Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA ENGINEERING – SEMESTER- VI EXAMINATION –Summer- 2019

Subject Code: 3360502   **Date: 10-05-2019**

Subject Name: Chemical Engineering Plant 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. Use of programmable & Communication aids are strictly prohibited.
        5. Use of only simple calculator is permitted in Mathematics.
        6. English version is authentic.

Q.1		Answer any seven out of ten.	**14**
	1.	Define cost index.	
	2.	What is zone selection?	
	3.	Give general equation for optimum design with two variables.	
	4.	What do you mean by Salvage value and scrap value?	
	5.	List types of engineering flow diagrams.	
	6.	Give mathematical equation to determine annual depreciation using sinking fund method.	
	7.	List out various method for plant layout.	
	8.	Discuss: Payout time period.	
	9.	What is Break Even point?	
	10.	List out factor affecting plant location.	
Q.2	(a)	Discuss the need for plant design.	**03**
		OR	
	(a)	Explain any one cost index.	**03**
	(b)	Discuss principles of piping layout.	**03**
		OR	
	(b)	Discuss the role of Chemical Engineer for plant design.	**03**
	(c)	Discuss selection of mass transfer equipment.	**04**
		OR	
	(c)	Explain specification sheet for a 1-2 Shell and Tube heat exchanger.	**04**
	(d)	Discuss break even chart.	**04**
		OR	
	(d)	Discuss checklist for pilot plant investigation.	**04**
Q.3	(a)	Discuss general procedure for determining optimum design.	**03**
		OR	
	(a)	List out various source of information and discuss any two.	**03**
	(b)	"It is advisable to select standard equipment wherever possible"- Justify	**03**
		OR	
	(b)	Discuss types of insulation.	**03**
	(c)	Describe analytical procedure for determining optimum condition with one variable.	**04**
		OR	
	(c)	Write short note on various types of flow diagrams	**04**
	(d)	Differentiate: Batch processing and Continuous processing.	**04**

(d) Differentiate: Standard equipment and Special equipment. **04**

Q.4 (a) Discuss the basis for good design. **03**

(a) A rotary drum vacuum filter is purchased with an initial cost of Rs. 1, 32,496 with estimated useful life of 10 year and salvage value Rs. 22,532. What will be the book value of property at the end of 6 year? Calculate using Straight line method. **03**

(b) The original cost of property is Rs. 30000 and it is depreciated by 6% sinking fund method. What is the annual depreciation charge if the book value of property after 10 years is the same as if it had been depreciated at Rs. 2500 per year by Straight line method? **04**

(b) List the cost involved in the fixed capital and working capital investment. **04**

(c) The annual direct production cost for a plant operating at 70% capacity are Rs. 2,32,000, while the sum of the annual fixed charge, overhead cost and general expanses are Rs. 2,00,000. What is the break-even point in unit of production per year if total annual sales are Rs. 5, 60,000 and the production sales at Rs. 40 per unit? What are the annual gross earnings for this plant at 100% capacity? **07**

Q.5 (a) List various methods for determining depreciations and discuss any one. **04**

(b) Explain Six-tenth factor rule. **04**

(c) Explain rate of return on investment. **03**

(d) Discuss Factors governing selection of insulation. **03**

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