

Part A

Question No.		Detailed Step by Step Procedure	Step wise marks division
1	a.	What are the different types of Approximate Estimate? There are many types of approximate estimates, including: Plinth area estimate Approximate quantity method Unit base method Cube rate estimate Preliminary estimate	2M
	b.	? Specifications are an explicit set of requirements including raw materials, ingredients, formulas, packaging, labels, and even the technical requirements of the machinery used	2M
	c.	Classify the types of Contracts – Formation? Contracts can be classified based on how they are formed, such as express, implied, quasi, e-contract, executed, executory, unilateral, and bilateral.	2M
	d.	schedule of rates? A key tool used for this purpose is the Schedule of Rates (SOR). The SOR is a comprehensive document that provides standardized rates for various construction works and materials, helping stakeholders estimate costs, prepare budgets, and plan resources.	2M
	e.	Summarize why we calculate standard rent of building? Standard rent is calculated to determine the maximum amount a landlord can charge for rent under the law. It's an important aspect of property valuation.	2M

Part B

Question No.		Detailed Step by Step Procedure	Step wise marks division																								
2.	A	Explain the item of the buildings and its units in detail? <table border="1" data-bbox="319 1680 1348 2072"> <thead> <tr> <th>S.No.</th><th>Particulars of items</th><th>Units of measurement</th><th>Unit of payment</th></tr> </thead> <tbody> <tr> <td>1</td><td>Earth work</td><td>cu.m</td><td>Per cu.m</td></tr> <tr> <td>2</td><td>Concrete</td><td>cu.m</td><td>Per cu.m</td></tr> <tr> <td>3</td><td>Damp Proof Course (D.P.C)</td><td>sq.m</td><td>Per sq.m</td></tr> <tr> <td>4</td><td>Brick work</td><td>cu.m</td><td>Per cu.m</td></tr> <tr> <td>5</td><td>Stone Work</td><td>cu.m</td><td>Per cu.m</td></tr> </tbody> </table>	S.No.	Particulars of items	Units of measurement	Unit of payment	1	Earth work	cu.m	Per cu.m	2	Concrete	cu.m	Per cu.m	3	Damp Proof Course (D.P.C)	sq.m	Per sq.m	4	Brick work	cu.m	Per cu.m	5	Stone Work	cu.m	Per cu.m	5 M
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	B.	<p>Preliminary or Approximate Estimate Preliminary or approximate estimate is required for preliminary studies of various items of work or project, to decide the financial position and policy for administrative sanction by the competent authority. The preliminary estimate is prepared by different methods for different types of works. The various methods of preparing the preliminary estimate are plinth area estimate, cubical rate estimate and estimate per unit base.</p> <p>Plinth area estimate The plinth area rate is calculated by finding the plinth area of the building and multiplying by the plinth area rate. The plinth area rate is obtained by comparing the cost of the cost of similar building having similar specifications in the locality.</p> <p>Cubic area estimate The cubic rate estimate is prepared on the basis of the cubical contents of the building. The cubic rate is obtained from the cost of the similar building in the locality having similar specifications. The cost of the building is estimated by multiplying the volume of the building with the cubic area rate. Cubic rate estimate is more accurate as compared to the plinth area estimate.</p> <p>Estimate per unit base The preliminary estimate may be prepared for different structures and works by various ways. For schools and hostels, per class rooms for schools, per bed for hospitals, per seat for theater halls, etc. For roads and highways and for irrigation works, the preliminary estimate is made per kilometer. For bridges and culverts per running meter. For sewerage and water supply projects based on per head of population served</p>	5 M																																				
3	A	<p>There are different types of estimates, including preliminary, detailed, quantity, bid, revised, and supplementary estimates. The type of estimate used depends on the project's requirements and the amount of information available.</p> <p>Preliminary estimate</p> <ul style="list-style-type: none"> • A quick estimate that provides a general idea of a project's cost • Created at the beginning of a project when there is limited information <p>Detailed estimate</p> <ul style="list-style-type: none"> • An accurate estimate that requires complete project information • A company can create a detailed estimate from a preliminary estimate • Provides information on costs, quantities, and rates <p>Quantity estimate</p> <ul style="list-style-type: none"> • An estimate based on the amount of materials and work needed for a project • Assumes a standard cost for each unit of work and material 	5 M																																				

