Hall Ticket Number :										

R-20

Code: 20A15AT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Sustainable Construction Methods

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	Define- Sustainable building.	1	L1
b)	How will you compare the optimum energy efficiency of a green building and a conventional building?	2	L1
c)	What is system efficiency in green buildings?	3	L1
d)	Give the role of chiller section in HVAC system.	4	L1
e)	What is meant by certified wood?	5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2.	Discuss about the important sustainable features for green buildings.	12M	1	L1
	OR			
3.	Explain the key requisites of a green building with a suitable example.	12M	1	L1
	UNIT–II			
4.	Describe the benefits experienced in green buildings in our country.	12M	2	L2
	OR			
5.	Explain LEED India rating system and energy efficiency in detail.	12M	2	L1
	UNIT–III			
6.	Explain the reduction in energy demand in green buildings.	12M	3	L1
	OR			
7.	Discuss the use of renewable energy sources.	12M	3	L2
	UNIT–IV			
8.	Explain the components of a HVAC system and write their and functions in detail.	12M	4	L1
	OR			
9.	Discuss the use of geo thermal energy for cooling and heating structures.	12M	4	L2
	UNIT–V			
10.	Explain the methods of improving fresh air ventilation in buildings in detail with a suitable example.	12M	5	L2
	OR			
11.	Discuss the merits and demerits of asbestos in buildings in detail.	12M	5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A153T

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Water Resource Engineering

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	Explain briefly about any two civil engineering applications of Hydrology.	1	L2
b)	What are the limitations of unit hydrograph?	2	L2
c)	List the standards of quality for Irrigation water.	3	L2
d)	Briefly explain about phreatic line in earthen dam.	4	L1
e)	Differentiate between Syphon aqueduct and Canal Syphon	5	L2

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT-I			
2. a)	What are the infiltration indices? Explain the procedure for their computations.	6M	CO1	L2
b)	Raingauge station X did not function for a part of a month during which a storm occurred. The storm produced rainfalls of 85, 74, and 90 mm at three surrounding stations A, B and C respectively. The normal annual rainfalls at the stations X, A, B and C are 778, 876, 730 and 950 mm respectively. Estimate the missing storm rainfall at station X if the percentage error is more than 10%.	6M	CO1	L3
	OR			
3. a)	Explain briefly about how is double mass curve is used to check the consistency and adjust of the rainfall data at a suspicious station	7M	CO1	L2
b)	A 6h storm produced rain fall intensities of 8, 17, 24, 13, 11 and 2 mm/h in successive one hour intervals over a basin of 1000 sq km. The resulting runoff is observed to be 2640 hectare-meters. Determine ϕ-index for the basin	5M	CO1	L3
	UNIT-II			
4. a)	Explain the stepwise procedure of S-curve method for developing hydrographs	6M	CO2	L2
b)	What are the components of Hydrograph? Explain methods of base flow separation with the help of neat sketch?	6M	CO2	L3
	OR			
5. a)	A 35 cm diameter well penetrates 25 m below the static water table. After 24hours of pumping at 5500 liters per minute, the water level in a test well at 100m away is lowered by 0.6 m and in the well 30 m away, the drawdown is 1.1m. Evaluate the transmissibility of the aquifer?	6M	CO2	L3

b) Compute an expression for discharge from a well full penetrating in an unconfined aquifer. 6M CO2 L3

UNIT-III

6. a) An irrigation canal has GCA of 80,000 hectares out of which 85% is culturable irrigable.The intensity of irrigation for Kharif season is 30% and for Rabi season is 60%. Find the discharge required at the head of the canal if the duty at its head is 800 hectares/cumecs for Kharif season and 1700 hectares /cumec for Rabi season 6M CO3 L3

b) Explain how the evapo-transpiration can be estimated using Blaney- Criddle equation. 6M CO3 L3

