



Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING

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



End Semester Examination

12 ^{19th} June 2023

12/6/23

Program: UG Final Year

Course Code: PC-BT801

Course Name: Engineering Economics, Estimation and Costing

Duration: 3 Hours

Maximum Points: 100

Semester: VIII

Notes:

Eng. Econ (Civil) Sem VIII

- Question 1 is **compulsory**. Attempt **any four** out of remaining six questions
- Assume **suitable data** if necessary and **state it clearly**
- Clearly write units everywhere. Points will be deducted in each place units are missing
- Figure on right indicate **maximum points** for the given question, **course outcomes attained**, and **Bloom's Taxonomy Level**

Q. No.			Points	CO	BL
1	a	Explain informal tender, liquidated damages, earnest money, security deposit	2	5	2
	b	Determine the quantity of material required for an M15 RCC beam of size 3.5m x 4m having a cross section of 230 mm x 300 mm.	5	4	3
	c	A clamshell bucket was purchased at a cost of Rs. 12Lakhs. Assuming a salvage value of Rs. 1.5 Lakhs, calculate its book value for each year using double declining balance method if its service life is 4 years.	8	3	3
	d	A contractor wants to rent out his compactor. One project is for coastal road project (A) and another one is for ground improvement (B). Initial investment for both is 6 Lakhs. For project A, returns expected are 2 Lakhs for first 2 yrs and 0.5 Lakhs for remaining 4 yrs. For project B, 1.5 Lakhs are expected every year. Based on payback period approach, recommend which project the contractor should bid for.	5	1	4
2	a	What is bar bending schedule? Explain its importance in the construction of a high-rise building in an urban area.	5	4	2
	b	A company invests Rs. 25 Lakhs and earns returns of Rs. 10 Lakhs, Rs. 9 Lakhs, Rs. 6.5 Lakhs, Rs. 9 Lakhs, and Rs. 9 Lakhs in 5 consecutive years. Determine the discounted payback period if interest rate is 10%	5	1	3
	c	Draft a notice inviting tender for the extension of the coastal road project from Kandivali to Virar at an estimated cost of Rs. 1500 Cr and estimated time of completion as 5 years.	10	5	6



Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING

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



3	a	Explain the difference between open, restricted and closed specifications with examples.	5	4	2
	b	Discuss the importance of a quantity surveyor in a construction project	5	4	3
	c	Show the rate analysis for providing and laying M20 Reinforced cement concrete in footing slabs (base) excluding formwork, including reinforcement, including mixing, pouring, compaction, and curing as per specifications. Assume suitable and reasonable rates for material and labour for Mumbai suburban area. Assume formwork and shuttering at Rs. Labour constants as per IS7272 are shown below	10	4	4

IS : 7272 (Part I) - 1974

**TABLE 1 RECOMMENDED LABOUR OUTPUT CONSTANTS FOR
BUILDING WORK — Contd**

Sr. No.	DESCRIPTION OF WORK	UNIT	LABOUR	RECOMMENDED CONSTANT IN DAYS	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)
	f) Reinforced cement concrete in situ in foundations, footings, bases for columns, etc excluding form work and reinforcement	M ³	Mason Mazdoor Bhisti Mixer operator Mixer Vibrator	0.17 2.00 0.90 0.07 0.07 0.07	The constants for items (f) to (m) include mixing, pouring, consolidating and curing. This does not include fair finish
	v) Reinforcement				
	Bar reinforcement including cutting to length, hooked ends, cranking or bending, hoisting and placing in any position, binding with binding wire and holding firmly so as not to be disturbed while placing and ramming of concrete	Quintal	Bar-bender Mazdoor	1.00 1.00	— —

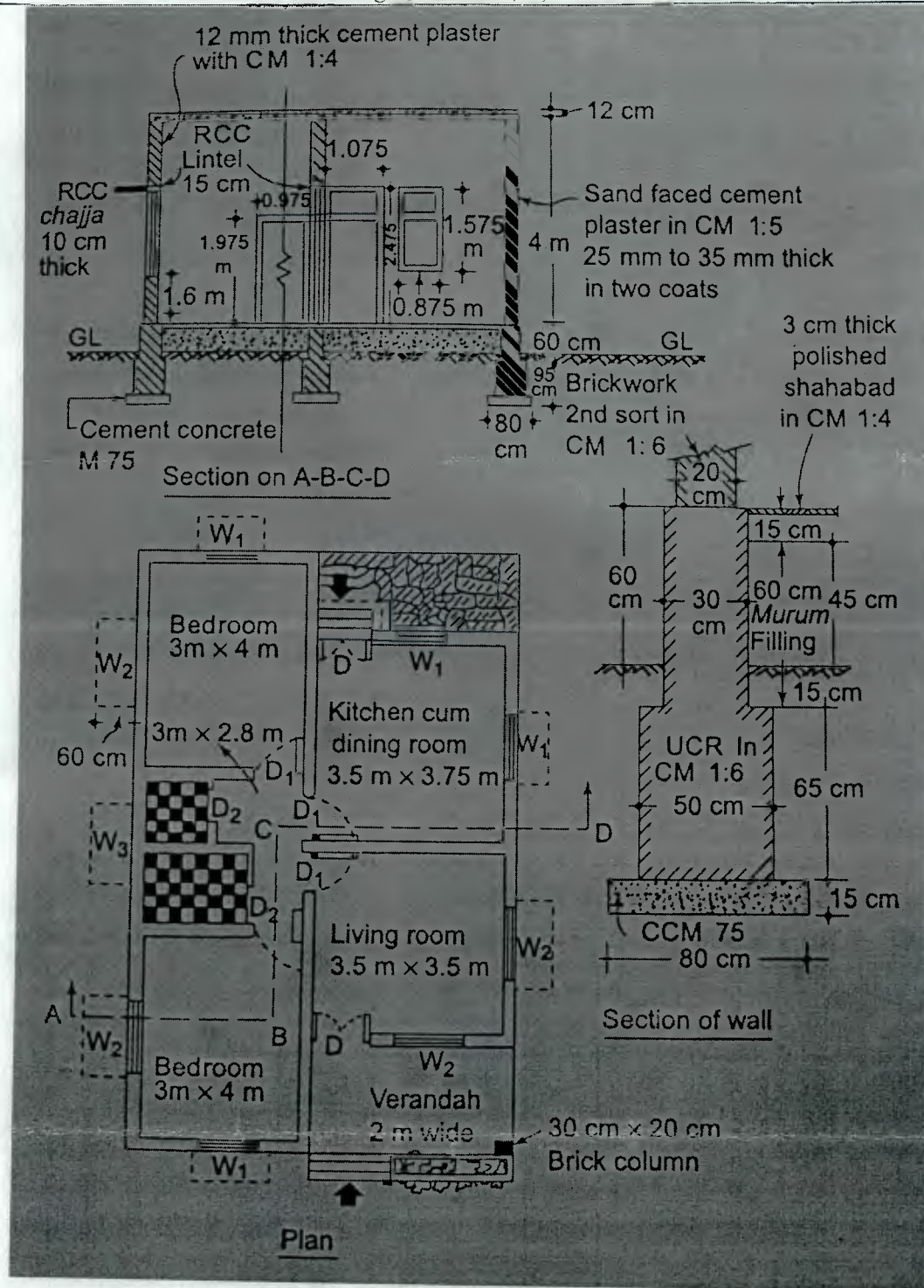
4	a	Figure 1 shows the plan and sectional details of a load bearing residential structure. Work out the following quantities: a) Earthwork in excavation for foundation b) Cement concrete M75 in foundation c) Uncoursed rubble masonry in CM (1:6) in foundation and plinth d) 3 cm thick polished Shahbad stone in 1:4CM in bedrooms only	5 2 8 3	4	3
---	---	--	------------------	---	---

