Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2022

Subject Code:3150506 Date:17-01-2023

Subject Name:Chemical Process Plant Design & Economics

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Discuss in brief role of a chemical engineer.	**03**
	(b)	Differentiate between standard v/s special equipment.	**04**
	(c)	State and discuss the factors to be considered in selection of the location of a chemical plant.	**07**
Q.2	**(a)**	Write short note on patents.	**03**
	(b)	Discuss typical gaseous pollutants and their sources.	**04**
	(c)	List all points in feasibility survey. Explain 'Markets' & 'Properties of products' with respect to the same.	**07**
		OR	
	(c)	Write short note on CPM and PERT.	**07**
Q.3	**(a)**	Discuss storage aspects as a general design consideration	**03**
	(b)	List out costs involved in Direct and Indirect Cost.	**04**
	(c)	The original cost for a distillation tower is Rs.24, 00,000 and the useful life of the tower is estimated to be 8 years. The sinking-fund method for determining the rate of depreciation is used and the effective annual interest rate for the depreciation fund is 10 percent. If the scrap value of the distillation tower is Rs.4, 00,000, determine the asset value (i.e., total book value of equipment) at the end of 5 years by using sinking fund method.	**07**
		OR	
Q.3	**(a)**	Discuss selection of size reduction equipment.	**03**
	(b)	Discuss types of depreciation in brief.	**04**
	(c)	A machine in a process generates a positive net annual cash flow of Rs.45000.Two alternatives is available. Machine A costs Rs.92500 and requires replacement in every 4 years. Machine B costs 1,35,000 and requires replacement after every 7 years. Neither machine has any scrap value. The cost of capital is 15%. Maintenance cost and other annual costs are same for both machines. Which machine should be selected?	**07**
Q.4	**(a)**	Define: (1) Salvage value (2) Book value (3) Market Value	**03**
	(b)	Discuss selection criteria of valves in brief.	**04**
	(c)	What is Pilot Plant? State the importance of pilot plant. Explain cost index with an example	**07**
		OR	
Q.4	**(a)**	Draw a typical master plot plan of an industry.	**03**
	(b)	Explain: (1) Battery limit (2) Grass Root Plant	**04**
	(c)	List types of flow diagrams and explain each with a neat sketch.	**07**

Q.5	**(a)**	Write a brief note on 'Unit area concept'.	**03**
	(b)	List preliminary specifications for equipment in general.	**04**
	(c)	Discuss with rough sketches different types of pipe fittings with specific uses. What are the advantages and disadvantages of vertical and horizontal layouts?	**07**

OR

Q.5	**(a)**	Write short note on plant overhead costs.	**03**
	(b)	Explain: (1) Rate of return (2) Payback period.	**04**
	(c)	Discuss various waste treatment and disposal methods.	**07**

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