OR

7. a) The slope of a channel in alluvial soil is 1/5900. Design the channel section and the maximum discharge which can be allowed to flow in it. Take Lacey's silt factor f =1. The channel is of trapezoidal section, having side slopes 0.5:1. 6M CO3 L5

b) Annual runoff in terms of depth over catchment area of 1675 sq-km of a reservoir is given below:-

Year	1962	1963	1964	1965	1966	1967	1968	1969
Runoff (cm)	98	143.5	168.3	94	95.3	152.4	110	131.3

What is the average yield from the catchment? What should be the live storage capacity of reservoir to use the source fully? If the dead storage is 20% of the live storage, what is the gross storage? Mark the filling and emptying periods on the mass curve. 6M CO3 L4

UNIT-IV

8. a) Explain causes and failures of hydraulic structures on permeable foundation? 6M CO4 L2

b) Give a practical profile of a low gravity dam. 6M CO4 L3

OR

9. a) Explain Bligh's theory and its limitations. 6M CO4 L3

b) Discuss briefly the design principles that are involved in the design of an Ogee spill way. 6M CO4 L5

UNIT-V

10. a) Explain different types of Falls with neat sketches. 6M CO5 L2

b) Explain different components of diversion head works with neat sketches. 6M CO5 L2

OR

11. a) Explain the design principles of Aqueduct. 6M CO5 L2

b) Distinguish clearly between non-modular and semi- modular outlets. Give examples. 6M CO5 L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A15BT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Advanced Structural Analysis

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer ***all*** the following short answer questions (5 X 2 = 10M) CO BL

a) The parabolic curve is the most efficient curve for arches – justify. CO1 L4

b) Explain the limitation of moment distribution method in structural analysis. CO2 L3

c) List the causes of creating side sway in portal frames**.** CO3 L4

d) For the beam calculate the degree of static indeterminacy and release the redundant to ensure the stability of the beam

CO4 L4

e) Give the significance of moment-curvature relationship in plastic analysis of structural members. CO5 L3

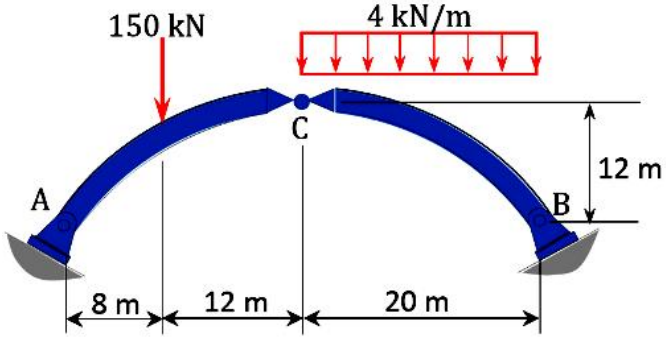
PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

2. A parabolic arch with supports at the same level is subjected to the combined loading as shown. Determine the support reactions and the normal thrust and radial shear at a point just to the left of the 150 kN concentrated load.



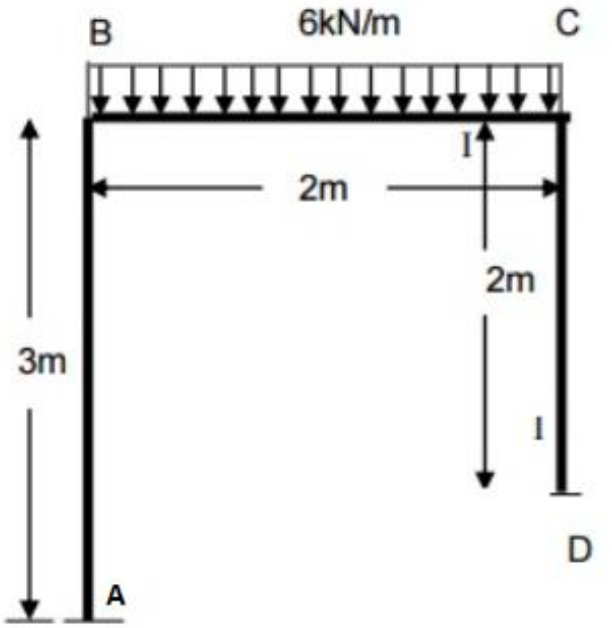
12M CO1 L4

OR

3. A two hinged parabolic arch of span 36 m and central rise 6 m, has the moment of inertia varying as secant of slope of rib axis. Find the horizontal thrust on the arch, if the point load of 100 kN acts at a distance of 9 m from the left support. Also find the bending moment under the load. 12M CO1 L4

