11819

3 Hours / 100 Marks   Seat No.

Instructions :   (1) *All* questions are *compulsory*.
   (2) Answer *each* next main question on a new page.
   (3) Illustrate your answers with *neat* sketches *wherever* necessary.
   (4) Figures to the *right* indicate *full* marks.
   (5) Assume suitable data, if *necessary*.
   (6) *Use* of Non-programmable Electronic Pocket Calculator is permissible.
   (7) *Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.*

Marks

1. Attempt **any ten** of the following :   **20**

   a) Name any four unit operations used in chemical industry.

   b) Define hydration with one example.

   c) Draw a symbol of
      i) Ball mill   ii) Rotary drier.

   d) Define the following :
      i) Conversion   ii) Yield.

   e) Define temperature. Name any two temperature scale.

   f) Convert ºC into ºF of the following :
      i) 290 ºC   ii) 520 ºC

   g) Write a chemical reaction involved in the manufacture of sulphuric acid.

   h) Name any two size reduction operations.

   i) Write any two differences between unit process and unit operation.

   j) Write the equivalent weight of :
      i) $KMnO_4$ ii) NaOH

   k) Write chemical reaction for the manufacture of ethylene oxide from ethylene with condition

   l) Convert a pressure of 1 Atm of the following unit :
      i) mmHg   ii) KPa.

Marks

2. Attempt **any four** of the following : **16**

   a) Explain nitration with suitable reactions.

   b) Draw a sketch of rotameter used for flow measurement and label its part.

   c) State mode of heat transfer with one example of each.

   d) 4 gms of NaOH are dissolved in water to obtain 100 ml solution. Find the normality and molarity of the solution.

   e) Draw a well labelled flow diagram for the manufacture of sulphuric acid.

   f) Define the following term :

   i) Normality   ii) Molarity

   iii) Molality   iv) Equivalent weight.

3. Attempt **any four** of the following : **16**

   a) Explain Redwood viscometer with well labelled diagram.

   b) Describe cracking with one example.

   c) Explain distillation with one example.

   d) Find molecular weight of the following :

   i) Na_2CO_3

   ii) H_2SO_4

   iii) CH_3COOH

   iv) $CaCl_2$.

   e) Describe manufacture of nitric acid with chemical reaction

   f) Explain sedimentation with one industrial application.

4. Attempt **any four** of the following : **16**

   a) Name any three level measurement indicator. Explain any one with neat sketch.

   b) Explain gas absorption with one industrial application.

   c) A gas mixture contains $9KgH_2$, 17kg NH_3 and 42 kg N_2 at 343^oK and 200 KPa pressure. Calculate the partial pressure of each component.

   d) Explain mercury in glass thermometer with neat sketch.

   e) Write physical properties of following (any two of each) :

   i) Sulphuric acid

   ii) Nitric acid

   f) State Dalton's Law and Amagat's Law with mathematical expression.

Marks

5. Attempt **any four** of the following :　　　　　　　　　　　　　　**16**

   a) Describe chlorination with two examples.

   b) Name the unit operations used for the separation of liquid mixture. Explain any one.

   c) Name any four personal protective equipments and write their specific application.

   d) Ethanol and water forms an azeotrope containing 96% by weight ethanol. Find the composition of the azeotrope by mole %.

   e) Draw well labelled flow diagram for the manufacture of nitric acid.

   f) Define mole % and weight % with respect to binary system.

6. Attempt **any four** of the following :　　　　　　　　　　　　　　**16**

   a) Give any one of the following :

     i) Blower

     ii) Pump

     iii) Fan

     iv) Compressor.

   b) Convert a volumetric flow rate of 5400 Litre/sec. to m^3/Hr.

   c) Differentiate between conversion and yield (any four points)

   d) Explain handling of fluid in brief.

   e) Name types of manometer. Explain any one with neat sketch.

   f) Prove that sum of mole fraction of the components in any system is equal to unity.

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