

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
SECOND SEMESTER 2021 – 2022

CONSTRUCTION PLANNING & TECHNOLOGY - Comprehensive Exam

Course No: CE F242

Date: 10-05-2022 [8:00 am start]

Duration: 180 Mins (Closed book)

Max. Marks: 80

1) Short answers: [10 x 1=10 marks]

- i. Reportable accidents are the ones in which the worker is unable to report for more than 48 hours (True/False)
- ii. Conciliators should not focus on the common interests of the parties of the projects (True/False)
- iii. Mobilization cost includes those costs that are necessary for the movement and communication of only equipments and not personnel (True/False)
- iv. It is very easy to reduce the cost at the construction stage than at the planning stage (True/False)
- v. RERA stands for _____
- vi. There is no difference between agreement and contract (True/False)
- vii. What is the disadvantage of open tendering?
- viii. What is meant by secured ground rent?
- ix. Briefly explain the belting method of valuation.
- x. What is meant by return frontage?

2) Government sanction is needed prior to the construction of a residential building. Prepare a preliminary estimate given that the building has a carpet area of 1500 m². Assume plinth area rate is Rs 4000/m². Extra for water supply and sanitary installation- 10% of the building cost. Extra for electric installations- 14% of the building cost. Extra for other services- 6% of the building cost. Contingencies- 2%. Supervision charges- 8%. And 40% of the built-up area will be taken up by walls, passages, staircases, laboratories, etc. **[4 marks]**

3) Vijay owns a land measuring 400 m² at the rate of Rs. 2000 per m² and constructs the building with plinth area of 150 m² at a cost of Rs. 10,00,000. He desires to have 12% return on the cost of building and 8% return on the land cost. What rent do you suggest for the property? Assume the annual repairs to be at 0.5% of the cost of construction, the municipal taxes and other outgoings at 30% of the gross rent, and the annual instalment of sinking fund for a life of the building of 30 years and scrap value 10% at an interest rate of 4%. **[6 marks]**

- 4) The following is the cost data with respect to a typical multi-storied residential project with estimated critical path duration as 50 weeks.

Data type	Item	Amount
Cost data	Weekly fixed overhead cost	Rs. 2,00,000/week
	Variable overhead percentage	15%
	Mobilization cost percentage	5%
	Markup percentage	6%
	Bond Premium	1%
Contract terms	Advance payment percentage of contract bid price	0%
	Retained percentage of pay requests	10%
	Number of months between submitting pay requests	1 month
	Lag in paying payment requests	1 month
	Lag to make final payment and return the retained money	0 month

The total direct cost of all the activities is estimated to be Rs. 1,70,00,000/- Determine contract price and bid price factor. **[7 marks]**

- 5) For the construction of factory shed, the following work package is adopted.

Work package	Duration (in months)	Budgeted cost (in Rs.)
1-2 (Engineering design)	2 months	1,00,000
2-3 (Steel supply and fabrication)	2 months	10,00,000
(2-4) Engineering Design	3 month	1,00,000
(3-5) Steel work erection	3 months	3,00,000
(4-5) Civil work	5 months	5,00,000
(5-6) Finishing work	4 months	2,00,000

The physical progress of the project is reviewed after 6 months and the following reporting is done.

Completed activity	Month started	Month completed	Actual duration (in months)	Actual costs incurred (Rs.)
1-2	0 th	2 nd	2	1,00,000
2-3	2 nd	4 th	2	8,00,000

