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RR-0615

First Year B. Sc. Examination

March / April – 2010

Industrial Chemistry : Paper - II

(Fundamentals of Chemical Engineering) (Vocational)

Time : 3 Hours]

[Total Marks : 70

Instructions :

(1)

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

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

Name of the Subject :
Industrial Chemistry - 2

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

Seat No. :
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Student's Signature

- (2) All sub questions of question no. 1 are **compulsory**.
- (3) Give reactions, flow diagram and neat sketches wherever necessary.
- (4) Figures to the right indicate full marks of question.
- (5) 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) What are basic requirements for crystallization?
- (iii) Explain Azeotropic distillation.
- (iv) Mixing is necessary, why?
- (v) Define: Heat capacity and specific heat.
- (vi) Enlist applications of extraction.
- (vii) What is desalination?
- (viii) Define compressor and classify them.
- (ix) Give the full name of ASME-API and TEMA.
- (x) Define : Hygroscopic and non-hygroscopic materials.
- (xi) How many moles of K_2CO_3 will contain 11.7 kg K?

- (xii) Why processing of air is necessary?
- (xiii) Define: Recycle ratio and combined feed ratio.
- (xiv) Give the classification of industrial evaporators.
- (xv) What are secondary fuels?

- 2** (a) Define average molecular weight and derive the expression for density of gas mixture. **4**

OR

- (a) Explain yield and selectivity for chemical reactions giving suitable example.
- (b) Define the following with operations and discuss theoretically material balance over them: **4**
 - (i) Evaporation
 - (ii) Crystallization

OR

- (b) Explain specific gravity scales and standard condition.
- (c) 2000 ml solution of strength 0.5 N H_2SO_4 is to be prepared in laboratory by adding 98% H_2SO_4 (Sp. Gr. = 1.84) to water. Calculate the ml. of 98% H_2SO_4 to be added to get solution of desired strength. **3**

- 3** (a) Define : **4**
- (i) Standard heat of reaction
 - (ii) Standard heat of formation.

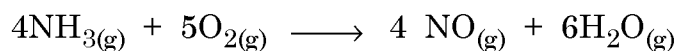
OR

- (a) Explain in detail about recycling unit operation with its applications.
- (b) What do you mean by balance? Explain. **4**

OR

- (b) Write energy balance equation in general and mathematically for batch and continuous process.

- (c) Calculate the standard heat of reaction of the following reaction. 3



Data : Component ΔH°_f kJ/mole of 298.15° K.

$\text{NH}_{3(g)}$ -45.94

$\text{NO}_{(g)}$ 90.25

$\text{H}_2\text{O}_{(g)}$ -241.82

- 4 (a) What are heat exchangers? Write a note on Finned tube heat exchanger. 4

OR

- (a) Enlist various types of pumps which are used in industries.
- (b) What are baffles? Why are they used? Compare it with fins. 4

OR

- (b) Classify compressor. Give the comparison between reciprocating pump and centrifugal pump.
- (c) Write a note on : turbo blowers. 3

- 5 (a) Describe the characteristics of good tower packing. 4

OR

- (a) Describe the characteristics of good entrainer for azeotropic distillation.
- (b) Explain various types of tray-towers for packing. 4

OR

- (b) Give a brief account on selection of solvents for gas absorption.
- (c) Write a short note on : Evaporation. 3

- 6 (a) What is filtration? Give classification of various filtration equipments. 4

OR

- (a) Classify crystallizers. Explain magma vacuum crystallizer.
- (b) Write industrial uses of air and steam. 4

OR

- (b) Discuss various types of Boilers and their functioning.
- (c) Write a note on : Types of fuels and its advantages-disadvantage. 3
