Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 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   Explain any one life saving application wherein Chemical engineers have a major role to play with.   (3)

2   List any three terms for expressing the composition of a solution   (3)

3   Identify the unit operation for decolourisation of industrial waste water. Describe the principle used.   (3)

4   Define the order of reaction and molecularity of a chemical reaction.   (3)

5   List any six process parameters that are monitored in a chemical plant   (3)

6   Outline the chemical reaction involved in production of sulphuric acid   (3)

7   Give any three chemical characteristics of wastewater   (3)

8   Classify the various types of fire.   (3)

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

9   Exemplify the chemical engineering applications in everyday life.   (5)

10   Write a note on the role of chemical engineers in atmospheric pollution control   (5)

Module II

11   A solution of caustic soda contains 20% NaOH by weight. Taking the density of the solution as 1.196 kg/L. Calculate the (i) normality, (ii) molarity and (iii) molality of the solution.   (5)

12   a)   Describe the equation of state.   (2)

    b)   Differentiate vapor pressure and partial pressure.   (3)

Module III

13   a)   Write various mechanisms by which size reduction may be achieved.   (2)

    b)   List any one example each for size reduction and size separation equipment.   (3)

Module IV

14   a)   Identify the mode of heat transfer occurring in solids.   (1)

    b)   State the law governing the mode of heat transfer   (2)

    c)   List the various mode of heat transfer that occurs in fluids   (2)

Module V

15	With a neat flow diagram explain DCDA process.	(5)
16	Illustrate the working and principle of thermocouple	(5)

Module VI

17	Distinguish between Process flow diagram and P& I Diagram	(5)
18	Explain various types of solid waste treatment methods.	(5)

PART C

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

Module 1

19	a)	Differentiate batch and continuous processes.	(3)
	b)	List the merits of continuous process over the batch process.	(3)

Module lI

20	a)	You are provided with two bars of steel and pure iron. The thermal conductivity of pure iron is 39 Btu/(ft h °F) and that of steel is 39 kcal/(m h °C). Compare the thermal conductivity of both material and select a better conductor.	(3)
	b)	The analysis of magnesite ore contains 81% $MgCO_3$, 14% SiO_2, and 5% H_2O by weight basis. Convert this composition into mole %.	(3)

Module III

21	Explain hydrogenation process and its industrial application	(6)

Module 1V

22	a)	Differentiate between laminar and turbulent flow	(3)
	b)	Differentiate between mixed flow reactor and plug flow reactor	(3)
23	a)	Define 'Black Body, emissivity and absorptivity in radiation heat transfer.	(4)
	b)	List any two radiation laws	(2)

Module V

24	Explain the working of U-tube manometer and Venturimeter with the help of a neat sketch	(6)

Module V1

25	Explain the Case study of Effect of Aerial Spraying of Endosulfan on Residents of Kasargod, Kerala.	(6)
26	Explain the need for effluent treatment plant in a chemical industry	(6)

****