School of Engineering and Applied Science, Ahmedabad University

Name: _____ Roll no.: _____

B.Tech Chemical Engineering

CHE 306 Chemical and Petrochemical Industries, End Term Examination (Winter 2024–2025)

Marks: 40, Wt.: 40%

01st May 2025, Thursday, 08.00 AM – 10:00 AM (Time duration: 2.0 hrs)

Section A (Each of 1.0 marks)

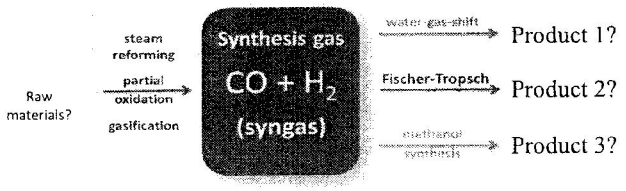
1. write the role of N-P-K in plant growth at various stages. (2 marks)

2. What is the difference between MAP and DAP? (2 marks)

3. What are the sources of raw materials for the following industrial products? (3 marks)
(a) Cement
(b) Urea
(c) Ammonia
(d) Sulfuric acid
(e) Methanol
(f) Triple superphosphate

4. Write down the reaction for the manufacture of (3 marks)
(a) cement
(b) Urea
(c) Ammonia

5. Find the raw materials and post-production of syngas and related industries as shown in the figure? (3 marks)



6. What are the components of dyes, and their individual roles? (2 marks)

Sec B (Each 0.75 marks)

1. Sodium tri poly phosphate (STPP) is chemically represented as
(A) $Na_5P_3O_{10}$
(B) $Na_4P_3O_8$
(C) $Na_3P_4O_6$
(D) Na_2PO_4

2. Which of the following does not come under the category of 'micro-nutrient' for plant growth?
(A) Chlorine
(B) Iron
(C) Boron
(D) Carbon

3. Raw materials for nitric acid manufacture are
(A) Hydrogen peroxide, air and water

(B) Anhydrous ammonia and air
(C) Anhydrous ammonia, air and water
(D) Wet ammonia, air and water

4. $H_4P_2O_7$ is the chemical formula of _____ phosphoric acid.
   (a) Pyro
   (b) Ortho
   (c) Meta
   (d) None of these

5. With increases in pressure, the conversion of Ammonium carbamate into urea
   (a) Increases
   (b) Decreases
   (c) Remains unaltered
   (d) Can either increase or decrease depends on biuret content

6. Himalayan pink salt, a rock salt mined mostly in Pakistan. The pink colour is due to
   (a) Sodium oxide
   (b) iron oxide
   (c) Calcium oxide
   (d) Calcium Chloride

7. Limestone is predominantly
   (a) magnesium carbonate
   (b) sodium carbonate
   (c) calcium carbonate
   (d) potassium carbonate.

8. Portland cement is a finely ground
   (a) calcium aluminates and silicates of varying compositions
   (b) calcium aluminates and sodium silicates of varying compositions.
   (c) calcium aluminates and caustic soda
   (d) calcium silicates and gypsum of fixed composition.

9. High alumina cement is manufactured by fusing
   (a) limestone and slaked lime
   (b) limestone and quick lime
   (c) limestone and bauxite
   (d) limestone and sand.

10. Clinker is the mass obtained by heating
   (a) powdered limestone and clay
   (b) gypsum
   (c) dolomite
   (d) sand, limestone and washing soda

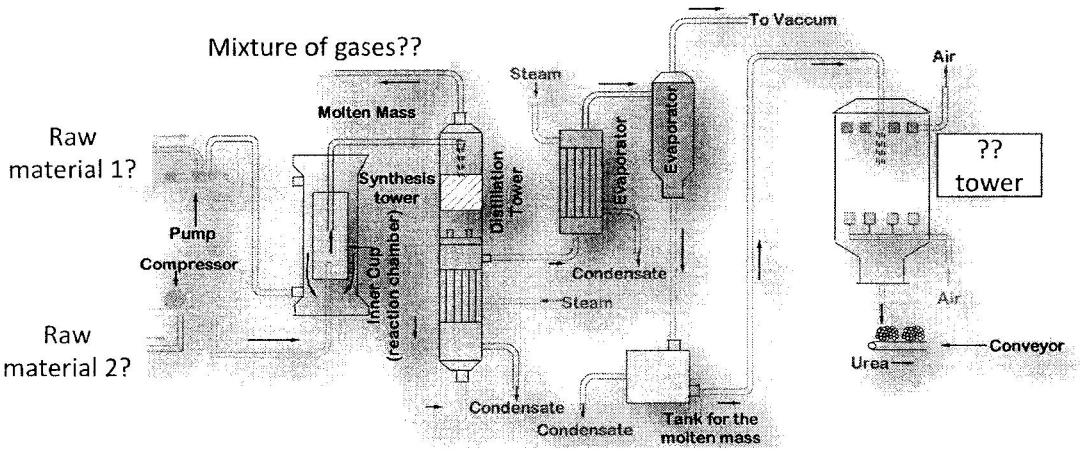
11. The favourable conditions for the maximum yield of ammonia by Haber's process are
   (a) high pressure, high temperature, high concentrations of reactants
   (b) low pressure, low temperature, low concentrations of reactants
   (c) high pressure, low temperature, high concentrations of reactants
   (d) high pressure, low temperature, low concentrations of reactants

12. Why cement beneficiation is done?

a) To remove silica and iron content
b) To remove silica and aluminum content
c) To remove silica and sulfur content
d) To remove silica and magnesium content

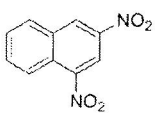
Sec C

1. Fill the details for the flow sheet of Urea manufacturing. (4 marks)

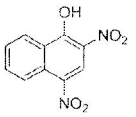


2. What is the difference between Chamber process and Contact process of H_2SO_4 manufacturing? (4 marks)

3. What are Auxochromes, chromophores in dyes? Identify the Auxochromes, chromophores in the following dyes. (4 marks)

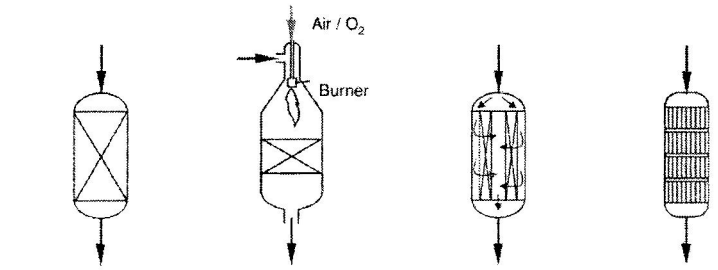


1,3-Dinitronapthalene is pale yellow



2,4-Dinitro-1-naphthol is orange-red

4. Several types of reactors are used for catalyst synthesis. Identify the below types of fixed bed reactors (4 marks)



Fixed bed reactors

END