Figure 1: Plan and sectional details



Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING

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



5	a	What is sensitivity analysis? Discuss its significance in economic decision making	4	2	2
	b	Prepare an approximate estimate of a residential building assuming cost of	8	4	3



Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058



		construction as Rs. 75,000 per square meters of plinth area. The building is RCC, (G+8) measuring 300m ² of carpet area on each floor. Assume suitable data and state it clearly.			
	c	A brick sells for Rs 12 per piece. The variable costs are Rs. 4 per piece, and 10,000 bricks are sold annually and a profit of Rs. 30,000 is obtained per year. A modification in the manufacturing technology will increase the variable costs by 20% and fixed costs by 10% but sales will increase to 12,000 bricks per year. Determine the breakeven point. If the selling price is to be kept same (Rs.12/brick) what will the annual profit be?	8	2	3
6	a	Discuss how the use of computers may be beneficial to a quantity surveyor	5	4	2
	b	What is cost-benefit analysis? Explain its advantages and limitations.	5	2	2
	c	A tricone drill bit that was purchased at a cost of Rs. 22,000 four years ago is considered for replacement against a calyx bit whose cost is Rs. 24,000. The tricone bit has a salvage value of Rs. 2,000. The annual maintenance cost of the tricone bit is Rs. 7,000. The calyx bit has an annual operating cost of Rs. 3,500, and its salvage value is Rs. 3,000 at end of year 10. Assume i = 15% and recommend if the bit should be replaced.	10	1	3
7	a	Explain the importance of the Arbitration and Conciliation Act in the context of any construction project.	4	5	2
	b	Discuss the clause related to measurement and payment to contractor and include terms related to liquidated damages.	4	5	2
	c	A road is to be constructed having a formation width of 12 m. Side slopes proposed are 2:1 in banking and 1.5:1 in cut. Calculate the quantity of earthwork by mean sectional area method, given the following data:	12	4	3

Distance (m)	0	50	100	150	200	250	300	350
Ground Level (m)	253.0	253.2	253.0	252.5	252.4	252.3	252.0	251.8
Formation Level (m)	252.0	252.2	252.4	252.4	252.8	252.8	252.8	252.8

Equations:

$$\text{Single payment present worth factor} = \frac{1}{(1+i)^n}$$

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

$$\text{Single payment compound amount factor} = (1+i)^n$$

$$\text{Equal payment compound amount factor} = \frac{(1+i)^n - 1}{i}$$

$$\text{Equal payment present worth factor} = \frac{(1+i)^n - 1}{i(1+i)^n}$$



Bharatiya Vidya Bhavan's
Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai - 400058.
End Semester Examination
June - 2023



Max. Marks: 100

Class: B.Tech.

Semester: VIII

Name of the Course: Earthquake Engineering

Duration: 3 Hours

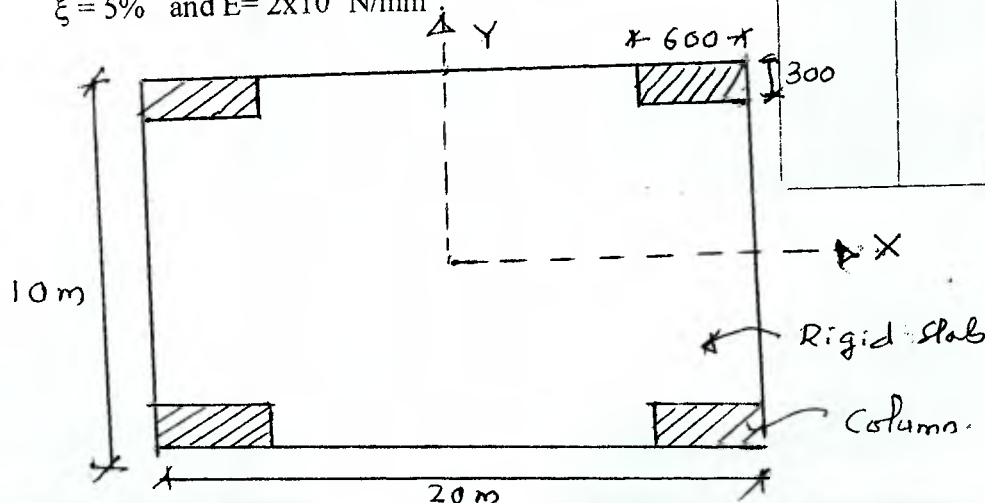
Program: Civil Engineering

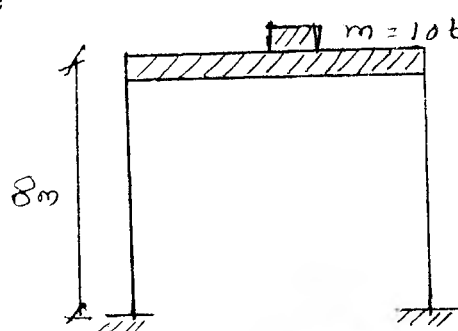
Course Code : PE- BTC 821

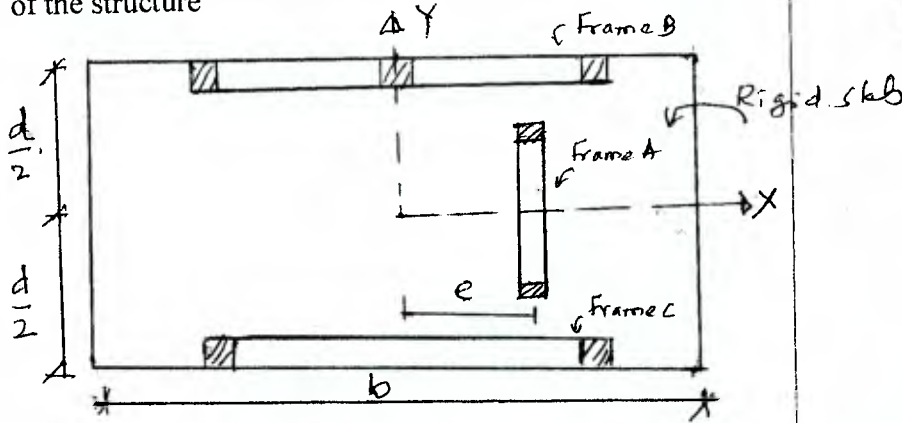
Instructions:

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub-questions should be grouped together.
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

Question No		Points	CO	Module No
Q1 (a)	(i) What is an earthquake? How earthquakes are classified based on their causes?	3	3	4
	(ii) What is meant by the magnitude and intensity of an earthquake? Briefly explain	3	3	4
Q1(b)	(i) A single-storey structure with a rigid slab is supported on four corner columns as shown in the figure. The height of the structure is 6.0 m. In general, what will be the degrees of freedom for this structure? And specify these DoF. Calculate the structure's natural frequency for excitation in X and Y directions separately.	5	2	2
	(ii) If the system is subjected to harmonic force with an amplitude of 100 KN and excitation frequency of 25 rad/sec at slab level in X direction, evaluate the maximum lateral displacement of the slab. The weight on the slab is 150Kg/m ² , uniformly distributed. Assume $\xi = 5\%$ and $E = 2 \times 10^4 \text{ N/mm}^2$	5	2	2



Q1(c)	A damped SDOF system is subjected to harmonic force. At resonance ($\beta = 1$) the amplitude is measured to be 40 mm. At 0.8 times the resonant frequency ($\beta = 0.8$) the amplitude is measured to be 10 mm. Determine the damping ratio	4	2	2																								
Q2 (b)	(i) A single-storey frame with a rigid girder as shown in the figure below is to be designed for ground motion, the response spectrum of which is shown in Figure 1. Determine the design value of lateral deformation and bending moments in the columns	4	2,4	5																								
	(ii) If the columns of the frame are hinged at the base, determine the design values of lateral deformation and bending moments in columns. Comment on the influence of base fixity on the design deformation and bending moments.	4	2,4	5																								
	(iii) If the beam cross-section is much smaller than that of columns, so the beam stiffness can be neglected, and columns are fixed at the bottom, determine the design values of lateral deformation and bending moments in columns. Compare the design values with the case i above	4	2,4	5																								
	 <p>Column Section 300x300 mm</p> <p>$E = 20,000 \text{ Mpa}$</p>																											
Q2(c)	A two-storey frame with free vibration characteristics as given below is subjected to a ground motion defined by $\ddot{u}_g = \ddot{u}_{g0} \sin \bar{\omega} t$ where $\ddot{u}_{g0} = 0.2g$ and $\bar{\omega} = 25.0 \text{ rad/sec}$. Calculate the maximum displacements of each story. Assume damping ratio $\xi = 5\%$.	8	2	3																								
	<table><tr><th>Floor No.</th><th>Mass (t)</th><th>Mode No.</th><th>ω, rad/sec</th><th colspan="2">Mode Shapes</th></tr><tr><td></td><td></td><td></td><td></td><th>Φ_{i1}</th><th>Φ_{i2}</th></tr><tr><td>1</td><td>20</td><td>1</td><td>14.58</td><td>1.0</td><td>1.481</td></tr><tr><td>2</td><td>15</td><td>2</td><td>38.07</td><td>1.0</td><td>-0.822</td></tr></table>	Floor No.	Mass (t)	Mode No.	ω , rad/sec	Mode Shapes						Φ_{i1}	Φ_{i2}	1	20	1	14.58	1.0	1.481	2	15	2	38.07	1.0	-0.822			
Floor No.	Mass (t)	Mode No.	ω , rad/sec	Mode Shapes																								
				Φ_{i1}	Φ_{i2}																							
1	20	1	14.58	1.0	1.481																							
2	15	2	38.07	1.0	-0.822																							

Q3	A three-storey single bay frame has a storey height of 4 m. each. All columns are 300 mm wide X 600 mm deep & beams are very stiff. The mass on each floor is 25 t. $E = 20000 \text{ Mpa}$. Calculate natural frequencies & mode shapes.	20	2	3
Q4 (a)	<p>The plan of one storey building is as shown in the figure. The structure consists of a roof idealized as a rigid diaphragm, supported on three frames A, B, and C as shown. The roof weight is uniformly distributed and has a magnitude of 200 Kg/m^2. The lateral stiffness is $K_y = 20000 \text{ KN/m}$ for frame A and $K_x = 30000 \text{ KN/m}$ for frames B and C. The plan dimensions are $b = 30 \text{ m}$ $d = 20 \text{ m}$ and $e = 5.0 \text{ m}$. The height of the building is 8m.</p> <p>Determine the natural frequencies and modes of vibrations of the structure</p> 	8	2	3
Q4(b)	If the above structure is subjected to ground motion \ddot{u}_{gy} only in the Y direction. write down the equations of motion for the system	4	2	3
Q4(c)	As a special case, if $e = 0$, and the above system is subjected to the ground motion only in X direction, the response spectrum of which is shown in figure 1. Determine the design value of lateral deformation, base shear and bending moment for the system.	8	4	6
Q5(a)	What is response spectrum? Explain the procedure to construct elastic response spectrum for a single recorded ground motion.	3	3	5
Q5(b)	Explain the characteristics of ground motions	3	3	5

		3	5	7
Q7 (a)	What is ductility of a structure? Explain the importance of ductility in seismic resistant structures.			
		2	5	7
Q7 (b)	(i) A building having a non-uniform distribution of mass is shown in the figure. Locate its center of mass (Fig. 3) (ii) The plan of a simple one-storied building is shown in the figure. All columns have the same dimensions. Obtain the center of stiffness. (Centre of Rigidity). (Fig. 4)			
		3	5	7
Q7 (c)	The first-floor plan of a building with shear walls is shown in the figure. The plinth-level plan is also the same. Calculate the fundamental period of the building as per the provision of 7.6.2, both in X and Y directions. The total height of the building is 24 m. (Fig. 5)			
		6	5	7
Q7 (d)	Explain the provisions of IS 13920-2016, for (i) Beams: General provisions, longitudinal reinforcement, and web reinforcement (ii) Shear Walls: Only General requirements	4		
Q7 (e)	For the SMRFs idealized as shear buildings with rigid girders, investigate whether the building structure has a soft story. The height of the first story is 4.5 m and that of the remaining is 3.0 m. (Fig. 6)	2	5	7