		<p>Revised estimate</p> <ul style="list-style-type: none"> • An estimate that is a counter to budget estimates and is only valid for the current fiscal year <p>Supplementary estimate</p> <ul style="list-style-type: none"> • An estimate created when additional work is required for a project • The total estimate is the cost of the original estimate plus the supplementary work 	
	B	<p>i) Assume the required data for Single room 5 X 4 m First class Brick Masonry used for steps of footing Quantity = Length X Breadth X Depth</p> <p>ii) Assume the Height and thickness of the wall for Single room 5 X 4 m First class Brick Masonry used for steps of super structure walls Quantity = Length X Thickness X Height</p>	5 M
4	A	<p>Brick masonry specifications include the type of bricks, mortar, bonding pattern, and joint thickness.</p> <p>Bricks</p> <ul style="list-style-type: none"> • Bricks should be free of damage or breakage • First class bricks should be made from good quality brick earth and burnt by coal • Bricks should be uniform in size, shape, and texture • Bricks should be soaked before use <p>Mortar</p> <ul style="list-style-type: none"> • Mortar should be made from fresh cement and sand • Mortar joints should be filled completely • Mortar should be used as soon as possible after mixing <p>Bonding pattern</p> <ul style="list-style-type: none"> • Bricks should be laid in English bond, unless otherwise specified • Bricks should be laid with frogs facing up, except in the top course • Vertical joints in alternate courses should line up <p>Joint thickness</p> <ul style="list-style-type: none"> • Mortar joint thickness depends on the class of brickwork • For class I brickwork, mortar joints should be no more than 6 mm thick • For class II brickwork, mortar joints should be no more than 10 mm thick <p>Other specifications</p> <ul style="list-style-type: none"> • Brickwork should be carried out in stages of no more than 3 ft (1 m) in height • Walls should be plumb and courses should be horizontal • Brickwork should be cured by keeping it wet for 10 days 	5 M
	B	<p>Select the content in specifications for a septic tank and explain it?</p> <p>Septic tank specifications include the tank's dimensions, capacity, and detention period. These specifications are based on the number of users, the amount of wastewater, and the local climate.</p> <p>Dimensions</p> <ul style="list-style-type: none"> • Width: The minimum width of a septic tank is 750 mm. • Length: For rectangular tanks, the length is usually 2–4 times the width. • Depth: The minimum depth is 1 m below water level. • Freeboard: The freeboard is the amount of space above the water level. <p>Capacity</p>	5 M

		<ul style="list-style-type: none"> • Liquid capacity: The minimum liquid capacity is 1000 liters. • Detention period: The minimum detention period is 24 hours. <p>Construction</p> <ul style="list-style-type: none"> • Shape: Septic tanks can be rectangular or cylindrical. • Compartments: A single compartment tank can be used for smaller capacities, but a two-compartment tank is better for larger capacities. • Sludge removal: Sludge should be removed from the tank every 6–12 months. <p>Design considerations</p> <ul style="list-style-type: none"> • The shape of the tank affects the flow of wastewater and how much sludge accumulates. • The depth of the tank should be kept to a minimum to avoid short circuiting between the inlet and outlet. • The design should consider the number of users, the amount of wastewater, and the local climate 	
5	A	<p>Substructure Estimation: Excavation, Foundation, Plinth and Damp Proof Course (DPC), Drainage</p> <p>Superstructure Estimation: Walls, Floor Slab, Roof, Windows and Doors,</p> <p>Write the specification and quantity to calculate the estimation of the building</p>	5 M
	B	<p>Earthwork specifications include the dimensions of the excavation, the amount of material to be removed or added, and the required equipment.</p> <p>Dimensions</p> <ul style="list-style-type: none"> • Depth: The depth of the excavation, which can vary depending on the type of footing and the soil type • Width: The width of the excavation, which can be the same as the width of the foundation concrete • Length: The length of the excavation <p>Material</p> <ul style="list-style-type: none"> • Cutting: The amount of material to be removed from the site • Filling: The amount of material to be added to the site • Rock and boulders: If any rock or boulders are found, they should be removed <p>Equipment</p> <ul style="list-style-type: none"> • Mechanical equipment <p>For large buildings and deep excavations, mechanical equipment like hydraulic excavators, tractors, or trucks may be used</p> <ul style="list-style-type: none"> • Shoring <p>If the soil is loose or the excavation is deep, shoring may be needed to support the sides from falling</p> <p>Other considerations</p> <ul style="list-style-type: none"> • The excavation should be measured in cubic meters or cubic feet • The rate should include all tools and plants required for the work • The excavation should be cleared of vegetation, trees, and shrubs 	5 M
6	A	Explain the following (i) Penalty	5 M

