



Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai - 400058



Previous Semester Examination

December 2022

Program: UG Civil (B. Tech (Civil)) Sem VIII
Course Code: PC-BTC801
Course Name: Engg. Eco, Est. & Costing

2/12/22
Duration: 3 Hours
Maximum Points: 100
Semester: VIII

Notes:

- Question 1 is compulsory. Attempt ANY 4 out of remaining 5
- Assume suitable data if necessary and state it clearly
- Equations are provided at the end of the questions
- Figure on right indicate maximum points for the given question, course outcomes attained, and Bloom's Taxonomy Level.

Q. No.		Points	CO	BL
Q. 1	a) Your company wishes to purchase a tractor loader and two choices are available: Volvo and JCB. Volvo loader is available at INR 11 Lakhs and has a salvage value of INR 1 Lakh. It is expected to generate net revenue of INR 4 Lakhs each year during its useful life of 5 years. The JCB loader has a purchase cost of INR 14 Lakhs with INR 2 Lakhs as salvage value and is expected to generate net revenue of INR 4.5 Lakhs each year during its useful life of 5 years. Based on NPV, which loader will you recommend if expected rate of return is 20%?	10	2	4
	b) Explain the following terms: contingencies in estimation and bill of quantities	5	5	2
	c) Differentiate between general and detailed specifications?	5	4	4
Q. 2	a) Workout the quantities of below mentioned items of work for the given plan and section provided in Figure 1. (i) Earth work in excavation (ii) Plain cement concrete in foundation	10	5	3
	b) Explain why a pre-tender conference is important	5	6	2
	c) Differentiate between a contract and an agreement	5	6	4
Q. 3	a) Explain how knowledge of economics can help management of construction equipment and decision making in running a company	10	1	2
	b) Calculate the rate for providing and laying first class brickwork in foundations and walls in cement mortar (CM) 1:3 including	10	4,5	4



	soaking of bricks, preparation of mortar, scaffolding, laying and curing. Assume rate for mason as Rs. 540 per day, mazdoor as Rs. 500 per day and bhisti as Rs.490 per day. Other related data as per IS code is given in Figure 2.			
4	a) Draw the cash flow diagram for a company that purchased a crane having a 5 year useful life for Rs. 45 lakhs, is expected to incur Rs. 35,000/- per year for maintenance and will fetch a salvage value of 10% of cost.	5	2	2
	b) Explain the terms: fixed cost, variable cost, and breakeven point. Illustrate with a neat sketch	5	3	2
	c) Discuss advantages and disadvantages of centre line method of taking off quantities.	5	5	4
	d) A pile drilling rig is purchased at a cost of Rs. 13 Lakhs and has a useful life of 6 years. Assuming a salvage value of Rs. 1 Lakh, prepare a depreciation schedule and show the book value of the rig for each year using straight line method.	5	5	4
5	a) A contractor has two backhoes loader: SX50 and CAT424. Down payment for both is 18 lakhs and useful life of both is 4 years. Smart 50 is estimated to give returns of INR 2.5 lakhs in 1st year, 5.5 lakhs in 2nd year and 10 lakhs in 3rd and 4th year. CAT424 is expected to give a return of 4.5 lakhs for all 4 years. Which loader should be chosen based on AARR method?	5	2	5
	b) The town municipality is installing a new water line that is expected to cost INR 5 Crores and be ready in 10 years. Considering a rate of 5%, determine the amount the municipality should charge its customers for recovering the capital cost.	5	3	4
	c) What is a mass haul diagram? How is it useful for economical management of an earthwork project?	5	5	2
	d) Explain the importance of sensitivity analysis. Describe how isoquants can be used for sensitivity analysis	5	3	2
6	a) A contractor needs to procure a dump truck. Two major companies X and Y have suitable rigs available. INR 7Lakhs is the initial investment for X while that for Y is 4 Lakhs. Assuming an annual rate of interest of 8%, determine the brand to be chosen if the annual maintenance cost for brand X is Rs. 3 lakhs for 3 years and for Y is Rs. 5 Lakhs for 3 years. Use NPV method for your recommendation.	5	2	5
	b) Draft a notice inviting tender for laying sewage pipes in MCGM ward S for an estimated cost of Rs. 2.6 Crores and to be	5	6	3