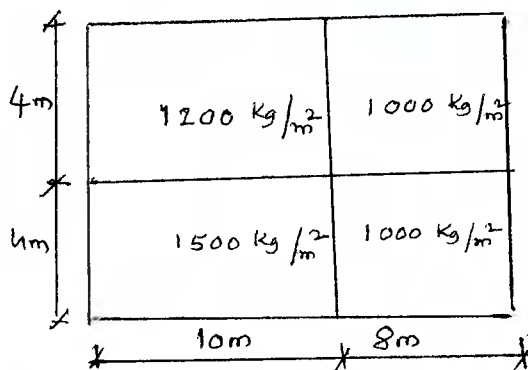


Fig. 3

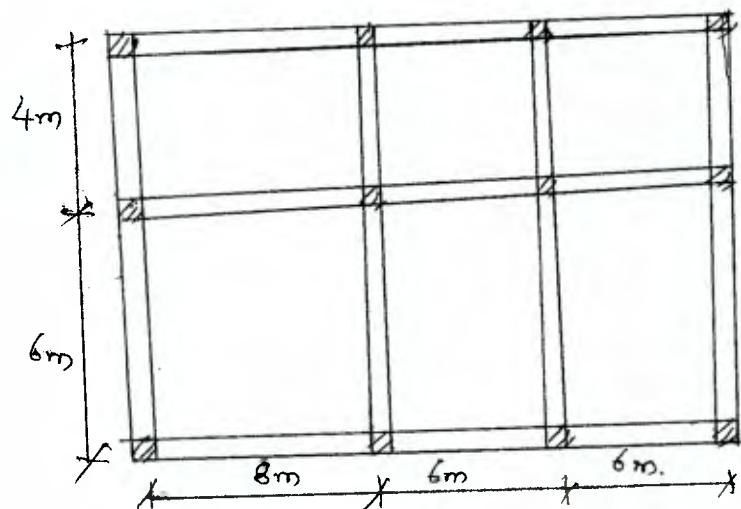
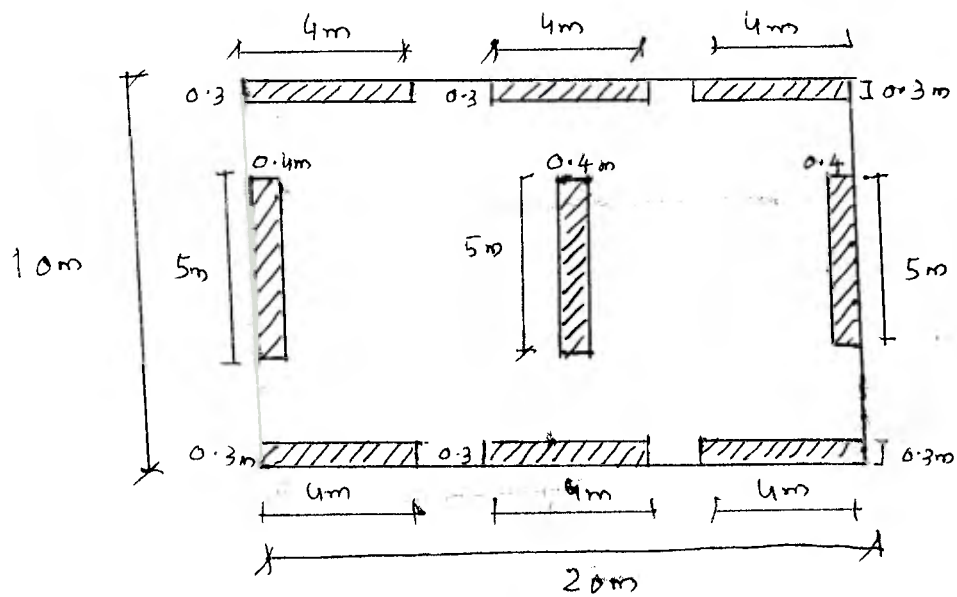
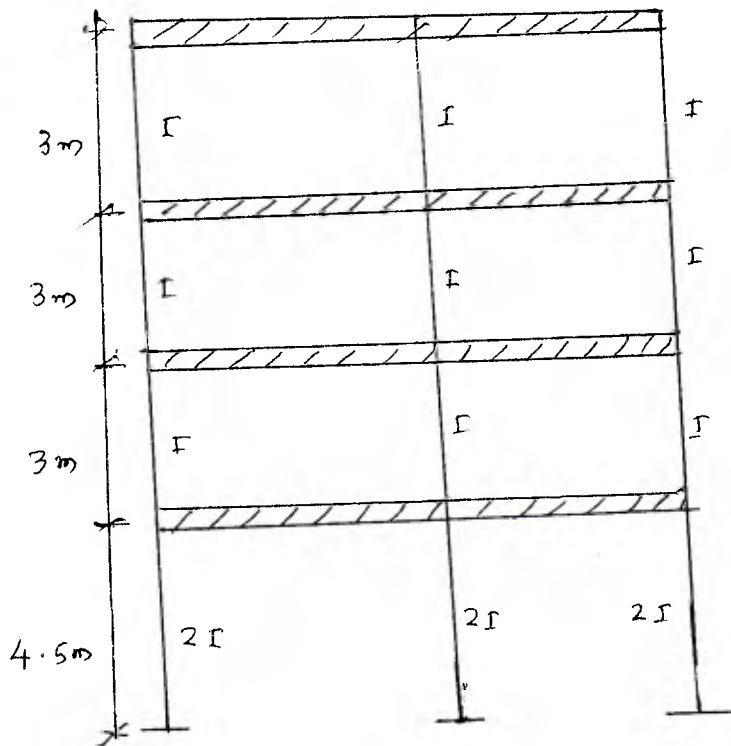


Fig. 4



(Fig 5)



(Fig. 6)