		<p>(ii) Compensation for delay in completion (iii) Damages?</p> <p>Penalties</p> <ul style="list-style-type: none"> • Penalties for delay: A mechanism for parties to agree on damages for late completion. • Breach of contract: If a contractor fails to complete a project on time without a valid reason, the client can seek compensation or terminate the contract. • Consumer protection laws: In some jurisdictions, developers may face penalties or legal action if delays affect the buyer's ability to use the property. <p>Compensation for delay</p> <ul style="list-style-type: none"> • Liquidated damages: A fixed amount paid per day or period that a project is delayed. This is a common form of delay damages. • Compensation: Something that makes things equivalent or amends for a loss. <p>Damages in quantity</p> <ul style="list-style-type: none"> • Damages for non-performance: Some construction agreements specify damages for non-performance. • Damages for late delivery: Liquidated damages can be imposed on sections of a contract, such as late delivery of drawings. 	
	B	<p>A labor contract outlines the terms of employment between a worker and an employer, while a material contract outlines the terms of an agreement for the purchase of materials.</p> <p>Labor contract</p> <ul style="list-style-type: none"> • Responsibilities: The worker is responsible for performing the work, while the employer is responsible for providing the necessary materials and equipment • Payment: The worker is paid for their labor, often on a weekly basis • Working conditions: The contract may outline working hours, safety requirements, and adherence to labor laws • Training: The worker may be required to be properly trained and have proper identification documents <p>Material contract</p> <ul style="list-style-type: none"> • Responsibilities: The contract outlines the terms for the purchase of materials needed to complete a project • Payment: The contract may outline the terms for payment for the materials, including the cost of the materials and any fees related to services • Scope : The contract may outline the scope of the project, including the materials required and any incidental services 	5 M
7	A	<p>Types of contract conditions</p> <ul style="list-style-type: none"> • Express conditions: Conditions that are explicitly stated in the contract • Implied conditions: Conditions that are not explicitly stated, but are assumed to exist based on common law or industry standards • Conditions precedent: Conditions that must be met before a party's obligations arise • Conditions concurrent: Conditions that require both parties to fulfill their obligations at the same time • Conditions subsequent: Conditions that terminate the obligations of the parties once a certain event occurs <p>Examples of contract conditions</p> <ul style="list-style-type: none"> • A financing contingency in a real estate contract that states the sale will only occur if the buyer can get financing • An agreement between siblings to clean each other's rooms and wash the dog 	5 M