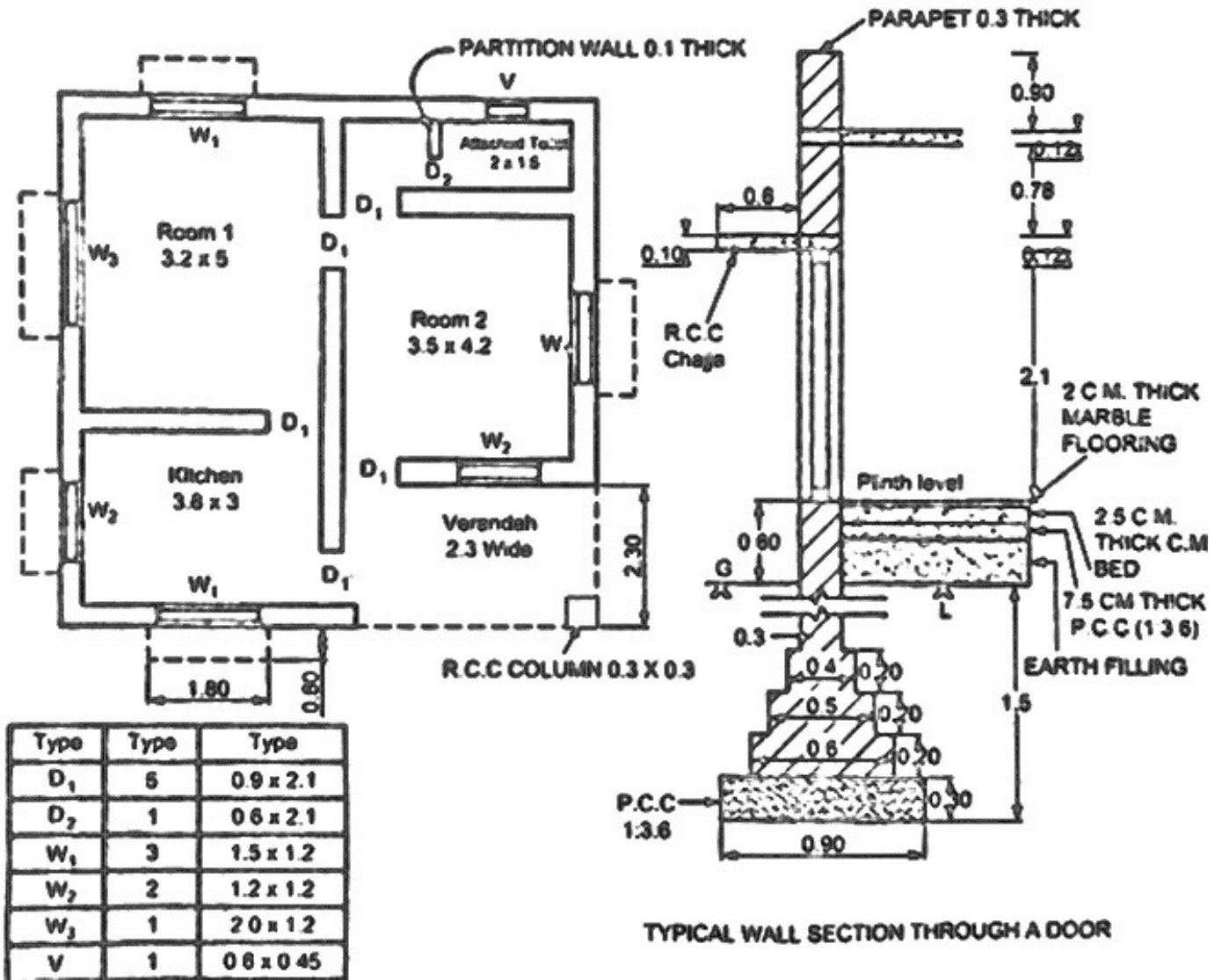
Activity in progress	Month started	Duration up to date (in months)	Estimated time of completion (from now)	Actual costs incurred (Rs.)
2-4	4 th	2	1	50,000
3-5	5 th	1	2	1,00,000
4-5	Not yet started	----	5 months	-----
5-6	Not yet started	----	4 months	-----

Adopt EVM methodology, determine the necessary parameters and indicate whether the project suffers from cost over-run and time over-run. **[15 marks]**

6) The plan and section of a residential building is shown in figure below. Estimate the following quantities using the center line method.

- ✓ Brickwork in foundation up to plinth level and
- ✓ Brickwork in superstructure

Assume bearing for lintel as 15 cm. [18 marks]



P.T.O

7) For the following data of a project, (a) prepare the month-wise running account bill, (b) prepare the cash inflow diagram for the contractor, and (c) prepare the cash outflow diagram for the contractor. **[20 marks]**

- The cost of the contract is Rs. 76,25,000
- Duration of contract: Four months
- The contractor submits the bill every month and payment is made immediately.
- The owner makes an advance payment of Rs. 5 Lakhs, which is to be recovered in four equal installments (each month).
- The owner also supplies materials worth Rs. 3.2 Lakhs, which is also to be recovered equally from each running account (RA) bill (each month).
- The owner will recover from the payments made to the contractor two per cent of the value of the work done as income tax deducted at source, and deposit this amount with the reserve Bank of India (RBI).
- The construction schedule has been prepared by the contractor and has been approved by the owner (Table below).

S.No	Item description	Unit	Total quantity	Rate (Rs.)	Amount (Rs.)	Quantities to be executed in			
						Month 1	Month 2	Month 3	Month 4
1	Earthwork in excavation	m ³	500	50	25,000	500			
2	R.C.C.	m ³	1,000	4,000	40,00,000	250	500	250	
3	Brickwork	m ³	2,000	1,000	20,00,000	500	600	900	
4	Sanitary works	L.S	----	----	2,00,000			50%	50%
5	Electrical works	L.S	----	----				50%	50%
6	Woodwork	L.S.	----	----	2,50,000			50%	50%
7	Finishing work	m ²	4,750	200	9,50,000				4750

Additional constraints and assumptions:

- The cost for the contractor to execute a particular item is 90 per cent of their quoted rates (cost of the project).
- The total cost for a particular item consists of labor (30 per cent), material (50 per cent), plant and machinery (10 per cent), and subcontractor cost (10 per cent).
- Assume that there is no delay in payment to labor, but a delay of one month occurs in paying to the subcontractors, material suppliers, and plant and machinery supplier.
- Retention is 10 per cent of billed amount in every bill. Fifty per cent retention amount is payable after one month of practical completion, while remaining 50 percent is payable four months later.