DISPLACEMENT RESPONSE SPECTRA
FOR EL-CENTRO EARTHQUAKE FOR 5% DAMPING $PGA = 0.32g$

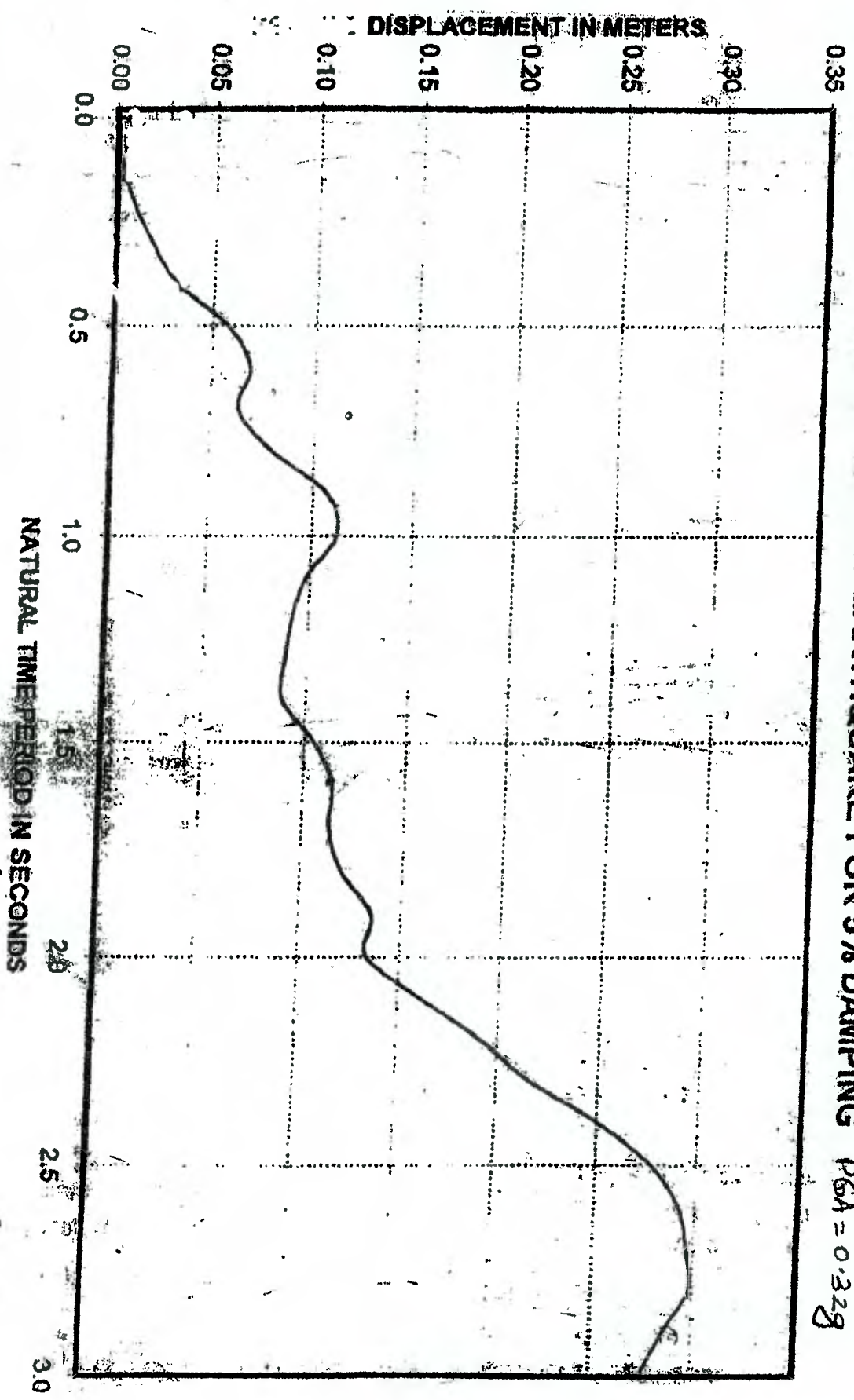
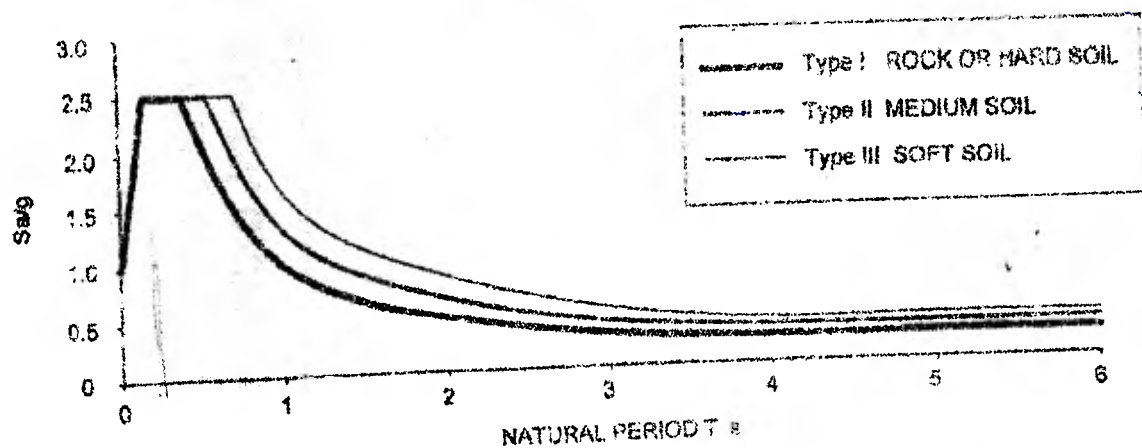


Figure 1

8



2B SPECTRA FOR RESPONSE SPECTRUM METHOD
FIG. 2 DESIGN ACCELERATION COEFFICIENT (S_a/g) (CORRESPONDING TO 5 PERCENT DAMPING)

Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
 (An Autonomous Institution Affiliated to University of Mumbai)
 Munshi Nagar Andheri (W) Mumbai 400058
End Semester Exam
June 2023

Max. Marks: 100

Class: B. Tech

Name of the Course: Environmental Impact Assessment

Course Code: PE BTC841

Duration: 3 Hrs

Semester: VIII

Program: Civil

Instructions:

- Question 1 is compulsory. Attempt any 4 of the remaining six questions
- Draw neat sketches/diagrams wherever required and wherever design is asked.
- Assume suitable data if necessary and state them clearly
- Figure on right indicate maximum points for the given question, course outcomes attained and Bloom's Level

		Points	CO	BL
Q1	Answer the following questions (any 4):	(20) (4*5)	1-4	4-5
(a)	When is public participation carried out in EIA process. Explain the importance of public participation in EIA process. What are the implications in this process in Draft EIA notification 2020.			
(b)	Define air pollution. Explain the impact of air pollution on human, materials and vegetation in detail. Explain mitigation measures adopted for the same in a highway project.			
(c)	Explain the matrix method for Assessment in detail. Explain advantages and disadvantages of the same			
(d)	Draw a flowsheet of EIA process showing the approx. time for the steps upto the time of receipt of EC			
(e)	Explain noise pollution. What are the impacts of noise pollution? Explain mitigation measures adopted for flyover construction in the middle of a city.			
Q2	A chemical (producing dyes) company is to be set up in a town of South Gujarat with following terrain characteristics: porous, filterable with a phreatic level near to the surface (0.75 m depth). The company is to be located close by to an river which is quite useful for people as a source of water. The company is suppose to operate for 24X7 and will have wastewater generation. There is a requirement of EIA to be conducted and you are a part of it. 1. Mention and explain three environmental impacts of this project during construction and operation phase 2. Mention and explain three mitigation measures in detail you will propose as part of your EMP to mitigate the impacts	(20)	1-4	4-5

	<p>identified ?</p> <p>3. Develop a social and environmental management plan for the same.</p> <p>4. As a member of SEAC committee what are the points you would look into when giving environmental clearance and which will be the recommendations to the project proponent</p> <p>5. Which clearances are required and which authorities will be granting those clearances? What are the typical timelines which are expected before the clearances are awarded?</p>			
Q3	A new airport is coming up in a city which is financially hub and which is close to sea (away from the main city) but the project will improve the connectivity globally. An environmental impact study is to be conducted and you are a part of EIA team. How would you go about designing and conducting the study. What can be the probable impacts and what would be the mitigation measures? Design Environmental management plan for the same. Which clearances are required and which authorities will be granting those clearances? What are the typical timelines which are expected before the clearances are awarded?	(20)	1-4	4-5
Q4	Answer the following questions (any 4)	(20) (4*5)	1-4	
(a)	Explain the procedure of water impact assessment with detailed description of each step			
(b)	What is ecology and how is it considered while conducting an EIA			
(c)	Explain methods for social cost benefit analysis			
(d)	Explain the procedure of air impact assessment with detailed description of each step			
(e)	Explain stationary and mobile control methods for air pollution			
Q5	Discuss EIA notification 2006 with EIA draft notification 2020 and explain the implications as to why 2020 notification has not been accepted and implemented.	(20)	2-4	4-5
Q6	Answer the questions	(20)	1-4	2,3 -4
(a)	State True or false with reasoning (Reasoning to be given for both true or false)	(10) (2*5)		
(i)	If there is available and relevant secondary data to a development proposal, the Env. Impact review committee should require additional primary sampling.			
(ii)	Data on natural hazards are required to be presented in the EIS.			
(iii)	Addition of 20dBA+20 dBA = 40 dBA			
(iv)	A defence airport can be exempted from EIA			