		<p>until their parents reassign chores</p> <p>Consequences of failing to meet a contract condition</p> <ul style="list-style-type: none"> • Breach of contract • Financial compensation • Specific performance • Contract termination • Dispute resolution through mediation, arbitration, or litigation 	
	B	<p>Piecework agreement</p> <p>A piecework agreement is a type of work arrangement where employees are paid based on their performance, rather than the time they spend working. The employee's salary is calculated based on the number of pieces they produce and the agreed-upon wage rate.</p> <p>Work order</p> <p>A work order is a document that specifies the details of a task that needs to be completed. It can include information like who is responsible for the task, the scope of the task, and the expected outcome. Work orders are a common type of Master Service Agreement (MSA).</p>	5 M
8	A	<p>Rate analysis for canal work is the process of determining the cost per unit of work for a canal. It involves calculating the cost of materials, labor, and other expenses. Like</p> <ul style="list-style-type: none"> • Material requirements: The amount of materials needed for the work, such as filter media or rockfill casing • Labor requirements: The amount of labor needed for the work • Equipment: The type of equipment needed for the work, such as a front end loader or tipper • Work conditions: The conditions in which the work will be done • Contractor profit: The profit the contractor will make on the work 	5 M
	B	<p>Standard data for labor and materials in civil works are used to determine the rate per unit of work. This process is called rate analysis.</p> <p>rate analysis</p> <ul style="list-style-type: none"> • Rate analysis is a method to determine the price of each unit of work. • It involves studying the factors that affect the rate of an item, such as labor costs, material costs, and equipment costs. • The rate analysis process results in a unit rate for each item of work. <p>factors are considered in rate analysis</p> <ul style="list-style-type: none"> • Labor costs: The cost of skilled, semi-skilled, and unskilled labor • Material costs: The cost of materials, including the purchase price • Equipment costs: The cost of equipment rental • Overheads: The cost of indirect expenses, such as general office expenses, taxes, and supervision • Contractor's profit: The profit margin to ensure profitability <p>Rate analysis used</p> <ul style="list-style-type: none"> • Rate analysis is used to determine the cost of a construction project. • It is also used to determine the quantity of materials needed for a construction project. 	5 M
9.	A	<p>Rate analysis for road works is a calculation that determines the cost per unit of work for road construction. It considers the cost of materials, labour, equipment, and</p>	5 M

		<p>overhead.</p> <p>Rate Analysis includes:</p> <ul style="list-style-type: none">• Materials: The cost of materials such as crushed stone, gravel, coarse sand, cement, and bitumen• Labor: The cost of labour for activities such as surveying, excavation, surfacing, and drainage• Equipment: The cost of equipment such as mixers and pneumatic tyred rollers• Overhead: The cost of overhead, such as contractor overhead and VAT <p>Rate analysis examples:</p> <ul style="list-style-type: none">• Works Department: Rate analysis examples for earth work in different types of soil• SlideShare: Rate analysis examples for road work, including the cost of excavation and the materials required for a conglomerate floor• Scribd: Rate analysis examples for road construction, including asphalt and concrete pavement																																																	
B	<p>Item Details: RCC column/beam/slab in concrete mix 1:1.5:3 Quantity Assumed: 10cu-m Rate Assumed, Cement: 280Rs per bag sand: 990 Rs per cu-m C.A: 880 Rs per cu-m Labour Rate: 3200 Rs per cu-m</p> <table><thead><tr><th>Item No</th><th>Item</th><th>Explanation</th><th>Quantity</th><th>Unit</th><th>Rate/unit</th><th>Amount</th></tr></thead><tbody><tr><td>A</td><td>Material</td><td colspan="5">Ratio between Wet mix to Dry mix = 1cum : 1.52cum For 10 cum:15.20cum 15.20/(Sum of Proportion) Therefore, 15.20cum/(1+1.5+3) Therefore, Value for One (1) is 2.76</td></tr><tr><td>1</td><td>Cement</td><td>2.76 cum x 30</td><td>83</td><td>bags</td><td>280</td><td>23184</td></tr><tr><td></td><td></td><td>(1cum = 30 bags)</td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td>Crush Sand/FA</td><td>2.76 cum x 1.5</td><td>4.14</td><td>cum</td><td>990</td><td>4098.6</td></tr><tr><td>3</td><td>Metal/CA</td><td>2.76 cum x 30</td><td>8.28</td><td>cum</td><td>880</td><td>7286.4</td></tr><tr><td></td><td>Total of</td><td></td><td></td><td></td><td></td><td>34569</td></tr></tbody></table>	Item No	Item	Explanation	Quantity	Unit	Rate/unit	Amount	A	Material	Ratio between Wet mix to Dry mix = 1cum : 1.52cum For 10 cum:15.20cum 15.20/(Sum of Proportion) Therefore, 15.20cum/(1+1.5+3) Therefore, Value for One (1) is 2.76					1	Cement	2.76 cum x 30	83	bags	280	23184			(1cum = 30 bags)					2	Crush Sand/FA	2.76 cum x 1.5	4.14	cum	990	4098.6	3	Metal/CA	2.76 cum x 30	8.28	cum	880	7286.4		Total of					34569	5 M
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		A				
		B	Labour charges	10	no	3200
						32000
		C	Wastage @ 5%			
						1728.45
		D	Plant & machinery @ 1%			
						345.69
		E	Water & electricity including curing @ 2%			
						691.38
			Total			
						69334.52
		F	Add for profit & Overhead @15%			
						10400.18
			Total rate		For 10cu m	
						79734.70
			Total rate		For 1cu m	
						7973.5

