Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2170503 **Date: 26/11/2018**

Subject Name: Plant Design & Project Engineering

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define "Pilot Plant". Discuss about its importance in chemical Industries.	**03**
	(b)	Differentiate between standard v/s special equipment.	**04**
	(c)	State and discuss the important factors to be considered in selection of the location of a chemical plant.	**07**
Q.2	**(a)**	Define the following : (i) Book value (ii) Salvage Value (iii) Cost Indexes	**03**
	(b)	Using diagram explain break- even point analysis and its importance.	**04**
	(c)	The original value of cyclone separator if Rs. 32,000/- and its salvage value is Rs. 2000/-. The service life is estimated to be 7 years. Determine the asset value at the end of 5 years using (a) Straight line method. (b) Text Book declining method (c) Double declining balance method (d) Sum of the years digit method	**07**
		OR	
	(c)	The annual direct production cost of plant operating at 60% capacity is Rs.1,20,00,000/-.While the sum of annual fixed charges, overhead cost and general expenses is Rs.1,00,00,000/-. What is the breakeven point in units of production per year if total annual sales are Rs.2,80,00,000/- and the product sells at Rs.2000/- per unit? What were the annual gross earnings and net profit for this plant at 100% capacity if the income tax rate is 22% of gross earnings?	**07**
Q.3	**(a)**	Discuss about "Scale model"?	**03**
	(b)	Discuss about the components involved in techno-economical feasibility report.	**04**
	(c)	Discuss the preliminary specifications for any chemical equipment. Prepare a specification sheet for a distillation column.	**07**
		OR	
Q.3	**(a)**	Discuss any three safety aspects to be considered in a chemical plant project.	**03**
	(b)	Discuss types of flow diagrams in detail.	**04**
	(c)	Discuss in brief about process utilities and its importance in chemical industry.	**07**
Q.4	**(a)**	Discuss basic factors involved in plant design.	**03**
	(b)	Define plant Layout. List out factors to be considered for an efficient	**04**

plant layout.

(c) Discuss the selection criteria of valves. Name commonly used pipe fittings and valves with their main functions. **07**

OR

Q.4 **(a)** Define followings: **03**
(i) Working Capital Investment
(ii) Turnover Ratio
(iii) Payout period

(b) Enlist different methods for estimating capital investment. Explain Unit Cost estimate method in detail. **04**

(c) Discuss cash flow with tree diagram for an industrial organization. **07**

Q.5 **(a)** What do mean by "Alternative Investments"? Enlist various method of profitability Analysis. **03**

(b) List out costs involved in Direct and Indirect Cost. **04**

(c) Discuss the method for evaluation of total product cost showing the individual components **07**

OR

Q.5 **(a)** What is "Bar Chart"? List out limitations of Bar chart. **03**

(b) Differentiate between C.P.M and P.E.R.T **04**

(c) An equipment consists of three parts A, B and C. These are assembled together after manufacture. Part A is of cast iron which requires a pattern and a module, Part B is to be machined on a special machine and hence special machine is to be purchased and erected. Part C needs special heat treatment before assembly. The assembly has to be tested with a specially fabricated ring before dispatch. The time needed by each activity is given below. Draw the Bar chart. **07**

No.	Activity	Days
1	Preparing pattern for casting Part A	5
2	Preparing mould for Part A	1
3	Casting and clearing of A	2
4	Heat treatment of C	2
5	Obtaining and installing machine M	8
6	Machining part B	3
7	Assembly Parts A, B and C	3
8	Preparing test ring	4
9	Testing assembly	1
10	Packing and dispatch	1
Total		30 days

****