17206

16172

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. Answer **any ten** : **20**

a) Give the unit of density and force in S.I.

b) Calculate the molecular weight of Na_2CO_3 (Atomic weight Na = 23, C = 12, O = 16).

c) List two unit operations used for separation of solid-liquid mixture.

d) What is volumetric flow rate ? Name an instrument used to measure volumetric flow rate.

e) Define :
i) Density ii) Specific gravity.

f) Convert 1 kg/m^3 into kg/lit.

g) Explain oxidation reaction with example.

h) Give the uses of sulphuric acid (any two).

i) Differentiate between unit process and unit operation (two points).

j) Draw the symbol of
i) ball mill ii) jaw crushes.

k) Convert 20°C to °F and °K.

l) List the principles by which size reduction is attained in industry.

2. Answer **any four** : **16**

a) State and explain Dalton's law and Amagat's law.

b) Calculate moles present in 100 kg NaOH.

c) Draw a neat labelled diagram of Rotameter.

d) State and explain the unit operation used for size separation.

e) Explain gas absorption in detail.

f) State and explain modes of heat transfer.

P.T.O.

Marks

3. Answer **any four**: **16**

a) Define the following :
   i) Molality ii) Normality

b) A mixture contains 100 kg NaOH and 200 kg Na_2CO_3. Express the composition of mixture by
   i) weight % ii) mol %.

c) 80 gms NaOH is dissolved in water to prepare 3000 ml solution. Calculate the normality of the solution.

d) Explain distillation in detail.

e) Explain the following with chemical reaction.
   i) Chlorination ii) Nitration with suitable example.

f) Describe esterification with chemical reaction.

4. Answer **any four**: **16**

a) Give the advantages of size reduction.

b) Define :
   i) Partial pressure ii) Vapour pressure

c) Calculate the weight of H_2SO_4 required to prepare 250 ml of 0.5 N solution.

d) Explain drying in detail.

e) List any two types of pumps for handling fluid with its specific applications.

f) Explain sulphonation reaction in detail with suitable example.

5. Answer **any four**: **16**

a) Explain with chemical reaction hydrogenation and hydration with suitable example.

b) Differentiate between filtration and sedimentation.

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

d) Explain saponification with chemical reaction.

e) Describe the manufacturing process of sulphuric acid.

f) Explain sedimentation process.

6. Answer **any four**: **16**

a) Explain the construction of mercury-in-glass thermometer with a neat sketch.

b) Draw a neat labeled diagram of Redwood viscometer.

c) Name any four personal protective equipment and give its use.

d) Describe how density is measured using specific gravity bottle.

e) Explain the construction and working of u-tube manometer with a neat sketch.

f) Explain how level is measured using float and tape method.
