17325

15116

3 Hours / 100 Marks Seat No. | | | | | | | | |

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

a) Define :
   i) Normality ii) Molarity.

b) Name any two chemical industries.

c) Differentiate between sedimentation and filtration (any two points).

d) State Rittinger's law.

e) Give one chemical reaction each of the following unit processes.
   i) Oxidation ii) Reduction.

f) Give flow sheet symbol for inflow line and outflow line.

g) Define :
   i) Vapour pressure ii) Boiling point of liquid.

h) Convert following °C values to of
   i) 100°C ii) 32°C.

i) Give the values of normal atmospheric pressure in atm and in kPa.

j) Define :
   i) Partial pressure ii) Pure component volume.

k) None any two oxidising agents.

l) Define :
   i) Density ii) Specific gravity of liquid.

m) Define the term pyrolysis.

Marks

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

a) Draw the symbols of
   i) Jaw crusher
   ii) Rotary dryer
   iii) Packed column
   iv) Centrifugal pump.

b) Write the uses of nitric acid (any four).

c) Explain chlorination reaction of methane.

d) How many moles of H_2SO_4 will contain 64 kg of S ?

e) Describe the role of chemical engineer in industries.

f) Explain the working of rotameter with neat sketch.

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

a) Define :
   i) Atomic weight
   ii) Molecular weight
   iii) gm atom
   iv) gm mole.

b) Explain any one of the fluid handling equipment.

c) Give the physical properties of sulphuric acid.

d) Write and explain nitration reactions of phenol.

e) Draw the process flow sheet for manufacturing of nitric acid.

f) Give the reasons for carrying out size reduction operation (any four).

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

a) Draw the neat diagram of Redwood viscometer.

b) A gas mixture contains 9 kg H_2, 17 Kg NH_3 and 42 kg N_2 at 343°K and 200 kPa pressure. Calculate partial pressure of each component.

c) State :
   i) Dalton's law
   ii) Amagat's law.

d) Explain the unit operation used to separate components of gas mixture depending upon the difference in solubilities of component in given solvent.

e) Explain size separation by screening.

f) Draw the process flow sheet for manufacturing of sulphuric acid.

Marks

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

a) Explain different modes of heat transfer.

b) Solution is prepared by addition of 10 kg of NaOH in 100 kg of water. Calculate weight percentage and mole percentage of a given solution.

c) Explain drying operation. Draw its symbol.

d) Explain in brief esterification with suitable example.

e) With neat diagram, explain the working of U-tube monometer.

f) Explain the nature of industries based on investment.

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

a) Convert a pressure of 800 mm of Hg to following units.

i) kPa

ii) atm.

b) 20 gm of NaOH is dissolved in water to prepare 500 ml of solution. Find normality and molarity of solution.

c) Name the unit operation used to separate liquid-liquid mixture by thermal energy. Explain that unit operation.

d) Differentiate between conversion and yield (any four points).

e) Write the procedure to measure density of liquid by specific gravity bottle.

f) Name any four personal protective devices. Give their uses.

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