Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 170503 **Date: 04/05/2017**

Subject Name: Plant Design & Project Engineering

Time: 02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	Explain principles of plant layout and discuss various factors in planning of layouts.	**07**
	(b)	What is Pilot Plant? State the importance of pilot plant in Chemical Industries.	**07**
Q.2	**(a)**	Enlist various methods (at least five) of estimating capital cost investment and explain any one in detail	**07**
	(b)	Discuss in detail factors affecting Total product cost.	**07**
		OR	
	(b)	Discuss the contents of a techno-economic feasibility report	**07**
Q.3	**(a)**	Critically analyze the location of following chemical plants in terms of raw material availability, site characteristic, waste disposal and transportation. 1. Reliance refinery, Jamnagar, Gujarat 2. Tata Chemicals, Mithapur, Gujarat	**07**
	(b)	Discuss various waste treatment and disposal methods.	**07**
		OR	
Q.3	**(a)**	Define/explain the following terms citing examples or mathematical correlation and/or additional illustration wherever possible: (**Any seven**) (i) Unamortized cost (ii) Functional depreciation (iii) AIT (iv) payout period (v) Cost index (vi) Current and cash ratio (vii) Vintage group account (viii) Detonation and deflagration.	**07**
	(b)	Write a brief note on 'Cost indices	**07**
Q.4	**(a)**	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.	**07**
	(b)	What are standard and special equipments? Discuss the advantages of standard equipment over special equipment	**07**
		OR	
Q.4	**(a)**	State the general requirements of piping layout. Name any four important pipe fittings and four commonly used supports for piping.	**07**
	(b)	Discuss the method for evaluation of total product cost showing the individual components	**07**

Q.5	**(a)**	An R & D Project has certain activities to execute. First three of these activities include design (21), building prototype (5) and evaluating equipment (7). The first activity does not have any predecessor, but it is the predecessor of 2nd and 3rd activity. 4th activity is testing of prototype (2), in which building of prototype is the predecessor. Writing equipment report (5), method report (8), and final report (2) are considered as 5th, 6th and 7th activities. 3rd and 4th activities are the predecessor of 5th and 6th activity. 5th and 6th activities are the predecessors of 7th activity. Construct the network diagram and indicate the critical path. The numbers in the brackets indicate the time (in weeks) required for that particular activity.	**07**
	(b)	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**

OR

Q.5	**(a)**	Enlist various methods for profitability analysis. Discuss any one in detail.	**07**
	(b)	Write short note on types of flow diagram used in chemical industries.	**07**

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