



17314

21415

3 Hours/100 Marks

Seat No.

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- Instructions :** (1) **All questions are compulsory.**  
(2) **Illustrate your answers with neat sketches wherever necessary.**  
(3) **Figures to the right indicate full marks.**  
(4) **Assume suitable data, if necessary.**

MARKS

1. A) Attempt **any six** of the following :
- a) Name the factors affecting reaction rate. **2**
  - b) Why is  $\text{SO}_3$  dissolved in conc.  $\text{H}_2\text{SO}_4$  and not in water. **2**
  - c) What is the role of fuming  $\text{H}_2\text{SO}_4$  in the manufacturing of sulphuric acid by contact process ? **2**
  - d) Give reason "Now-a-days  $\text{V}_2\text{O}_5$  is preferred to platinised asbestos in the contact process for the manufacturing of sulphuric acid". **2**
  - e) State importance of DCDA process. **2**
  - f) State Le-Chatelieres principles. **2**
  - g) Define calcination. **2**
  - h) What do you mean by hardening of cement ? **2**
- B) Attempt **any two** of the following :
- a) Give chemical reaction involved, temperature, nature of reaction involved in manufacturing of HCl. **4**
  - b) Draw flowsheet for manufacturing of Hydrogen using water gas. **4**
  - c) Give raw materials used in manufacture of portland cement. **4**
2. Attempt **any two** of the following.
- a) Draw a diagram for manufacturing of  $(\text{NH}_4)_2\text{SO}_4$  and  $(\text{NH}_4)_3\text{PO}_4$  fertilizers. **8**
  - b) Draw a flowsheet and explain manufacturing of red phosphorus and phosphoric acid from phosphate rock. **8**
  - c) Describe with process flowsheet Solvay's process for soda ash manufacturing. **8**

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3. Attempt **any four** of the following.
- a) Write chemical reactions for manufacturing of super phosphate and triple super phosphate. 4
  - b) Explain how yellow phosphorus is converted to red phosphorus. 4
  - c) Draw a flowsheet for manufacturing of  $\text{PCl}_3$ . 4
  - d) Write cell reactions involved in mercury cell and diaphragm cell. 4
  - e) Explain the manufacturing process of caustic soda with a neat process flow diagram. 4
  - f) Give any two properties of chlorine and HCl. 4
4. Attempt **any four** of the following.
- a) Give any four industrial uses of caustic soda. 4
  - b) Give reaction involved in pollution control for single super phosphate. 4
  - c) What are different grades of phosphorous available in market ? 4
  - d) Give any four industrial uses of soda ash. 4
  - e) Explain the manufacture of water gas with a neat flow diagram. 4
  - f) Draw a process flow diagram for the manufacture of acetylene. 4
5. Attempt **any two** of the following.
- a) Describe with flowsheet manufacturing process for manufacturing of nitric acid. 8
  - b) Draw a flowsheet diagram and mention pressure and temperature condition for double distillation column for production of oxygen and nitrogen by Linde process. 8
  - c) Name two mixed fertilizers. What do you mean by N.P.K ? Why mixed fertilizers are popular now a days ? 8
6. Attempt **any four** of the following.
- a) Write any four industrial application of acetylene. 4
  - b) Give significance of  $\text{C}_2\text{S}$ ,  $\text{C}_3\text{S}$ ,  $\text{C}_3\text{A}$ ,  $\text{C}_4\text{AF}$  in cement. 4
  - c) Name and explain two methods of separation of azeotropic mixture of nitric acid. 4
  - d) Draw flowsheet and write chemical reaction involved in manufacturing of producer gas. 4
  - e) How super phosphate is related with fertility of soil ? 4
  - f) Write down any four advantages of DCDA process over conventional process. 4
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