UNIT-II

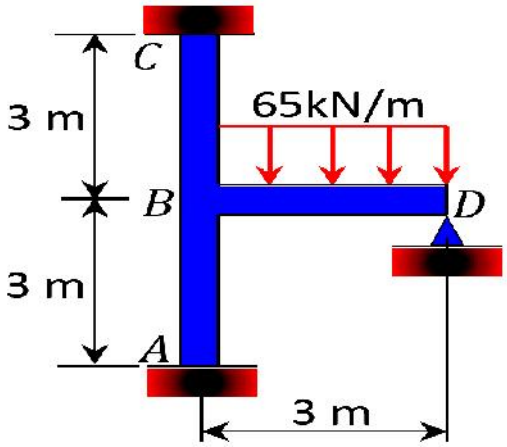
4. A portal frame ABCD is fixed at A and D, and has rigid joints at B and C. The beam is loaded with uniformly distributed load of intensity 6 kN/m. The moment of inertia of AB is 2I and that of BC and CD is I. Analyse by slope deflection method and plot the bending moment diagram.



12M CO2 L3

OR

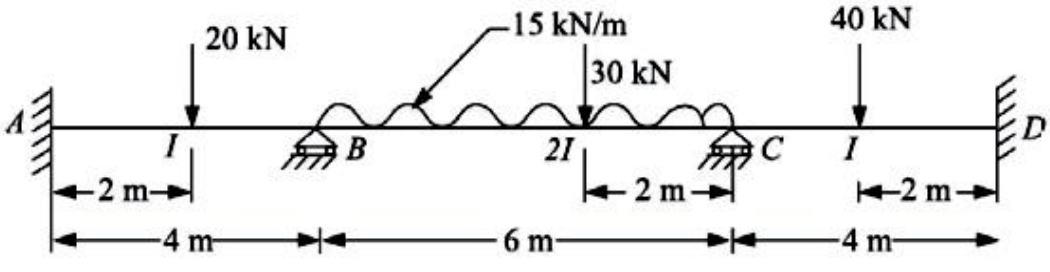
5. Using the moment distribution method, determine the end moments at the supports of the frame shown. EI = constant.



12M CO2 L3

UNIT-III

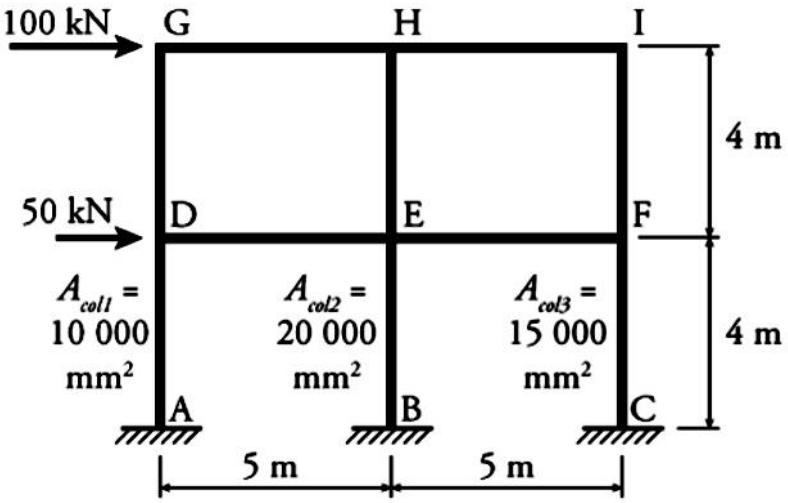
6. Analyse the continuous beam by Kani's method. EI = Constant.



