



**PBQ-0030011009**

Seat No. \_\_\_\_\_

**B. Sc. (Sem. I) (CBCS) Examination**

**November / December - 2018**

**BS-IC-101 : Industrial Chemistry**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70

**Instructions :**

- (1) Question paper carries total 5 questions.
- (2) All the questions are compulsory and carry 14 marks each.
- (3) Draw labeled diagram wherever necessary.
- (4) Assume suitable data.

- 1 (a) Answer the following questions. 4
- (1) Octane number of 2,2,4-trimethyl pentane is \_\_\_\_\_.
  - (2) Zeolite is used as \_\_\_\_\_ in cracking process.
  - (3) "In electrolytic method impure metal is kept at anode." True or False ?
  - (4) \_\_\_\_\_ and \_\_\_\_\_ are types of metallurgy.
- (b) Answer the following in brief : (any one out of two) 2
- (1) Enlist types of catalytic reactors.
  - (2) Enlist metal working processes and explain any two in detail.
- (c) Answer in detail : (any one out of two) 3
- (1) Explain reforming of naphtha in detail.
  - (2) Explain magnetic separation process for ore with diagram.
- (d) Write a note on : (any one out of two) 5
- (1) Explain fractional distillation of crude oil in detail.
  - (2) Explain in detail : Hall Heroult cell for extraction of Aluminium.
- 2 (a) Answer the following questions. 4
- (1) Lignite is type of \_\_\_\_\_.
  - (2) % of oxygen can be found by \_\_\_\_\_ analysis of coal.
  - (3) \_\_\_\_\_ is toxic alcohol.
  - (4) Colour of nitrocellulose is \_\_\_\_\_.
- (b) Answer the following in brief : (any one out of two) 2
- (1) Define : BTU.
  - (2) Draw structure of cellulose.

- (c) Answer in detail : (any one out of two) 3  
 (1) Explain coal gas manufacturing process.  
 (2) How can we manufacture ethyl alcohol ?
- (d) Write a note on : (any one out of two) 5  
 (1) Explain storage and handling of coal in detail.  
 (2) Explain manufacturing of paper with flow diagram.
- 3 (a) Answer the following questions. 4  
 (1) Absolute pressure = \_\_\_\_\_ pressure vacuum.  
 (2) The ratio of weight in gram to molecular weight is known as \_\_\_\_\_.  
 (3) Film type evaporator is also known as \_\_\_\_\_.  
 (4) Forced circulating evaporator having high cleaning problem. True/False.
- (b) Answer the following in brief : (any one out of two) 2  
 (1) Define : (a) Molarity (b) Kg atom  
 (2) Give two merits of short tube evaporator.
- (c) Answer in detail : (any one out of two) 3  
 (1) Discuss mole fraction in detail.  
 (2) Draw only diagram of wiped film evaporator.
- (d) Write a note on : (any one out of two) 5  
 (1) An aqueous solution of sodium chloride is prepared by dissolving 25 kg of NaCl in 100 kg of water. Find weight % and mole % composition of solution.  
 (2) Explain multiple effect evaporators with neat diagram.
- 4 (a) Answer the following questions. 4  
 (1) Blending is also known as \_\_\_\_\_.  
 (2) Adopt \_\_\_\_\_ units in case of problems without chemical reaction.  
 (3) Input = Output is true for \_\_\_\_\_ state condition.  
 (4) Unit operation means only physical changes are taken place. True/False.
- (b) Answer the following in brief : (any one out of two) 2  
 (1) Give importance of material balance in chemical industries in brief.  
 (2) Explain material balance of solid-liquid extraction with diagram.

- (c) Answer in detail : (any one out of two) 3
- (1) Explain material balance of crystallization with rectangular block diagram.
  - (2) Give any six examples of unit operations.
- (d) Write a note on : (any one out of two) 5
- (1) The waste acid from a nitrating process containing 21%  $\text{HNO}_3$ , 55%  $\text{H}_2\text{SO}_4$  and 24%  $\text{H}_2\text{O}$  by weight is to be concentrated by addition of concentrated sulfuric acid containing 93%  $\text{H}_2\text{SO}_4$  and concentrated nitric acid containing 90%  $\text{HNO}_3$  to get desired mixed acid containing 28%  $\text{HNO}_3$  and 62%  $\text{H}_2\text{SO}_4$ . Calculate the quantities of waste and concentrated acids required for 1000 kg of desired mixed acid.
  - (2) Give any five outlines procedure of material balance.
- 5 (a) Answer the following questions. 4
- (1) Flash distillation is also known as \_\_\_\_\_ distillation.
  - (2) PRV stands for what ?
  - (3) Rashing ring is an example of packing material. True/False
  - (4) Selectivity of solvent in extraction should be greater than \_\_\_\_\_ for better separation.
- (b) Answer the following in brief : (any one out of two) 2
- (1) Draw only diagram of steam distillation.
  - (2) Write any two characteristics of ideal packing.
- (c) Answer in detail : (any one out of two) 3
- (1) Discuss sieve and valve trays with diagram.
  - (2) Explain factors affecting selection of solvent for extraction.
- (d) Write a note on : (any one out of two) 5
- (1) Derive Rayleigh equation for simple distillation.
  - (2) Explain spray tower with diagram.