vapourized — Justify.
(iii) In styrene production why vacuum is used in the ploy alkyl still unit?
(iv) From the perspective of waste minimization, discuss the merits of the production of phenol via hydrochlorination route.
(v) Write down the reactions involved in phenol-production via chlorobenzene route.
(vi) Why unsaturated compounds are converted to the saturated ones before sending them to oxidation reactor during the production of phenol from cumene.
(vii) What are the basic advantages of emulsification?

7. (a) Give detailed description about the additives used in detergent.

(b) Explain the recovery process of aromatics from reformate with the help of the flow sheet.

6 + 6 = 12

Group – E

8. (a) Explain the manufacturing process of polystyrene with a neat flow sheet.

(b) Write down its applications.

10 + 2 = 12

9. Describe the following: **(4 × 3) = 12**
(i) Improvement in catalyst in HDPE production
(ii) High pressure process for LLDPE production
(iii) Production of PP
(iv) Production of PVC.