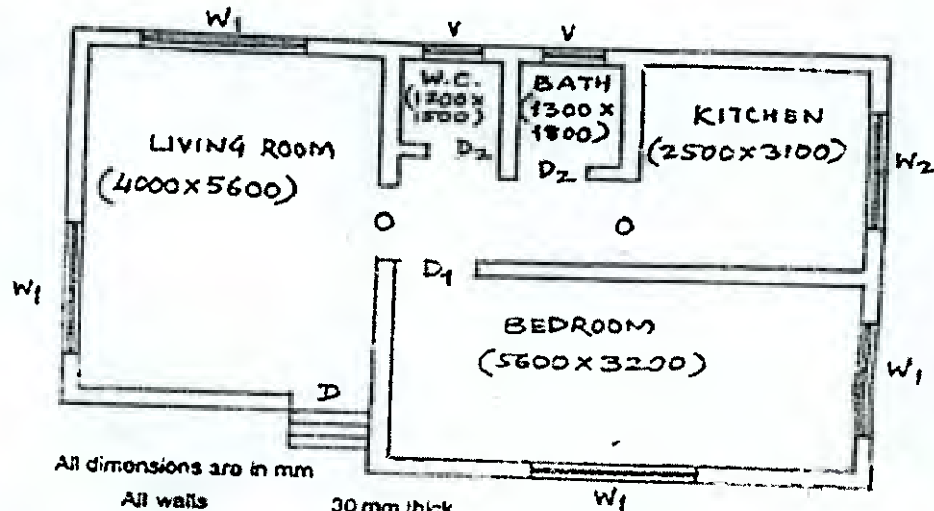


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	completed in 9 months.			
	c) What is a bar bending schedule (BBS)? Draw a typical BBS for a RCC column assuming suitable dimensions and details.	5	5	2
	d) Discuss material contract and labour contract with suitability of each type.	5	6	2



All dimensions are in mm

All walls	30 mm thick
Slab thickness	120 mm
Chajja	80 mm thick
Chajja projection	500 mm
Slab projection	50 mm
Band Lintel	150 mm thick
Lintel level	2100 mm
Floor to ceiling ht.	2.9 m
Doors :	
D	1200 x 2100
D ₁	1000 x 2100
D ₂	900 x 2100
Windows :	
W ₁	2000 x 1300
W ₂	1500 x 800
V	800 x 400
Opening	O 1000 x 2100

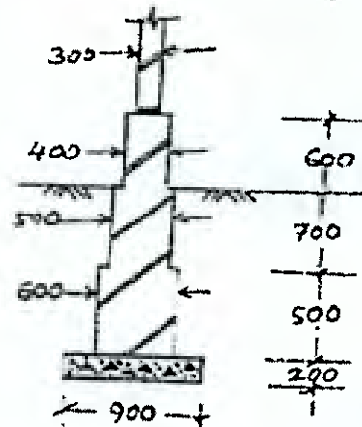


Figure 1: Plan



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IS : 7272 (Part I) - 1974

TABLE 1 RECOMMENDED LABOUR OUTPUT CONSTANTS FOR BUILDING WORK — Contd

Sl. No.	DESCRIPTION OF WORK	UNIT	LABOUR	RECOMMENDED CONSTANT IN DAYS	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)
iv) Brick work (Straight Walls)					
	a) Brick work in walls exceeding one brick thick, in cement/lime mortar	M ³	Mason Mazdoor Bhisti	0.94 1.80 0.20	<div style="border: 1px solid black; padding: 5px;"> i) The constants include labour involved in scaffolding ii) The constants could be adopted for brick work with any mix or mortar iii) Labour for mixing mortar will be extra </div>
iii) Mortars					
	a) Mixing by hand, cement mortar of any mix/proportions	M ³	Mazdoor Bhisti	0.75 0.07	Labour required will be approximately same for different mix proportions

Figure 2: IS: 7272 (PartI)

Equations:

Equal payment capital recovery factor: $A = \frac{i(1+i)^n}{(1+i)^n - 1} P$

PV factor = $\frac{(1+i)^n - 1}{i(1+i)^n}$