

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

M.Tech-II Semester (CM)

COURSE CODE (CREDITS): 10M11CE214 (3)

MAX MARKS: 35

COURSE NAME: Construction Financial Management

COURSE INSTRUCTOR: Dr. Ashok Kumar Gupta

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed

Q.No	Question	CO	Marks																						
Q1	Q1. A construction company is considering the development of a multi-storey commercial complex. The following financial data are available: Initial Project Details: a) Initial construction cost = ₹12,00,00,000 b) Land cost = ₹3,00,00,000 c) Engineering and supervision cost = 10% of construction cost d) Contingency cost = 5% of construction cost e) Project life = 10 years f) Salvage value of building = ₹2,50,00,000 g) Working capital required = ₹1,00,00,000 h) Discount rate = 12% i) Annual maintenance cost = ₹18,00,000 j) Major repair cost in Year 5 = ₹80,00,000 Expected Annual Rental Income <table><tr><th>Year</th><th>Rental Income (₹)</th></tr><tr><td>1</td><td>1,80,00,000</td></tr><tr><td>2</td><td>1,95,00,000</td></tr><tr><td>3</td><td>2,10,00,000</td></tr><tr><td>4</td><td>2,25,00,000</td></tr><tr><td>5</td><td>2,40,00,000</td></tr><tr><td>6</td><td>2,55,00,000</td></tr><tr><td>7</td><td>2,70,00,000</td></tr><tr><td>8</td><td>2,85,00,000</td></tr><tr><td>9</td><td>3,00,00,000</td></tr><tr><td>10</td><td>3,15,00,000</td></tr></table> Find out: (i) Total Initial Project Cost, (ii) Net Cash Flow for each year, (iii) Net Present Value (NPV), (iv) Benefit–Cost Ratio (BCR), (v) Payback Period, (vi) Internal Rate of Return (IRR), (vii) Conduct	Year	Rental Income (₹)	1	1,80,00,000	2	1,95,00,000	3	2,10,00,000	4	2,25,00,000	5	2,40,00,000	6	2,55,00,000	7	2,70,00,000	8	2,85,00,000	9	3,00,00,000	10	3,15,00,000	3	12
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	Sensitivity Analysis if: Construction cost increases by 15%, & Rental income decreases by 10%.		
Q2	The government proposes to upgrade a two-lane mountain highway into a four-lane highway to improve traffic flow and safety. The following data are available: Initial Construction Cost - Land acquisition cost = ₹40 crore - Construction cost = ₹160 crore - Environmental mitigation cost = ₹20 crore - Total initial cost = ₹220 crore Annual Benefits The project generates the following benefits: - Vehicle operating cost savings = ₹32 crore/year - Travel time savings = ₹18 crore/year - Accident reduction savings = ₹10 crore/year - Increase in tourism revenue = ₹8 crore/year Total annual benefit (first year) = ₹68 crore Benefits increase at 4% per year due to traffic growth. Annual Costs - Routine maintenance cost = ₹6 crore/year - Periodic maintenance every 5 years = ₹25 crore - Operating cost increases at 5% per year Other Data - Project life = 25 years - Salvage value = 20% of construction cost - Discount rate = 10% - Inflation rate = 5% - Residual land value remains constant - Analysis is done in constant price terms Determine: - Present Worth of Benefits. - Present Worth of Costs. - Benefit–Cost Ratio (BCR). - Net Present Value (NPV). - Perform Incremental BCR analysis if an alternative design increases construction cost by ₹40 crore but increases annual benefits by ₹12 crore. - Determine whether the project is economically viable. - Perform sensitivity analysis if discount rate increases to 12%.	4	12
Q3	For a single-room structure: - Room size: 5 m × 4 m - Height: 3 m	5	11

	Foundation Concrete		
	Size: $5 \times 4 \times 0.5$ m		
	Brickwork		
	Wall thickness = 0.23 m		
	Slab		
	Thickness = 0.15 m		
	Calculate base project cost. Item rates are mentioned below.		
	Item	Rate (₹)	
	Foundation concrete	6,000/m ³	
	Brickwork	7,000/m ³	
	Slab concrete	7,500/m ³	
	Plaster	250/m ²	
	Flooring	800/m ²	
	Calculate total cost, if contingency @5%, contractor benefit @ 10% and GST@18%. Also calculate project cost by parametric costing method @ ₹15,000/m ² .		