

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2021****Subject Code:3150506****Date:17/09/2021****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) List out names of three different stages for chemical engineering projects.	03
	(b) Discuss in brief about followings: (i) Marshall and Swift Equipment Cost Indexes (ii) Chemical Engineering Plant Cost Index	04
	(c) Explain selection of material handling equipments in chemical plant.	07
Q.2	(a) Answer the followings: (i) Which are the two types of coupling? (a) Regular and wet coupling (c) Wet and slip coupling (b)Screw and et coupling (d)Regular and slip coupling (ii) Which of following is not extended type pipe fitting? (a) Coupling (c) Elbow (b) Adapter (d) Union (iii) Which valve is best for on off services? (c) Gate valve (c) Butterfly Valve (d) Globe Valve (d) Foot Valve	03
	(b) What are important aspects of semi-commercial and commercial evolutionary stages in a pilot plant?	04
	(c) Explain objectives and contents of techno-economic feasibility survey in detail.	07
	OR	
	(c) Draw a generalized schematic flow diagram of design and development stages of an engineering project.	07
	Q.3	(a) Define: (i) net worth (ii) fixed capital (iii) working capital
(b) Depreciation. The original value of a piece of equipment is Rs. 11,00,000, completely installed and ready for use. Its salvage value is estimated to be Rs 75,000 at the end of a service life. Estimated service life is 10 years. Determine the asset value of the equipment at the end of 5 years using following two methods: (i) Straight line method and (ii) Text book declining balance method.		04
(c) Discuss in detail about storage lay-out and equipment lay- out of a process plant.		07
OR		
Q.3	(a) List out name of any three methods for profitability analysis.	03
	(b) State various factors affecting investment and total product cost?	04
	(c) Enlist various factors to be considered for comparison of different processes. Discuss any two of them in detail.	07

- Q.4** (a) What is the importance of pilot plant and scale-up in chemical process plant? **03**
- (b) Define: Payout period. How you will estimate the payout period in years with and without interest charge. **04**
- (c) Write a short note on applied utilities for a chemical process plant. **07**
- OR**
- Q.4** (a) Enlist any six factors for selection of location of a chemical process unit. **03**
- (b) Explain break-even chart. A D Fine Chemicals Ltd. sells a chemical for Rs.120 per kg and it cost Rs. 80 per kg to produce it, and has annual fixed cost of Rs. 12,00,000. How much kg of product will the company need to sell to break-even? **04**
- (c) Draw a neat diagram and explain break-even point. State importance of break-even analysis. **07**
- Q.5** (a) Define: (i) current assets (ii) fixed assets and (iii) intangibles **03**
- (b) Enlist various factors to be considered for comparison of different processes. Discuss any two of them in detail. **04**
- (c) Explain method of evaluation of total product cost explaining **07**
- OR**
- Q.5** (a) Draw a labeled diagram of cash flow method. **03**
- (b) Explain 'critical path method' in detail. **04**
- (c) State any five methods of profitability analysis and explain their principle in detail. **07**
