17206

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. Answer any TEN :   **20**

(a) Name any two industries each of

   (i) pharmaceutical

   (ii) petrochemical

(b) Define and give the unit in SI of the following :

   (i) force

   (ii) density

(c) Name the unit operation used for

   (i) size separation

   (ii) solid-liquid separation

(d) Convert 100 °C into °F and K.

(e) Differentiate between density and specific gravity.

(f) Calculate the molecular weight of $CuSO_4.5H_2O$

   [At. wt of Cu = 63, S = 32, O = 16, H = 1]

(g) Explain hydration with an example.

P.T.O.

(h) Define :

    (i)   Conversion

    (ii)   Yield

(i) What is nitrating mixture ? Give its use.

(j) Draw the symbol of the following :

    (i)   Ball mill

    (ii)   Pack column

(k) Give different scales of pressure.

(l) Draw the diagram of absorption column.

2.   Answer any FOUR :   **16**

(a) 100 gms of H_2SO_4 is dissolved in water to prepare 1 lit. solution. Calculate the normality of the solution. [At. wt. S = 32]

(b) Define :

    (i)   Dalton's law

    (ii)   Amagat's law

(c) With a neat labelled diagram explain the construction of Rotameter.

(d) Explain filtration in detail.

(e) What are the principles by which solid mixture can be separated ? Name the operations using each principle.

(f) Explain distillation. Draw simple distillation unit.

3.   Answer any FOUR :   **16**

(a) A mixture contains 100 gms NaOH and 200 gm KOH. Express the composition of mixture (i) by weight (ii) by mole.

    [At. wt. Na = 23, K = 39]

(b) Calculate the weight of NaOH required to prepare 1.5 lit. of 2 N solution.

(c) Define :
    (i)   Molarity
    (ii)   Normality
    (iii) Molality

(d) Explain modes of heat transfer.

(e) Explain oxidation and reduction with examples.

(f) What is esterification ? Explain with an example.

4. Answer any FOUR : 16

    (a) Define :

        (i) Partial pressure

        (ii) Pure component volume

    (b) Calculate g moles of $CaCO_3$ present in 200 gms $CaCO_3$.

        [At. wt. Ca = 40, C = 12]

    (c) Give any six different types of chemical industries.

    (d) Explain gas absorption with an example.

    (e) Draw symbols of

        (i) Centrifugal pump

        (ii) Plate and frame filter press

    (f) Convert $1000 \ kg/m^3$ into g/cm^3

5. Answer any FOUR : 16

    (a) What is chlorination ? Explain with example.

    (b) Draw a neat symbol of

        (i) Jaw crusher

        (ii) Screen

        (iii) Rotary dryer

        (iv) Settling tank

    (c) Draw a neat flow sheet for the manufacture of nitric acid.

    (d) Write down the reactions involved in the manufacture of sulfuric acid.

    (e) Give any four uses of sulfuric acid.

    (f) Define :

        (i) Mesh

        (ii) Oversize particle

        (iii) Undersize particle

6. **Answer any FOUR :** 16

    (a) Explain how density of a liquid is measured using specific gravity bottle.

    (b) Draw a neat labelled diagram of Redwood viscometer.

    (c) With a diagram explain the working of mercury thermometer.

    (d) Explain the construction and working of U-tube manometer.

    (e) Draw the flow sheet for the manufacture of sulfuric acid.

    (f) Give the reactions involved in the manufacture of nitric acid.

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