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

Autonomous Institute Affiliated to VTU

January / February 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)	Why should engineers study Engineering economics? Discuss the role of engineering economy in Engineering Decsion Making. Give any two situational examples to support your answer.	*CO1*	*PO2*	**10**
	b)	Distinguish between Tactics and Strategy.	*CO1*	*PO1*	**05**
	c)	An Agritech company installed an automated irrigation system with an investment of Rs 2 Lakhs. If the company expects to recover its investment in 5 years. Using an interest rate of 12%, What should be the amount to be provisioned per year.	*CO2*	*PO2*	**05**
		OR			
2	a)	Detrmine the effective interest rate for a nominal annual rate of 8.5% that is compounded: (i) Semiannually (ii) Quarterly (iii) Monthly (iv) Daily	*CO1*	*PO1*	**08**
	b)	A person invests Rs 15 Lakh from the end of this year and following years he invests Rs 10 Lakhs, Rs 9 Lakhs, Rs 8 Lakhs and Rs 6 Lakhs. This plan for investment is because his income would go on diminishing. Find the maturity amount 6 Years later if i=12% compounded annually.	*CO1*	*PO1*	**08**
	c)	At age 25 how much should one invest each year in order to have Rs 1,00,000 at age 40? Assume 10 percent compounded annual growth rate.	*CO2*	*PO1*	**04**
		UNIT - II			
3	a)	Two machines are under consideration by a metal fabricating company. Machine A will have a first cost of $15,000, an annual maintenance cost and operation cost of $ 3,000 and a salvage	*CO2*	*PO1* *PO2*	**10**

			value of $3,000. Machine B will have a first cost of $22,000, an annual cost of $1500 and a $5,000 salvage value. If both machines are expected to last for 10 years,determine which machine should be selected on the basis of present-worth values using an interest rate of 12% per year.			
		b)	A plant superintendent is trying to decide between the machines detailed below, Particulars | Machine A | Machine B First cost | $11,000 | $18,000 Annual operating cost | $3,500 | $3,100 Salvage Value | $1,000 | $2,000 Life Years | 6 | 9 Determine which one should be selected on present worth comparison using an interest rate of 15% per year.	*CO2*	*PO1*	**10**
			OR			
	4	a)	Discuss the conditions applicable to make present worth comparisons.	*CO2*	*PO1*	**05**
		b)	A public utility is trying to decide between two different sizes of pipe for a new water main. A 250-millimeter line will have an intial cost of $35,000, whereas a 300-millimeter line will cost $55,000. Since there is less head loss through the 300 miilimetre pipe the pumping cost for the larger pipe is expected to be $3,000 per year less than for the 250-millimeter line. If the pipes are expected to last for 20 years. Which pipe should be selected, if the interest rate is 15% per year? Use a present worth analysis.	*CO2*	*PO2*	**10**
		c)	Why is the payback period method a very popular means of deciding among the alternatives? What is the intuitive appeal in this method of economic appraisal of investments?	*CO1*	*PO1*	**05**
			UNIT - III			
	5	a)	The following costs are estimated for two equal-service tomato peeling machines in a food-canning plant: Particulars | Machine A | Machine B First cost | $26,000 | $36,000 Annual Maintenance cost | 800 | 300 Annual Labour cost | 11,000 | 7,000 Extra income taxes | --- | 2,600 Salvage Value | 2,000 | 3,000 Life,years | 6 | 10	*CO2* *CO3*	*PO3*	**10**

			If the minimum required rate of return is 15 % per year, which machine should be selected. Use the Equivalent Annnual Worth Analysis.			
		b)	What is the difference between the terms Equivalent Annual Cost (EAC) and Equivalent annual worth (EAW)? Give one example where each of this is appropriate.	*CO2*	*PO2*	**05**
		c)	How do you convert the end of the life value of the assets into equivalent annual amounts? Explain with an example.	*CO2*	*PO1*	**05**
			OR			
	6	a)	Two environmental chambers (A and B) are being considered for a government project which is to last for 6 years. Pertinent data are listed below. Particulars | Chamber A | Chamber B First cost | $4,000 | $2,500 Annual Operating cost | 400 | 300 Salvage Value | 1,000 | -100 Estimated life,years | 3 | 2 (i) What chamber should be selected based on EUAW if money is worth 12% per year? What must be the difference in annual operating cost be to make the equivalent annual worth of both chambers equal?	*CO2* *CO3*	*PO1* *PO2*	**10**
		b)	Give any situational case example which favours the application of Equivalent annual worth comparisons.	*CO2*	*PO1*	**05**
		c)	Outline the procedure for comparson of assests with unequal lives using the Equivalent annual worth method.	*CO2*	*PO1*	**05**
			UNIT - IV			
	7	a)	Clarify the meaning of IRR, ERR and MARR with their areas of application giving situational examples.	*CO2*	*PO1*	**10**
		b)	A project has the following details. Initial Investment; - Rs 60000000 Annual Gross Income; - Rs14,000000 Annual Operating costs -Rs6500000 Salvage value after 8 years is Zero. The project is expected to operate for 8 Years. If the Management of the company expects a Minimum Attractive Rate of Return as 12%. Would you recommend this project?	*CO3*	*PO3*	**10**

			OR			
	8	a)	Is it possible that a certain investment option may have more than one Internal rate of return? Explain with an illustrative example. Graphically depict the situation of Multiple rates of return for investment options.	*CO2*	*PO2* *PO3*	**10**
		b)	If $5000 is now invested in stock equity that is expected to yield $100 per year for 10 years and $7000 at the end of 10 years,what is the implied rate of return? Show the cash flow diagram and the step-by-step methodology for calculating the rate of return using the trial-and-error methdod.	*CO2*	*PO2* *PO3*	**10**
			UNIT - V			
	9	a)	Explain the term technical obsolescence. Give reasons as to why obsolescence occurs.	*CO2*	*PO1*	**05**
		b)	A documentation centre is bought with an investment of Rs 15 lakhs by a small-time business man. The useful life is estimated to be 10 Years. The salvage value of the equipment is Rs 1.5 Lakhs. Determine the Book value of the equipment at the end of the life and the annual depreciaton charge using the Double Declining Balance method.	*CO2* *CO3*	*PO1* *PO2*	**10**
		c)	What are three main reasons for charging depreciation of assets?	*CO3*	*PO2*	**05**
			OR			
	10	a)	Differentiate between Depreciation and Depletion. Give situational examples to indicate where each of these concepts is applicable.	*CO2*	*PO1*	**05**
		b)	The initial cost of a caravan vehicle used by a Film production company is Rs 60 Lakhs. The vehicle has a useful life of 15 years. The estimated salvage value at the end of life is Rs 5 Lakhs. Calculate the annual depreciation charge and book value of the vehicle using the Sinking fund method. Take an interst rate of 12% for this type of asset.	*CO2,* *CO3*	*PO3* *PO4*	**10**
		c)	What is inflation? Why is it important in economic analysis? How you incorporate inflation factor in your caluclations?	*CO2*	*PO1*	**05**

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