U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Industrial Engineering & Management **Duration: 3 hrs.**
Course Code: 23IM5PCENE **Max Marks: 100**
Course: Engineering Economics

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Explain the importance of cash flow diagram and steps in constructing the same. Contrast between lenders and borrowers cash flow diagrams	*CO1*		**10**
	b)	Differentiate between decision making activity done using intuition and analysis	*CO1*		**05**
	c)	An Agritek company installed a new computer-controlled irrigation system that uses reclaimed sewage for watering the fairways. The cost of the pumps, piping, and controls was Rs.1,100,000. If the club expects to recover its investment in 10 years using an interest rate of 10% per year, what should be the amount per year?	*CO2*	*PO1*	**05**
		OR			
2	a)	With a suitable example, discuss the impact of time on value of money i.e. Time Value equivalence.	*CO1*		**10**
	b)	The utility bill of Recycling has been increasing by Rs.400 per year. If the utility bill in year 1 is Rs.3500, what would be the equivalent annual worth in years 1 through 6 at an interest rate of 20% per year	*CO2*	*PO1*	**05**
	c)	Costs for support of a certain printer made by Canon have been decreasing by Rs. 20,000 each year. If the costs in year 1 are Rs. 250,000, what would be the present worth of the costs through year 8 at an interest rate of 15% per year?	*CO2*	*PO1*	**05**
		UNIT - II			
3	a)	Discuss about the conditions applicable for PW comparison.	*CO1*		**05**
	b)	Discuss the use of pay-back comparison method in the engineering economy. Also mention its merits and demerits	*CO1*		**05**

		c)	An entrepreneur intending to start a new business knows that the first few years are the most difficult. To lessen the chance of failure, a loan plan for startup capital is proposed in which interest paid during the first two years will be at 3 percent, at 6 percent for the next two years and at 12 percent for the final two years of the 6 year loan. How large a loan can be justified for proposed repayments at the end of years 2, 4 and 6 of, respectively, Rs 20000, Rs. 30000, and Rs. 50000(Draw CFD)	*CO2*	*PO1*	**10**
			OR			
	4	a)	A civil contractor has three options to purchase a dump truck for transportation and dumping of soil at a construction site. All the alternatives have the same useful life. The cash flow details of all the alternatives are provided as follows; Option-1: Initial purchase price = Rs.30,00,000, Annual operating cost = Rs.30,000, Annual income Rs.1,50,000 for first three years and increasing by Rs.5000 in the subsequent years till the end of useful life, Salvage value = Rs.8,00,000, Useful life = 10 years Option-2: Initial purchase price = Rs.27,00,000, Annual operating cost Rs.35,000 for first 5 years and increasing by Rs.2000 in the successive years till the end of useful life, Annual income = Rs.1,40,000, Expected salvage value = Rs.6,50,000, Useful life = 10 years. Using present worth method, find out which alternative should be selected, if the rate of interest is 8% per year.	*CO2* *CO3*	*PO1* *PO2*	**15**
		b)	Elaborate on the methods that are used for comparing assets with unequal lives.	*CO1*		**05**
			UNIT - III			
	5	a)	A material supply contractor has two options from two different manufacturing companies, Company-1 and Company-2 to purchase a tractor for supply of construction materials. The details of cash flow of the two options are given below; Company-1 Tractor: Initial purchase cost = Rs.2000000, Annual operating cost including labor and maintenance = Rs.50000, Cost of new set of tires to be replaced at the end of year '3', year '6'and year '9' = Rs.110000 each, Expected salvage value = Rs.520000, Useful life = 10 years. Company-2 Tractor: Initial purchase cost = Rs.2200000, Annual operating cost including labor and maintenance = Rs.27000, Cost of new set of tires to be replaced at the end of year '4' and year '8' = Rs.120000 each, Expected salvage value = Rs.700000, Useful life = 10 years. Determine which company tractor should be selected on the basis of equivalent uniform annual worth at the interest rate of 12%	*CO2* *CO3* *CO4*	*PO1* *PO2* *PO3*	**15**

			per year. (Draw CFD)			
		b)	Discuss the situations, which are suitable for EAW method comparison	*CO1*		**05**
			OR			
	6	a)	Using the annual worth method, compare the following machines having different life spans at an interest rate of 11 per year. **Machine-1** Cash flow details: Initial purchase price = Rs.1200000 Annual operating cost = Rs.38000 Annual revenue = Rs.210000 for first 6 years and then Rs.225000 afterwards till the end of useful life. Expected salvage value = Rs.320000 Useful life = 14 years **Machine-2** Cash flow details: Initial purchase price = Rs.1400000 Annual operating cost = Rs.26000 Annual revenue = Rs.290000 Expected salvage value = Rs.450000 Useful life = 7 years	*CO2* *CO3*	*PO1* *PO2*	**15**
		b)	Using suitable example, explain the patteern of a capital recovery	*CO1*		**05**
			UNIT - IV			
	7	a)	Discuss the meanings of IRR, ERR and MARR with examples.	*CO1*		**10**
		b)	A company is trying to diversify its business in a new product line. The life of the project is 10 years with no salvage value at the end of its life. The initial outlay of the project is Rs. 20,00,000. The annual net profit is Rs. 3,50,000. Find the rate of return for the new business	*CO2* *CO3*	*PO1* *PO2*	**10**
			OR			
	8	a)	Discuss the three major causes of replacement with examples	*CO1*		**08**
		b)	A firm is considering replacement of an equipment, whose first cost is Rs. 4,000 and the scrap value is negligible at the end of any year. Based on experience, it was found that the maintenance cost is zero during the first year and it increases by Rs. 200 every year thereafter. When should the equipment be replaced if i = 12%?	*CO1* *CO2*	*PO2* *PO3*	**12**
			UNIT - V			
	9	a)	What is depreciation? Explain in brief the three main causes of asset's deprecation	*CO1*		**10**
		b)	A business has bought a machine for Rs. 100,000. They have estimated the machine's useful life to be eight years, with a salvage value of Rs. 11,000. Calculate the book value and	*CO2* *CO3*	*PO1* *PO2*	**10**

			depreciation amount for eight years using DDB method			
			OR			
	10	a)	Discuss about the causes, effects and measures to control inflation	*CO1*		**05**
		b)	The initial cost of a piece of construction equipment is Rs.3500000. It has useful life of 10 years. The estimated salvage value of the equipment at the end of useful life is Rs.500000. Calculate the annual depreciation and book value of the construction equipment using double-declining balance method, and sinking fund method. (i = 8 percent). Assume k=2/n	*CO2* *CO3*	*PO2* *PO3* *PO4*	**15**

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