10	A	<p>10 a)</p> <p>Net return required on Land per annum =</p> $= 20,00,000 \times \frac{5}{100}$ $= 1,00,000/-$ <p>Net return required on building per annum =</p> $= 80,00,000 \times \frac{8}{100}$ $= 6,40,000/-$ <p>Total net return per annum = 7,40,000/-</p> <p><u>Expenditure on Outgoings:</u></p> <p>1) Annual repair @ 1% on cost of Building</p> $= 80,00,000 \times \frac{1}{100} = 80,000/-$ <p>2) Sinking fund @ 4% for 60 years on 90% of Building cost</p> $= 80,00,000 \times \frac{90}{100} \times \frac{0.42}{100}$ $= 30,240$ <p>0.42% being amount of sinking fund per annum of</p> <p>3) Other Outgoings at 30% of net return on building</p> $= 6,40,000 \times \frac{30}{100} = 1,92,000$ <p>Total expenditure on outgoings per annum = 3,02,240</p> <p>Gross rent = Net return + Outgoings</p> $= 7,40,000 + 3,02,240 = \text{₹ } 10,42,240 \text{ per annum}$ <p>Standard rent per month = $\frac{10,42,240}{12} = \text{₹ } 86,854/-$</p> <p>Standard rent per flat = $\frac{86,854}{4} = \text{₹ } 21,714/-$ per month</p>	5 M
	B	<p>Annuity Head Rent</p> <p>An annuity due may arise due to any recurring obligation. Many monthly bills, such as rent, car payments, and cellphone payments, are annuities due because the beneficiary must pay at the beginning of the billing period.</p>	5 M

		<p>Deferred Income A deferred income annuity (DIA) allows you to use a lump sum or multiple purchases to receive a guaranteed¹ "retirement paycheck".</p> <p>Deferred Annuities A single-premium deferred annuity is funded with one lump-sum deposit before the investment grows, and is then annuitized.</p>	
11.	A	<p>There are several methods for valuing assets and businesses, including asset-based, income-based, and market-based approaches.</p> <p>Cost method: Uses the original price paid for an asset</p> <ul style="list-style-type: none"> • Replacement value method: Used when there are no similar assets on the market • Net realizable value method: Used when there are no similar assets on the market • Asset approach: Calculates the fair market value of assets, including the cost to build or replace them <p>Income-based valuation</p> <ul style="list-style-type: none"> • Discounted cash flow (DCF) analysis: Uses projected future cash flows to determine a business's value • Capitalization of earnings method: Used to determine a business's value <p>Market-based valuation</p> <ul style="list-style-type: none"> • Market value method: Uses the current market price of an asset, or its projected price • Comparable company analysis: Compares the company being valued to similar companies • Market capitalization: Multiplies the current share price by the number of outstanding shares <p>Other valuation methods</p> <ul style="list-style-type: none"> • Residual income model: An absolute valuation model that focuses on cash flow, dividends, and growth rate • Contractor's method: A cost method used when other methods can't be used • Number of years purchase method: Used to value goodwill • Annuity method: Used to value goodwill, and considers the time value of money 	5 M
	B	<p>Amount of return required on land @ 5% of Rs 20,000/- = 1000/- Amount of return required on building @ 6% of 80, 000/- = 4800/- Net Income = 5800/- Let gross rent per annum = x Amount of annual repairs 8% of 80, 000/- = 640/- Amount for other repairs = 25 Net in come = Gross income – Out goings 5800 = x 640 – 25x Rent per month = $\frac{8586}{12} = 715.50$</p>	5 M

Signature