(v)	Caline 4 can be used easily for hilly terrain.			
(b)	Biodiversity audit is to be conducted as a part of EIA study in an area where an expressway is passing. Design the audit process. Based on the findings what are the mitigation or precautionary measures that will be conveyed by you as an EIA expert to the project proponent.	(10)	3-4	4-5
Q7	A new expressway is coming up in a state which will attract tourism (in between two metro cities in two states) and connects two financial hubs passes through major forests, national parks and some coastal towns. An environmental impact study is to be conducted and you are a part of EIA team. How would you go about designing and conducting the study. What can be the probable impacts and what would be the mitigation measures. Design Environmental management plan for the same. Which clearances are required and which authorities will be granting those clearances. What are the typical timelines which are expected before the clearances are awarded?	(20)	3-4	4-5

All the Best



Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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



End Semester Examinations June 2023
(2022-23)

9/6/23

Program: B. TECH. Sem. VIII

Duration: 03 Hrs.

Course Code: OE-BTC-812

Maximum Points: 100

Course Name: HUMAN RESOURCES DEVELOPMENT & ORGANIZATIONAL BEHAVIOR (HRDOB)

Semester: VIII (Civil/Mechanical/Electrical Engineering)

Notes:

- Attempt **any five** questions.
- Answer to all sub questions should be grouped together.
- **Figure** to right indicates full marks.
- Assume suitable data wherever necessary and state it **clearly**.

Q. No.	Questions	Points	CO	BL	PI
1	(a) Discuss the purpose of human resource development (HRD) to enhance learning in an organization.	10	1	1	6.1.1
	(b) Briefly explain the important challenges of human resource development.	10	1	1	6.1.1
2	(a) Justify the statement: HRD is the process of helping people to acquire competencies.	10	2	2	10.2.1
	(b) Discuss: A Framework for the HRD Process that includes need assessment, design, implementation and evaluation phases.	10	2	3	10.2.1
3	(a) Discuss the types of interventions for organizational transformation.	10	1	2	12.1.2
	(b) Why counselling at workplace is important? Explain qualities of counsellor.	10	2	3	11.3.2
4	(a) What is the competency mapping? Explain the need for expected core competency.	10	2	4	12.2.2
	(b) What is career? Explain steps of career planning and discuss career management model.	10	2	4	12.1.1
5	(a) Discuss: Organization development, Employee development, Management development and Career development.	10	2	4	12.1.1
	(b) How diversity at workplace matters? What kind of role HR can play in the process to manage it? Discuss.	10	2	4	12.1.1
6	(a) Why study of organisational behaviour is important? Discuss major	10	2	2	8.1.1



Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058



End Semester Examinations June 2023

(2022-23)

	contributing disciplines to the field of organizational Behavior.				
	(b) What is a work team? What makes workplace teams effective? Discuss.	10	2	5	8.2.2
7	(a) Study of Human resources development is used to develop a systematic and planned approach through which the efficiency of employees is improved. Justify the statement.	10	2	4	8.1.1
	(b) Discuss the role of HRD in developing ethical attitude and behavior and development.	10	2	1	9.1.1



Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058



END SEM Examinations June 2023

Program: Civil/Mech/Elect Engineering

Duration: 3hr

Course Code: (OE-BTC 613 & OE-BTC 813)

Maximum Points: 100

Course Name: Watershed Development & Management

Semester: VI/VIII

Instructions:

1. Fresh (C, M, E) Sem VI / VIII

1. Attempt any five questions.
2. Neat diagrams must be drawn wherever necessary.
3. Assume Suitable data if necessary and state it clearly.

Q. No.		Questions	Points	CO	BL	PI
1	a	Describe the climatic and hydrologic characteristics associated with Watersheds.	8	CO1	BL2	1.4.1
	b	A watershed has following data as given below	5	CO1	BL3	1.4.1
		Determine the values of form factor, circulatory ratio, shape factor, compactness coefficient and elongation ratio of the watershed for the following details given below:				
		Area of watershed is 50 sq. km. Length of drainage basin is 10,000 m. Perimeter of basin is 25,000 m. Maximum basin length is 15,000 m.				
	c	Discuss the salient features of Integrated Watershed management programme.	7	CO1	BL1	1.4.1
2	a	Explain the interaction of surface water storage and groundwater storage when precipitation occurs in the Watershed.	7	CO1	BL2	1.4.1
	b	Describe the chronology of watershed development programme in India.	5	CO1	BL1	2.1.1
	c	Discuss in detail the engineering measures for soil conservation.	8	CO2	BL2	1.4.1
3	a	Define watershed management and discuss the need of watershed management in the context of present scenario.	6	CO1	BL2	1.3.1
	b	Explain in detail types of soil erosion in a watershed	9	CO2	BL2	2.1.1
	c	Brief about initiatives taken by National Highway authority of India for water conservation and groundwater recharge during highway construction.	5	CO1	BL2	2.1.1

4	a	Discuss in detail the classification of land capability.	8	CO1	BL2	1.3.1
	b	The size of the catchment area is about 1200 m ²	7	CO1	BL4	1.4.1
	With an average annual rainfall of about 1570mm. Assume that only 50% of the rainwater is stored (due to losses). Estimate the quantity of water which is available for recharge. Assuming that the requirement of water for domestic purpose is 15 lits/capita/day for the family of 7 members. Determine the requirement of water for which can be stored in tank/recharged.					
	c	Classify bench terraces as per slope and also draw neat labelled diagram.	5	CO1	BL1	1.3.1
5	a	Describe how watershed management programme helped the people of Hiware Bazar village.	6	CO1	BL1	2.1.2
	b	Discuss the guidelines for preventing water and wind erosion in a watershed.	7	CO1	BL2	2.3.2
	c	Discuss the purpose of Artificial recharge and list the different techniques of artificial recharge.	7	CO1	BL1	1.3.1
6	a	Classify and discuss check dams.	8	CO1	BL2	2.1.2
	b	Define grassed waterway and write its function in the soil conservation.	6	CO1	BL2	1.3.1
	c	You have been assigned as a responsibility for the development of a particular watershed, discuss about the data required for the watershed development project based on the household basis.	6	CO2	BL2	1.3.1
7	a	Discuss the roles and responsibilities of the Watershed Development Team(WDT)	8	CO2	BL2	3.1.2
	b	Brief about the criteria for selection of watershed projects.	5	CO1	BL1	2.3.2
	c	Discuss the classification of watershed on the basis of land use.	7	CO1	BL2	1.3.1



Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058



END SEM Examinations June 2023

Program: Civil Engineering

Duration: 3hr

Course Code: PE-BTC853

Maximum Points: 100

Course Name: Valuation & Value Engineering

Semester: VIII

Instructions:

1. Attempt any five questions.
2. Neat diagrams/cash flow diagram must be drawn wherever necessary.
3. Assume Suitable data if necessary and state it clearly.

