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JAV-003-0011009 Seat No. _____

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

December - 2019

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 & carry 14 marks each.

(3) Draw labelled diagrams wherever necessary.

(4) Assume suitable data.

1 (a) Answer the following questions : **4**

(1) Levorsen has given organic origin theory of _____

(2) A natural gas containing mainly methane but not higher hydrocarbon is called _____

(3) Iron ores can be concentrated by magnetic separation process. True/False?

(4) Write any four examples of oxide ores.

(b) Answer in brief : (any **one** out of two) **2**

(1) Enlist industrial applications of natural gas

(2) Define : (a) Metallurgy, (b) Ore.

(c) Answer in detail : (any **one** out of two) **3**

(1) Describe Girbotol process for removal of H_2S from petroleum products.

(2) Draw only flow diagram of process for extraction of metal from its ore.

(d) Write a note on : (any **one** out of two) **5**

(1) Give an account of Dubb's process for liquid phase thermal cracking.

(2) Explain froth flotation process with schematic diagram.

2 (a) Answer the following questions : **4**

(1) Analysis of nitrogen content in a coal sample is part of _____ analysis.

(2) Write various types of coal.

(3) CH_3OH is blended with ethanol to make it toxic. True/False?

(4) Nitric and sulfuric acids are used for _____ of cellulose.

(b) Answer in brief : (any **one** out of two) **2**

(1) Define : (a) BTU (b) Calorific value

(2) Write applications of starch.

(c) Answer in detail : (any **one** out of two) **3**

(1) Discuss proximate analysis of coal.

(2) What is artificial silk? Explain its preparation.

(d) Write a note on : (any **one** out of two) **5**

(1) Explain in detail manufacturing of paper.

(2) Discuss with diagram carbonization of coal by beehive oven process.

3 (a) Answer the following questions : **4**

(1) Define : Molality

(2) What is Gram mole?

(3) Give difference between evaporation and dryer.

(4) Short tube evaporator is not suitable for high viscous liquid. True/False

(b) Answer in brief : (any **one** out of two) **2**

(1) Discuss pressure with example.

(2) Enlist the merits and demerits of forced circulating evaporator.

(c) Answer in detail : (any **one** out of two) **3**

(1) Explain mole fraction.

(2) Draw only diagram for climbing film evaporator.

(d) Write a note on : (any **one** out of two) **5**

(1) Give an account of fundamental and derived quantities.

(2) Explain in detail multiple effect evaporators.

4 (a) Answer the following questions : **4**

(1) What is mixing?

(2) Define: Filtration

(3) During overall material balance of drying, _____ solid is converted in to dried solid.

(4) Give the statement of law of conservation of mass.

(b) Answer in brief : (any **one** out of two) **2**

(1) Draw only block diagram of absorption for material balance.

(2) Explain solid-solid and liquid-liquid extraction.

(c) Answer in detail : (any **one** out of two) **3**

(1) Draw only block diagram of distillation for material balance.

(2) It is desired to make up 1000 kg of a solution containing 35% by weight of a substance 'A'. Two solutions are available, one containing 10 weight% 'A' and other containing 50 weight% 'A'. How many kgs of each solution will be required?

(d) Write a note on : (any **one** out of two) **5**

(1) Centrifuge machine is charged with slurry containing 25% solids by weight and wet solids obtained after filtration are analyzed to contain 8% moisture by weight and filtration is found to contain 200 ppm solids. If centrifuge machine produces 100 kg per desired wet product and quantity of slurry to be handled is 5000 kg per batch; calculate

(i) The time required for filtration and slurry

(ii) Loss of solids in filtration per batch

(2) Write down outline procedures used for doing material balance.

5 (a) Answer the following questions : **4**

(1) The ratio of _____ to mole fraction is known as volatility.

(2) In regular packing, cost of installation is _____

(3) The density difference should be _____ during extraction for better separation.

(4) Gas absorption is an example of unit operation. True/False?

(b) Answer in brief : (any **one** out of two) **2**

(1) What is minimum and maximum boiling azeotrope?

(2) Enlist various packing material used in gas absorption.

(c) Answer in detail : (any **one** out of two) **3**

(1) Explain steam distillation with diagram.

(2) Discuss factors affecting selection of solvent in extraction.

(d) Write a note on : (any **one** out of two) **5**

(1) Explain spray and packed tower with neat diagrams.

(2) Discuss continuous distillation with rectification process with diagram.
