



**HDV-003-0011009**

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

**B. Sc. (Sem. I) (CBCS) Examination**  
**November / December – 2017**  
**BS - IC - 101 : Industrial Chemistry**

**Faculty Code : 003**  
**Subject Code : 0011009**

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

[Total Marks : 70

- Instructions :**
- (1) Question paper carries total 5 questions.
  - (2) All the questions are compulsory.
  - (3) All questions carry 14 marks each.
  - (4) Figures to the right indicate maximum marks.
  - (5) Draw labeled diagram wherever necessary.
  - (6) Assume suitable data.

- 1 (a) Answer the following questions : 4
- (1) Octane number of 2,2,4 trimethyl pentane is \_\_\_\_\_.
  - (2) Define lean or dry gas.
  - (3) Define : Mineral
  - (4) "Gold can be derived in free form from mines" is this statement true or false?
- (b) Answer in brief : (any **one** out of two) 2
- (1) Enlist different products derived from petroleum. Explain use of Gasoline and Naphtha.
  - (2) Give names of any six different metals and their ores.
- (c) Answer in detail : (any **one** out of two) 3
- (1) Explain difference between fixed and fluidized bed catalytic cracking reactor.
  - (2) Explain magnetic separation of ore with diagram.

- (d) Write a note on : (Any **one** out of two) 5
- (1) Explain fractional distillation of petroleum with diagram and working.
  - (2) Explain froth-floating process with detailed diagram and function.
- 2** (a) Answer the following questions : 4
- (1) Give full form of GCV.
  - (2) Give formula for finding out %Moisture of coal.
  - (3) Give chemical formula of nitrocellulose.
  - (4) Enlist types of starch.
- (b) Answer in brief : (any **one** out of two) 2
- (1) How can we determine volatile matter of coal?
  - (2) Give features of artificial silk.
- (c) Answer in detail : (any **one** out of two) 3
- (1) Enlist types of coal; explain lignite and anthracite in brief.
  - (2) Explain properties and manufacturing process of cellulose from cotton.
- (d) Write a note on : (any **one** out of two) 5
- (1) Explain carbonization of coal by retorts.
  - (2) Explain manufacturing of paper in detail.
- 3** (a) Answer the following questions : 4
- (1) Force per unit area is \_\_\_\_\_.
  - (2) Unit of volumetric flow rate is Mass/Time. This statement is True/False?
  - (3) Write minimum two demerits of forced circulating evaporator.
  - (4) \_\_\_\_\_ evaporator is used for high viscosity materials.

- (b) Answer in brief : (any **one** out of two) **2**
- (1) Define :
    - (a) gm. atom
    - (b) kg mole
  - (2) Define the term 'evaporation' with example.
- (c) Answer in detail : (any **one** out of two) **3**
- (1) Discuss Mole fraction in detail.
  - (2) Draw only diagram of climbing film evaporator.
- (d) Write a note on : (any **one** out of two) **5**
- (1) 20 gm of caustic soda are dissolved in water to prepare 500 ml of solution. Find Normality, Molarity and Molality of solution.
  - (2) Explain multiple effect evaporators with diagram.
- 4** (a) Answer the following questions : **4**
- (1) Adopt \_\_\_\_\_ units in case of problems without reaction in material balance calculations.  
(Weight/Mole)
  - (2) Mixing operation is also known as \_\_\_\_\_
  - (3) For steady state operation, Input = Output. This statement is True/False?
  - (4) Solid-liquid extraction is also known as \_\_\_\_\_
- (b) Answer in brief : (any **one** out of two) **2**
- (1) State the law of conservation of mass for material balance.
  - (2) Define the term 'filtration' with example.
- (c) Answer in detail : (any **one** out of two) **3**
- (1) Write any three outlines (rules) for material balance calculations.
  - (2) Discuss material balance of evaporation with rectangular block diagram.

- (d) Write a note on : (any **one** out of two) 5
- (1) 10,000 kg/h of solution containing 20% methanol is continuously fed to a distillation column. Distillate is found to contain 98% methanol and waste solution from the column carries 1% methanol. All percentages are by weight.
- Calculate :
- (a) the mass flow rates of distillate and bottom product and
- (b) the percent loss of methanol.
- (2) Explain material balance of crystallization and distillation operations with rectangular block diagram.
- 5 (a) Answer the following questions : 4
- (1) Give full form of PRV.
- (2) Azeotropes are known as 'constant boiling mixture'. True/False?
- (3) Recoverability of solvent should be \_\_\_\_\_ in extraction.
- (4) Write minimum two characteristics of ideal packing.
- (b) Answer in brief : (any **one** out of two) 2
- (1) Draw only diagram of steam distillation with diagram.
- (2) Define the term 'absorption' with example.
- (c) Answer in detail : (any **one** out of two) 3
- (1) Draw only diagrams of sieve tray and bubble cap tray.
- (2) Discuss selection of solvent for extraction operation.
- (d) Write a note on : (any **one** out of two) 5
- (1) Discuss mixer settler cascade with neat diagram.
- (2) Explain continuous distillation with rectification.