Q. No.		Questions	Points	CO	BL	PI											
1	a	Discuss the purpose of valuation and how it is different than value engineering.	8	CO2	BL2	1.4.1											
		Determine the best alternative based on annual equivalent method at $i=20\%$, $n=5$ years	6	CO3	BL3	1.4.1											
	b	The investment proposal is given as below															
		<table><tr><td></td><td>Alternative A</td><td>Alternative B</td></tr><tr><td>Investment ₹</td><td>-1,50,000.0</td><td>-1,75,000.0</td></tr><tr><td>Annual Equal Return ₹</td><td>60,000.0</td><td>70,000.0</td></tr><tr><td>Salvage Value ₹</td><td>15,000.0</td><td>35,000.0</td></tr></table>		Alternative A	Alternative B	Investment ₹	-1,50,000.0	-1,75,000.0	Annual Equal Return ₹	60,000.0	70,000.0	Salvage Value ₹	15,000.0	35,000.0			
	Alternative A	Alternative B															
Investment ₹	-1,50,000.0	-1,75,000.0															
Annual Equal Return ₹	60,000.0	70,000.0															
Salvage Value ₹	15,000.0	35,000.0															
	c	Differentiate between freehold and leasehold property, Market value and Book value.	6	CO1	BL1	1.4.1											
2	a	The cost of new structure is ₹.2,00,000/-, The life of structure is 75 years. Salvage value of the structure at the end of its lifetime is 10% of the construction cost. Determine the depreciation in the 30 th year. a) Straight line method, b) Sinking fund method at 8% compound interest.	6	CO2	BL2	1.4.1											
	b	Identify and discuss the reasons for unnecessary/poor cost in construction project.	9	CO1	BL5	1.4.1											
	c	Discuss the value management and highlight its importance in the context of construction project.	5	CO1	BL1	1.3.1											
3	a	Describe in depth the FAST Diagram and draw FAST Diagram for superstructure of a bridge.	8	CO1	BL4	1.3.1											
	b	Discuss the different cost associated with LCCA and brief about the opportunities of cost reduction during the life cycle of an asset.	6	CO3	BL3	1.4.1											
	c	The plot measuring 500 sq. m. The built up area is 300 sq. m. The plinth area rate of this 1 st class building is ₹ 6000/-per sq. meter. This rate includes cost of water supply, sanitary and electric installations. The age of the building is 40 years, the cost of the land is ₹ 5000/-per sq. meter. Determine the total value of the property considering the age of the property as 10,75,50,25 and 20 years and tabulate the result.	6	CO2	BL3	1.4.1											

4	a	Discuss with example Use value, esteem Value, exchange Value, cost Value, Aesthetic value, Ergonomic Value,	6	CO1	BL3	1.4.1															
	b	A construction company has received quotes for the modern paver block machine for which life is 7 years.	9	CO3	BL5	2.2.4															
	The data is given as below																				
	<table><tr><td>Details</td><td>Machine 1</td><td>Machine 2</td></tr><tr><td>Purchase Price in ₹</td><td>15,00,000.0</td><td>20,00,000.0</td></tr><tr><td>Salvage value in ₹</td><td>2,00,000.0</td><td>3,00,000.0</td></tr><tr><td>O & M Cost in ₹</td><td>3,00,000.0</td><td>2,50,000.0</td></tr></table>						Details	Machine 1	Machine 2	Purchase Price in ₹	15,00,000.0	20,00,000.0	Salvage value in ₹	2,00,000.0	3,00,000.0	O & M Cost in ₹	3,00,000.0	2,50,000.0			
Details	Machine 1	Machine 2																			
Purchase Price in ₹	15,00,000.0	20,00,000.0																			
Salvage value in ₹	2,00,000.0	3,00,000.0																			
O & M Cost in ₹	3,00,000.0	2,50,000.0																			
Assuming an average annual inflation of 5% for the next 7 years, determine the best machine based on the present worth method. Interest rate is 15% compounded annually.																					
	c	Explain the steps in the belting method of valuation.	5	CO2	BL2	2.1.2															
5	a	Brief about the contents of format of valuation process.	5	CO2	BL2	1.3.1															
	b	Discuss the steps in value engineering job plan (VEJP).	10	CO1	BL5	1.4.1															
	It is proposed to implement the VE process for highway construction project in which rigid and flexible pavements are to be considered,																				
	c	Define easement and discuss the easement right.	5	CO2	BL1	1.3.1															
6	a	R & D department of a construction company is planning to develop an advanced machine center.	8	CO3	BL2	1.4.1															
	For which 3 quotations are called from manufacturers with down payment, the details are as mentioned below:																				
	<table><tr><td>Manufacturer</td><td>Down Payment in ₹</td><td>Yearly Equal Installments</td></tr><tr><td>1</td><td>5,00,000.0</td><td>2,00,000.0</td></tr><tr><td>2</td><td>4,00,000.0</td><td>3,00,000.0</td></tr><tr><td>3</td><td>6,00,000.0</td><td>1,50,000.0</td></tr></table>						Manufacturer	Down Payment in ₹	Yearly Equal Installments	1	5,00,000.0	2,00,000.0	2	4,00,000.0	3,00,000.0	3	6,00,000.0	1,50,000.0			
	Manufacturer	Down Payment in ₹	Yearly Equal Installments																		
1	5,00,000.0	2,00,000.0																			
2	4,00,000.0	3,00,000.0																			
3	6,00,000.0	1,50,000.0																			
Installments are paid for 15 years, determine the best alternative based on the annual equivalent method by assuming $i=20\%$, compounded annually.																					
	b	List out the different rules to check the correctness of function definition.	6	CO1	BL4	1.3.1															
	c	Explain distress value, monopoly value, potential value, reversionary value, sentimental value, replacement value.	6	CO2	BL4	1.3.1															
7	a	Explain in detail different methods of valuation of the property	8	CO2	BL3	1.4.1															
	b	Discuss the value engineering as against cost cutting.	6	CO1	BL1	1.4.1															
	c	For the procurement of equipment two brands are available as A and B	6	CO3	BL1	2.2.4															
	Investment for Brand A=₹ 4,50,000/- and Investment for Brand B=₹ 7,25,000/-. Which brand of equipment should the contractor choose at the interest rate 8% compounded annually?																				
<table><tr><td rowspan="2">Option</td><td colspan="3">Saving details year wise ₹</td></tr><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>A</td><td>2,25,000.00</td><td>2,25,000.00</td><td>2,25,000.00</td></tr><tr><td>B</td><td>3,00,000.00</td><td>3,00,000.00</td><td>3,00,000.00</td></tr></table>							Option	Saving details year wise ₹			1	2	3	A	2,25,000.00	2,25,000.00	2,25,000.00	B	3,00,000.00	3,00,000.00	3,00,000.00
Option	Saving details year wise ₹																				
	1	2	3																		
A	2,25,000.00	2,25,000.00	2,25,000.00																		
B	3,00,000.00	3,00,000.00	3,00,000.00																		



