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Mid Term Examinations - October 2026

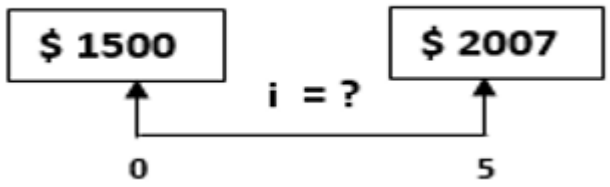
Date: 05/10/2026 **Time:** 11:45 AM - 01:15 PM

Course Code: CIV3038 **Course Name:** Construction Economics and Finance

Semester: Seventh Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2
Marks	56	34

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	At what interest rate would these 2 payment be equivalent? 	2	CO1	BT2
2	On the basis of costing, list the components that comes under Operating cost.	2	CO2	BT2
3	Write a note on Salvage value. Write the formula for the Sinking fund.	2	CO2	BT2
4	Define Geometric gradient with the help of an example. Write the expression for the same.	2	CO1	BT1
5	Rohan purchased 2500 shares that cost $18 each. After exactly one year, the share price of each stock raised to $24. Assuming there are no dividends and no trading costs, what is the nominal rate of return?	2	CO1	BT2

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	Managers employ various quantitative techniques to evaluate alternatives and make objective and efficient decisions. These techniques use scientific, mathematical, and statistical approaches to support the decision-making process. Explain the various quantitative techniques used for evaluating alternatives in decision making.	10	CO1	BT2
7	A company is considering 2 equipments for their construction project. Equipment A has an initial cost of $50,000, Annual operating cost (AOC) of $30,000 and salvage value of $10000 after 5 years. Equipment B has $60,000 as initial cost with an AOC of $20,000 and salvage value of $12000 after 7 years. Which Equipment should the company select at an interest rate of 10% per year.	10	CO1	BT3

PART C: Answer Any 1 Following Questions. 15 M

Q.N.	Questions	M	CO	BT

PTO (Please Turn Over)

8	A civil infrastructure company is evaluating the financial and operational feasibility of purchasing a heavy-duty hydraulic excavator fitted with a 200 hp engine for continuous earth-moving operations. **1.Financial and Capital data:** Purchase cost = Rs. 300000 Service life in years = 5 years Salvage value = Rs. 25000 • Borrowing Interest Rate = *8%* , Risk Premium = *4%* , and Annual Taxes, Insurance, & Storage (TIS) = *3%* **2.Duty cycle and operating conditions:** • Each full digging cycle takes 30 seconds, divided as follows: - *5* seconds digging through hard ground at *100%* full rated power. - *25* seconds swinging and dumping at *50%* rated power. ◦ Due to field delays and positioning, the machine operates for an average of *45* minutes per clock hour. **3.Consumables Specifications:** ◦ **Fuel Consumption Rate:** *0.04* gallons per horsepower-hour (gal/hp·hr) developed. ◦ **Engine Oil Capacity:** *7* gallons crankcase volume, with full oil replacement required every *150* operating hours . **Tasks:** 1. Determine the Minimum Acceptable Rate of Return (**MARR**) percentage. 2. Calculate the total **Annual Ownership Cost** using the Capital Recovery Method. 3. Determine the **Operating Cost rate of Fuel** (in gallons per hour). 4. Determine the **Operating Cost rate of Lubricating Oil** (in gallons per hour).	15	CO2	BT3
9	An infrastructure development firm is preparing a project budget for deploying heavy equipment on site. To set accurate internal rental rates, the fleet manager needs to determine the unit hourly ownership cost and hourly maintenance cost based on the following asset parameters: **Asset Financial & Operational Data:** · Initial Acquisition Price : ₹500,000 · Estimated Terminal Salvage Value : ₹50,000 · Expected Economic Life : 10 years · Annual Operational Usage : 2,500 hours/year · Annual Maintenance Budget : 8% of the initial purchase price · Annual Operating Expense : ₹30,000 · Cost of Capital / Interest Rate : 10% per annum (i) Calculate the **Hourly Cost of Maintenance**. (ii) Calculate the **Hourly Ownership Cost**	15	CO2	BT3

PARTD: Answer Any 1 Following Questions. 15 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
10	The Public Works Department estimates that the maintenance expenses for a heavy earth-moving machine will follow an increasing cash flow over its 8-year service life. The maintenance cost for year 1 for the project was found to be Rs. 6000, Year 2 maintenance was Rs. 6800 and so on with Rs. 800 per year increment continues through year 8. At an interest rate of 12% per year, determine the present worth and annual equivalent of the equipment.	15	CO1	BT3

11	An engineering firm pays ₹2,50,000 now for a structural design software license. No additional payment is required during the first two years. Starting at the end of Year 3, the firm will pay ₹50,000 annually for 4 years for software upgrades. In addition, a one-time training fee of ₹30,000 will be paid at the end of Year 5. If the interest rate is 8% per year, determine the present worth of the total cash outflow. Also, determine the equivalent uniform annual cost of operating and maintaining this machine over the 5-year period. Use the Cashflow diagram to explain the problem.	15	CO1	BT3