PETROCHEMICAL TECHNOLOGY
(CHEN 3131)

Time Allotted : 2½ hrs **Full Marks : 60**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

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

Group – A

1. Answer any twelve: **12 × 1 = 12**

Choose the correct alternative for the following

(i) H_2S is removed in amine absorption column by using
(a) Diethyl Amine solution (b) Dimethyl ethylene solution
(c) Sulphurous acid (d) Nitrous acid.

(ii) The catalyst used in catalytic reforming unit is
(a) Alumina (b) Vanadium Pentoxide
(c) Platinum (d) Zinc oxide.

(iii) Catalyst used in acrylonitrile production unit is
(a) Nickel (b) Chromium oxide
(c) Zinc oxide (d) Bismuth phosphomolybdate.

(iv) Refrigerated brine solution is used in the production of
(a) Ethylene oxide (b) Isopropanol
(c) Propylene oxide (d) Ethylene dichloride.

(v) Absorbent used in absorption tower during butadiene production is
(a) Light oil (b) Cuprous ammonium acetate
(c) Naptha (d) Natural gas.

(vi) In catalytic cracking the
(a) Gasoline obtained has a very low octane number
(b) Gasoline obtained has a very high aromatic content
(c) Pressure and temperature is very high
(d) Gasoline obtained has a very high amount of gum forming compounds.

(vii) Suspension agent used in the detergent is
(a) Sodium silicate (b) Carboxymethyl cellulose
(c) Bicarbonate (d) Methylene blue

(viii) Match the following

A. Autothermal reforming	(i) LAB
B. Alkylation	(ii) P - Xylene
C. Parex process	(iii) Olefins
D. Dehydrogenation	(iv) Synthesis gas

(a) A (iv), B (i), C (ii), D (iii) (b) A (i), B (iv), C (ii), D (iii)
(c) A (iv), B (i), C (iii), D (ii) (d) A (iii), B (i), C (ii), D (iv)

(ix) Ziegler – Nata catalyst is a mixture of
(a) Titanium chloride and aluminium chloride
(b) Palladium and nickel
(c) Titanium chloride and hydrogen peroxide
(d) Titanium tetrachloride and Alkyl aluminium.

(x) Plasticizer used in the polymer production is
(a) Silica (b) Activated carbon
(c) Membrane (d) White clay.

Fill in the blanks with the correct word

(xi) Lighter oil has _____ API.

(xii) India is the _____ manufacturer and exporter of dye.

(xiii) Dowtherm is a mixture of two stable compound of _____ and _____.

(xiv) The optical brightener agent used as a detergent additive is _____.

(xv) Polypropylene production takes place in _____ reactor.

Group - B

2. (a) Discuss the classification of petroleum product. *[(CO1)(Analyse/HOCQ)]*
(b) What are the composition of crude oil? *[(CO1)(Remember/LOCQ)]*
(c) Discuss the major engineering problems associated with methanol production from synthesis gas. *[(CO1)(Apply/IOCQ)]*

6 + 2 + 4 = 12

3. Discuss the steam reforming operation of naptha with the help of a neat flow sheet. *[(CO1)(Analyse/HOCQ)]*

12

Group - C

4. (a) Briefly discuss the manufacturing process of ethylene oxide production with the help of a neat flow sheet. *[(CO2)(Analyse/HOCQ)]*
(b) Why again second compressor is used before the stripper column? *[(CO2)(Apply/LOCQ)]*

8 + 4 = 12

5. (a) Briefly describe the purification process of butadiene with a help of a neat flow sheet. *[(CO2)(Analyse/HOCQ)]*

(b) Why two reactors are used in butadiene production unit? *[(CO2)(Understand/LOCQ)]*

10 + 2 = 12

Group - D

6. (a) Briefly describe the manufacturing process of phenol production from cumene with the help of a neat flow sheet. *[(CO3)(Analyse/HOCQ)]*

(b) Also mention the reactions occurred in the phenol production from cumene. *[(CO3)(Remember/LOCQ)]*

(c) Discuss the major engineering problems associated with this production. *[(CO3)(Apply/IOCQ)]*

8 + 2 + 2 = 12

7. (a) Write the reactions occurred during phthalic anhydride production. *[(CO3)(Remember/LOCQ)]*

(b) Draw the flow sheet of phthalic anhydride manufacturing process. *[(CO3)(Understand/LOCQ)]*

(c) Discuss the major engineering problems associated with this production. *[(CO3)(Apply/IOCQ)]*

3 + 6 + 3 = 12

Group - E

8. (a) Briefly discuss the manufacturing process of phenol formaldehyde resin production with the help of a neat flow sheet. *[(CO4)(Analyse/HOCQ)]*

(b) Write a short note on comparative studies on plastic, fibre and elastomer. *[(CO4)(Remember/LOCQ)]*

8 + 4 = 12

9. (a) Define glass transition temperature. *[(CO4)(Remember/LOCQ)]*

(b) Give an overview on catalyst used in polymer production unit. *[(CO4)(Apply/IOCQ)]*

(c) Discuss the major engineering problem associated with HDPE production. *[(CO4)(Understand/IOCQ)]*

(d) Define elastomer. *[(CO4)(Remember/LOCQ)]*

2 + 4 + 4 + 2 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	28	18	54