16172

3 Hours / 100 Marks   Seat No.

Marks

1. Attempt **any ten** of the following :   **(2×10=20)**

    a) Enlist any four examples of chemical industries.

    b) Define mole and kmol.

    c) Define vapour pressure.

    d) What is weight percent ?

    e) Draw the symbol of absorber and stripper.

    f) What do you mean by sedimentation ?

    g) State the basic difference between unit operation and unit process.

    h) Convert 500 mm Hg into atm.

    i) Define specific gravity.

    j) Define reduction.

    k) Define reaction efficiency.

    l) convert m^3/hr to lit./sec.

    m) Name any two level measuring instruments.

    n) Define yield.

2. Attempt **any four** of the following :   **(4×4=16)**
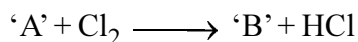
    a) Explain the scope of chemical engineering.

    b) Define conduction and convection with one example.

    c) Explain distillation with neat diagram.

    d) Draw process flow sheet for manufacturing of nitric acid.

    e) Explain 'U' tube manometer with neat diagram.

    f) What is esterification ? Write down the chemical reaction for it.

P.T.O.

Marks

3. Attempt **any four** of the following : (4×4=16)

    a) How to prepare 1N, 1 Molar, H_2SO_4 ?

    b) What is PPE ? List out body parts and respective PPE to protect that body part.

    c) Find A, B, C, D in following reaction.

    $$CH_4 + Cl_2 \xrightarrow{UVL} \text{`A'} + HCl$$

    $$\text{`A'} + Cl_2 \longrightarrow \text{`B'} + HCl$$

    $$\text{`B'} + Cl_2 \longrightarrow \text{`C'} + HCl$$

    $$\text{`C'} + Cl_2 \longrightarrow \text{`D'} + HCl$$

    d) Explain 'float and tape' method for level measurement.

    e) Define conversion and yield with suitable example.

    f) Define fluid. List out solid-liquid, liquid-liquid, liquid-vapour operations.

4. Attempt **any four** of the following : (4×4=16)

    a) Write down properties (2) and uses (2) of nitric acid.

    b) Define viscosity, density, sulphonation, nitration.

    c) Give statement and mathematical expression of Dalton's law and Amagat's law.

    d) Define size reduction. Draw the symbols of

       i) Jaw crusher   ii) Ball mill   iii) Screen

    e) Draw mercury thermometer. State the principle of mercury thermometer.

    f) Draw the block diagram of manufacturing of H_2SO_4.

5. Attempt **any four** of the following : (4×4=16)

    a) What do you mean by hydrogenation and hydration ? Write down the chemical reaction for above unit process.

    b) Compare large scale, medium scale and small scale industries.

    c) Write down the chemical reactions involved in manufacturing of H_2SO_4 and HNO_3.

    d) Convert : i) $1 m^3$ into cm^3 and lit

              ii) 1 atm into KPa and bar.

    e) Give statement and mathematical expression of Bond's law and Rittinger's law.

    f) Give the relation between °C, °F and K (temperature units).

6. Attempt **any four** : (4×4=16)

    a) Define equivalent weight. Calculate equivalent weight of H_2SO_4 and HNO_3.

    b) Draw a symbol of

       i) Rotary dryer   ii) Plate and frame filter

       iii) Plate column   iv) Packed column

    c) A mixture contains 100 gm MaOH and 200 gm KOH express their composition by weight% and mole%.

    d) Explain gas absorption phenomenon with example.

    e) Explain history of chemical engineering.

    f) Give definition, principle and purpose of drying.

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