



SB-0615

First Year B. Sc. Examination
March/April – 2011
Industrial Chemistry : Paper - II
(Fundamentals of Chemical Engineering)
(Vocational)

Time : Hours]

[Total Marks : 70

Instructions :

(1)

नीचे दशांशक निशानीवाणी विगतो उत्तरवही पर अवश्य लखवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
F. Y. B. Sc.

Name of the Subject :
Industrial Chemistry : Paper - 2

Subject Code No. : 0 6 1 5 Section No. (1, 2,.....): NIL

Seat No. :

Student's Signature

- (2) All sub questions of question no. 1 are compulsory.
- (3) Give the reaction, flow diagram and neat sketches wherever necessary.
- (3) Figures to right indicate full marks of question.
- (4) Atomic weights : C=12, H=1, O=16, N=14, S=32, Na=23, Cl=35.5.

- 1 Answer the following questions in brief : 15
- (i) Define gram atom and gram mole.
- (ii) State the law of conservation of energy.
- (iii) Define : Extraction and leaching.
- (iv) What are the basic requirements for crystallization ?
- (v) Classify heat-exchangers.
- (vi) Mention the desirable qualities of crystals.
- (vii) What are primary and secondary fuels ?
- (viii) Define : Recycle Ratio and Combined Feed Ratio.

- (ix) Give the expressions for Dulong's formula for calculating calorific value.
- (x) Give the full name of ASME-API and TEMA.
- (xi) Explain azeotropic distillation in short.
- (xii) What are compressible and incompressible fluids ?
- (xiii) Why processing of air is necessary ?
- (xiv) Find the moles of oxygen present in 500 grams.
- (xv) Define : Hygroscopic and non-hygroscopic materials.

2 (a) Explain : Ideal gas law equation. 4

OR

- (a) Explain : Specific gravity scales and standard conditions.
- (b) Explain about unit operations and discuss 4
theoretically mass balance over them :
 - (i) Crystallization
 - (ii) Distillation.

OR

- (b) Explain :
 - (i) Theoretical and excess air
 - (ii) Heat capacity and specific heat.
- (c) The ammonia air mixture containing 0.2 kgNH₃ per 3
kg air enters into absorption system where ammonia is
absorbed in water. The gas leaving the system is found
to contain 0.004 kg NH₃ per kg of air. Find the
percentage recovery of ammonia.

3 (a) Explain the effect of pressure on heat of reaction. 4

OR

- (a) Define recycle operation. Why they have commercial
importance ? Show it diagrammatically.
- (b) What do you mean by balance ? Explain . 4

OR

- (b) Discuss : Energy balance equation for batch and
continuous process.
- (c) In manufacture of sulphur trioxide, feed to reactor 3
consists of 50 kmols SO₂ and 150 kmols air. Calculate
the % excess air over theoretically required that is used.

- 4 (a) Enlist various types of pumps which are used in industries ? 4

OR

- (a) Give the comparison between reciprocating pump and centrifugal pump.
(b) Discuss the plate type heat exchangers. 4

OR

- (b) Write a note on fins.
(c) What are baffles ? Why are they used ? Compare it with fins. 3

- 5 (a) Give the characteristics of solvents used for extractive distillation. 4

OR

- (a) Describe packed tower absorption with neat diagram.
(b) Give a brief account on selection of solvents for gas absorption. 4

OR

- (b) Explain various types of tray-towers for packing.
(c) Discuss the various methods of distillation of binary mixtures. 3

- 6 (a) Give the principles of filtration ? Discuss in detail the construction and working of rotary drum filter. 4

OR

- (a) Discuss leaf filters with its merits and demerits.
(b) Write a short note on Swansons-Walker Crystallizer 4

OR

- (b) Write industrial uses of air and steam.
(c) What are boilers ? Give classification of boilers and different types of boiler problems ? 3