Bharatiya Vidya Bhavan's SARDAR PATEL COLLEGE OF ENGINEERING

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



End Sem Exam June 2023

Program: B.Tech – Civil Engineering *sem VIII*

Course Code: PE –BTC824

Course Name: Finite Element Analysis

Duration: 3 hr

Maximum Points: 100

Semester: VIII

Notes:

1. Attempt any five questions.
2. Assume appropriate data wherever required.

14/6/23

Q. No.	Questions	Points	CO	BL	Module No.
1a	<p>For the spring assemblage shown below, calculate reaction forces. Also calculate displacement at point X.</p> <p>$L_1 = L_2 = L_3 = 10\text{cm}$ $k = 10000\text{ kN/m}$</p>	12	1,2	3	4
1b	Derive shape functions for eight noded rectangular element using Lagrangian Interpolation function.	08	1	3	2
2a	<p>Solve the following differential equation using Galerkins Method Least Square Method Point Collocation Method</p> <p>$\Phi'' - \Phi = x$ Use Boundary Conditions $\Phi(x=0)=0$ and $\Phi(x=1)=1$</p>	15	1	3	1
2b	Derive shape function for two noded line element.	05	1	2	4
3	<p>Analyse the beam and find deflection at X-X</p> <p>$EI = 80,000\text{ kN.m}^2$</p>	20	1,2	3	5
4a	Write short notes on shape functions and their uses in finite element analysis	05	1	2	3



Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING

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



End Sem Exam June 2023

4b	Temperature distribution in a steel plate is simulated using the linear type triangular element with the nodal coordinates of $(x_1=1, y_1=1), (x_2=8, y_2=0.5)$ and $(x_3=4, y_3=5)$. The nodal values of temperature at nodes are $\{25, 27, 23\}$ respectively. Find the value of temperature at point $(3.5, 3.5)$	15	1,2	3	3
5a	Calculate the field variable x at a point $P(s=L/4)$ for a line element with cubic interpolation function and also its first derivative at the same point, given that $\{x\}=[2, 4, 6, 7.5]$	6	1,2	3	3
5b	For the three-bar assemblage shown in figure determine a) Assembled stiffness matrix b) displacement at point x (5 cm right of node 2) c) Reactions at nodes 1 and 4 $AE = 5000 \text{ kN}$ 	14	1,2	3	4
6	Analyse the plane frame shown in the fig using FEM. Consider $E=300 \text{ GPa}$, $I=10^{-4} \text{ m}^4$ and $A=0.01 \text{ m}^2$ 	20	1,2	3	5
7	Analyse beam system shown using FEM. 	20	1,2	3	5



Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING

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



END SEMESTER EXAM- JUNE 2023

Program: CIVIL ENGINEERING

Duration: 3hrs

Course Code: PE-BTC-842

Maximum Points: 100

Course Name: Environmental Law and Policy

Semester: VIII

NOTE:

1. Q.1 is compulsory & solve any four out of remaining six questions

1. Q.1 is compulsory (Civil) Sem VIII

14/6/23

Q.No.	Questions	Points	CO	BL	Module No.
1	Write a short note on(Any four) 1) Aichi Targets 2) Montreal Protocol 3) Need for forest conservation act, 1980. 4) Any five salient features of Municipal Solid Waste Rules, 2016. 5) Population explosion v. Sustainable development 6) Kyoto Protocol	20	1-4	BLI	1-7
2	A. Discuss how the Constitutional provisions pertaining to control and prevention of pollution in India. B. Define: Environmental Law & its importance. Explain the various sources of environmental law	20	1,2	BLI	1
3	A. "Antibiotics poisoning Yamuna river- researcher says drugs may be behind spikes of cancer and diabetic" Discuss how Central pollution control board monitor and evaluate the impact under provisions of water (prevention and control) pollution act, 1974. B. Explain any four principles of international environmental law with examples.	20	1-3	BLI BLII	2
4	A. "Large parcels of the Pallikaranai Marsh have been lost due to reduction of wetland area, fragmentation and adhoc manipulation, destroying 90% of the Marsh. The remnant 10%, which is a Protected Area is the last hope for the city of Chennai"- Tamilnadu state wetland authority Discuss how Ramsar convention helps to counter above issues with its three pillar mechanisms. B. "Biodiversity loss: India has lost 90% of area under four biodiversity hotspots, 25 species extinct- In India, 1,212 animal species are monitored by the International Union for Conservation of Nature (IUCN) in its Red List" Discuss the above issue with relevant provisions of	20	1-3	BLII BLIII	2,3



Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING

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



END SEMESTER EXAM- JUNE 2023

	Biodiversity Act,2002 based on following points, 1. Objectives of Convention on Biological Diversity 2. Aim/purpose of Biological Diversity Act,2002. 3. Role/functions of National Biodiversity Authority 4. Role/functions of State Biodiversity Boards 5. Role/functions of Biodiversity Management Committee.				
5	A. "Climate inaction could expose more than two billion people to dangerous heat conditions, with the whole of some countries becoming too hot for humans to live in, a new study warns- research conducted by scientists from the Global Systems Institute at the University of Exeter and Nanjing University" Discuss how to improve landmark commitments made in Paris Agreements and role of India with its NDCs. B. "The Indian biosafety rules and regulations is developed with the objective to facilitate and disseminate the statutory requirements to be adhered by the researcher who are undertaking research work using modern biotechnology tools " Explain how Cartagena & Nagoya Protocol on International Bio-safety rules and regulations directs GOI while dealing with biotechnology tools.	20	1-3	BLII	4
6	A. "The Ministry of Environment, Forest and Climate Change on Monday stated that any number of Dalbergia sissoo timber-based items can be exported as a single consignment without CITES permit if the weight of an item is less than 10kg " Discuss how CITES treaty helps to protect endangered plants and animals from the threats of international trade. B. Explain the hazardous waste management rules,2016 in detail. OR C. "Illegal wildlife trade is recognized as a serious transnational crime with an overall turnover of billions of dollars every year, requiring a coordinated effort by various enforcement agencies and other stakeholders to tackle it effectively" Discuss how Wildlife protection act, 1972 empowers Central government to regulate and stop the import, trade or possession of invasive plant or animal alien species	20	1-3	BLI BLII	2
7	A. Write a short note on: Disaster management act, 2005. B. Write a short note on: a salient features of Atomic Energy act,1962.	20	1-3	BLI	2.7