

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: BE101-06

Course Name: INTRODUCTION TO CHEMICAL ENGINEERING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|---|--|-----|
| 1 | Chemical engineers have contributed substantially more than any other engineering disciplines in advancing the quality of life. Justify this statement citing three examples in everyday life. | (3) |
| 2 | The mass velocity of a gas through a duct is $1000 \text{ kg/m}^2 \text{ h}$. Express the velocity in $\text{lb/ft}^2 \text{ s}$ | (3) |
| 3 | Propose a separation technique for removal of CO_2 from products of combustion. What property of CO_2 makes it feasible? | (3) |
| 4 | Distinguish between laminar and turbulent flow | (3) |
| 5 | List any six process parameters that are monitored in a chemical plant | (3) |
| 6 | Explain the basic concept of P & I diagram. | (3) |
| 7 | Identify the role of safety in chemical process industries. | (3) |
| 8 | List three different techniques for municipal solid waste treatment. | (3) |

PART B

Answer eight questions, (at least one full question from each module) each carries 5 marks.

Module I

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| 9 | List any five different professional fields of Chemical Engineering with their primary role | (5) |
| 10 | Discuss the role of chemical engineers in controlling atmospheric pollution. | (5) |

Module II

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| 11 | A solution of potassium chloride in water contains 384 g KCl per litre of the solution at 300 K. the specific gravity of the solution is 1.6. Determine the following:
a) The weight percentage of KCl
b) The molarity of the solution | (5) |
| 12 | a) Illustrate the equation of state
b) Differentiate between vapour pressure and partial pressure. | (2)
(3) |

Module III

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| 13 | Differentiate between Extraction and Leaching with an example. | (5) |
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Module IV

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| 14 | Explain different modes of heat transfer with example | (5) |
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Module V

- 15 Give the schematic representation of (i) control valve (ii) centrifugal pump (5)
(iii) heat exchanger (iv) distillation column (v) CSTR
- 16 a) Explain the principle based on which a thermocouple is working. (2)
b) Enumerate the need for using U-tube manometer and Venturimeter in industries. (3)

Module VI

- 17 Write down the major causes of Bhopal gas tragedy. (5)
- 18 Scope for Chemical Engineers in the development of sustainable alternatives for betterment of world's economy. (5)

PART C

Answer six questions, (at least one full question from each module) each carries 6 marks.

Module I

- 19 Chemical engineers play key role in meeting the world's energy demand. Explain (6)

Module II

- 20 An aqueous NaCl solution contains 230 g of NaCl per litre at 20 °C. The density of the solution at this temperature is 1.148 g/cc. Calculate (i) mole %, (ii) weight % and (iii) molality. (6)

Module III

- 21 Explain hydrogenation process and its industrial application (6)
- 22 a) Distinguish unit operations and unit processes with examples (3)
b) Distinguish between drying and evaporation. (3)

Module IV

- 23 What are the different Classification of chemical reactions with an example (6)

Module V

- 24 Describe the DCDA process for the production of sulphuric acid with a process flow diagram. (6)

Module VI

- 25 a) Discuss the physical, chemical and biological characteristics of waste water. (4)
b) List any four waste water treatment techniques (2)
- 26 Explain the effect of Aerial spraying of Endosulphan on residents of Kasarrgod (6)
