

**CHEMICAL PROCESS TECHNOLOGY
(CHE2202)**

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) Which type of membrane is used in membrane cell process?
(a) Permeable (b) Semi - permeable
(c) Impermeable (d) Semi - impermeable
- (ii) The by-product obtained in solvay tower is
(a) Na₂CO₃ (b) NH₄Cl
(c) CaCl₂ (d) All of these
- (iii) Muds produced in chloro-alkali plants are primarily composed of
(a) CaCO₃, MgCl₂ (b) CaCO₃, Mg(OH)₂
(c) Cl₂, HCl (d) H₂O, H₂SO₄
- (iv) The nitrogenous fertilizer with highest percentage nitrogen is
(a) Urea (b) Ammonium sulphate
(c) Ammonium nitrate (d) Calcium nitrate
- (v) Urea is classified as which type of fertilizer?
(a) Phosphatic (b) Potassic
(c) Nitrogenous (d) Micronutrient
- (vi) Catalyst used in ethylene dichloride is
(a) Cobalt molybdenum (b) Bismuth
(c) Ferric chloride (d) Zinc oxide
- (vii) Which of the mentioned below not a process of obtaining gasoline?
(a) Cracking (b) Polymerization
(c) Alkylation (d) Casting
- (viii) Acrylonitrile is produced by ammoxidation of propylene using
(a) Hydrogen gas (b) Chlorine
(c) Ammonia and oxygen (d) Helium gas

- (ix) The yellow glycerine is produced during soap production from
 (a) Filtration Unit (b) Evaporator
 (c) Vacuum still (d) Mixing tank
- (x) Ion exchange is used in soap production unit to remove
 (a) Salt and colour (b) Colour and odour
 (c) Salt and impurities (d) Glycerine

Fill in the blanks with the correct word

- (xi) Ca is present in NaOH content by _____ in membrane cell process.
- (xii) At lower acid concentration H_2SO_4 and SO_3 form a troublesome _____.
- (xiii) _____ pressure is applied in second and third distillation tower of ethanol amine production unit.
- (xiv) The bonding in cement is _____.
- (xv) Ammonia is industrially synthesized from nitrogen and hydrogen through the _____ process.

Group - B

2. (a) Describe the manufacturing process of chlorine production in diaphragm cell with a help of neat flow sheet. [[CO1, CO2](Analyse/HOCQ)]
 (b) Also discuss the major engineering problems associated with the production. [[CO5, CO6](Remember/LOCQ)]
8 + 4 = 12
3. (a) Briefly discuss the manufacturing process of soda ash production in solvay tower with a help of a neat flow sheet. [[CO1](Analyse/HOCQ)]
 (b) Also discuss the major engineering problems associated with this production? [[CO5, CO3](Understand/LOCQ)]
8 + 4 = 12

Group - C

4. (a) Describe the physico-chemical principles involved in the synthesis of ammonia. [[CO2, CO3](Analyse/HOCQ)]
 (b) Draw a process flow sheet to produce ammonia, highlighting the major equipment and sequence of operation. [[CO2, CO3](Remember/LOCQ)]
4 + 8 = 12
5. (a) Explain the desalting process with neat schematic diagram and its benefit. [[CO3](Analyse/HOCQ)]
 (b) State the various product names of light distillate, middle distillate, and heavy distillate along with their temperature range. [[CO2, CO3](Remember/LOCQ)]
6 + 6 = 12

Group - D

6. (a) Discuss the manufacturing process of vinyl chloride production with the help of a neat flow sheet. [[CO3, CO2](Analyse/HOCQ)]
(b) Explain the major engineering problems associated with vinyl chloride production. [[CO3, CO6](Remember/LOCQ)]
8 + 4 = 12
7. (a) Briefly discuss the manufacturing process ethanol amine production, its application and major engineering problems. [[CO2, CO5, CO6](Apply/IOCQ)]
(b) Write the reactions occurred in glycerine production unit. [[CO1](Remember/IOCQ)]
(5 + 1 + 2) + 4 = 12

Group - E

8. (a) Explain the desire quality of boiler feed-water and cooling tower water. [[CO4](Analyse/HOCQ)]
(b) Explain the effects of industrial wastewater on streams. [[CO4](Remember/LOCQ)]
(c) Explain in detail the factors to be considered while stream sampling. [[CO4](Apply/IOCQ)]
4 + 4 + 4 = 12
9. (a) Briefly discuss the Portland cement manufacturing process with a help of neat flow sheet. [[CO2](Analyse/HOCQ)]
(b) State the advantages and disadvantages of dry process and wet process of cement manufacturing. [[CO4, CO5](Remember/LOCQ)]
8 + 4 = 12
-

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	35.42	16.67	47.91

