

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination November 2018

B. Tech/ M. Tech (as applicable) in Chemical Engineering, Semester: Fifth

Roll No.....

COURSE CODE:CHE509

Time: 3 hours. Max. Marks:80

COURSE TITLE: Chemical Process Technology

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark) 10

- i. The molecular formula of the predominant chemical compound in commercial sugar is
(a) $C_{12}H_{22}O_{11}$ (b) $C_{12}H_{24}O_{12}$ (c) $C_6H_{10}O_5$ (d) $C_6H_{12}O_6$
- ii. Sulfuric acid produced by contact process is
(a) Cheaper (b) pure and concentrated (c) of poor quality (d) very dilute
- iii. High alumina cement is manufactured by fusing
(a) Limestone and slaked lime (b) Limestone and quick lime
(c) Limestone and bauxite (d) Limestone and sand
- iv. Choose the correct statement in viscose rayon manufacturing process,
(a) Carbon disulphide used as reactant for xanthate formation is regenerated in a later step
(b) Caustic soda used as reactant for steeping of cellulose is regenerated in a later step
(c) Sulphuric acid is used in steeping process of cellulose
(d) The spun viscose rayon is hardened in an alkali bath
- v. The products of saponification of fat are
(a) Glycerol and salt of higher fatty acids (b) Glycerol and higher aliphatic alcohols
(c) Glycerol and organic acids (d) Ethylene glycol and organic acids
- vi. Vanaspati is produced by the process of
(a) Hydrolysis (b) Oxidation (c) Reduction (d) Hydrogenation
- vii. The main raw materials for the production of soap are
(a) Tallow and 20% oleum (b) Vegetable oils and 98.7% H_2SO_4
(c) Vegetable oils and caustic soda (d) Tallow and soda ash
- viii. Maltose is converted into glucose by the enzyme
Diastase (b) Invertase (c) Maltase (d) Zymase
- ix. Polyvinyl chloride is produced by
(a) co-polymerization
(b) addition-type kinetics
(c) reacting chlorine with polyethylene
(d) reacting hydrochloric acid with polyethylene
- x. Alcohol content in beer is about
8-10% (b) 50-55% (c) 96% (d) 89.4%

- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- A Write the five unit process with chemical reaction for petroleum industries.
- B Which unit operations are used in heat exchanging system, explain with suitable schematic representation?
- C Which unit operations are used in Fluid-solid contacting system, explain with suitable schematic representation?
- D Which unit operations are used in solid handling system, explain with suitable schematic representation?
- Q.3A What are the application of sulfur? Discuss sulfur production by oxidation-reduction of hydrogen sulfide with process flowsheet. 05
- Q.3B What are the properties and application of urea? Discuss anyone method of production of urea with process flowsheet. 05
- Q.4A What are the consumption pattern of the nitric acid as per the USA applications, also write the properties of the nitric acid. 05
- Q.4B Which methods are most suitable in the manufacturing of sulfuric acid explain it with process flowsheet? 05
- Q.5A What are the methods for the hydrogenation of coal with suitable process flowsheet, raw materials requirements, and process description? 05
- Q.5B How many methods are used for the production of phosphoric acid, explain wet process (Hydrochloric acid leaching) in details with process flowsheet. 05
- Q.6A What are the method of production for synthetic ammonia explain with suitable process flowsheet with process description? 05
- Q.6B1 What are the chemical reactions for the production of nitric acid by ammonia oxidation process? 05
- OR
- Q.6B2 What are the properties of the different grades of cement explain in details with chemical formula and constituents of cement. 05
- Q.7A Make a process flowsheet for the production of Portland cement chemical reactions, quantitative requirements, process description and major engineering problems. 10
- Q.8A What are the methods for the extraction of sugar cane to produce of the crystal white sugar with suitable process flowsheet, chemical reactions, quantitative requirements, process description and major engineering problems? 10
- OR
- Q.8B What are the methods for the production of pulp from hard wood with suitable process flowsheet, properties, chemical reactions, quantitative requirements, process description and major engineering problems? 10

*****All the Best*****