12M CO3 L4

OR

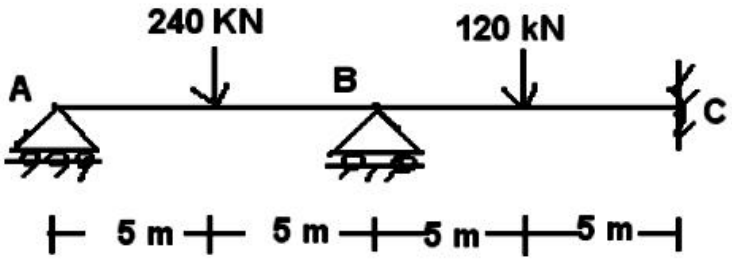
7. Analyse the frame for lateral load using portal frame method.



12M CO3 L4

UNIT-IV

8. Analyse the continuous beam using matrix stiffness approach.

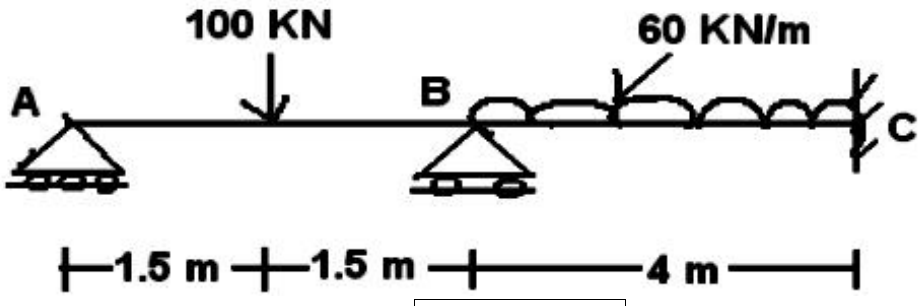


EI = constant

12M CO4 L4

OR

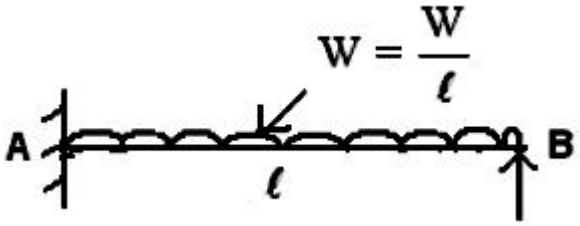
9. Analyse the continuous beam using matrix force method.
EI = constant.



12M CO4 L4

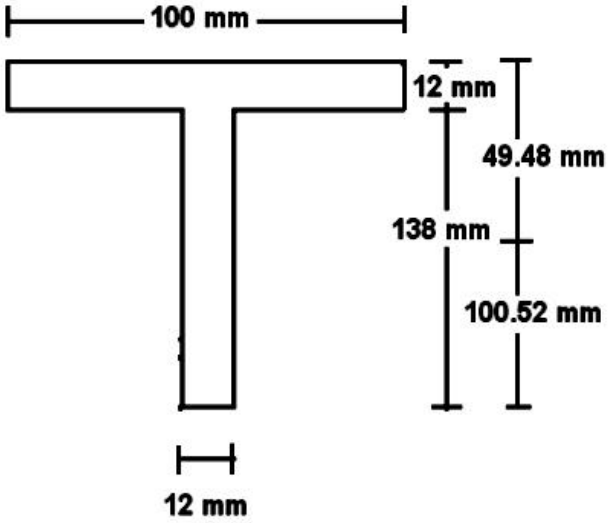
UNIT-V

10. Analyse a propped cantilever of length 'L' and subjected to udl of w/m length for the entire span and find the collapse load. 12M CO5 L3



OR

11. Determine the shape factor of a T-section beam of flange dimension 100 mm x 12 mm and web dimension 138 mm x 12 mm thick.



12M CO5 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A151T

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Basic Reinforced Concrete Design

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **28 marks.**
3. In Part-B, each question carries **14 marks.**

PART-A

Answer any one question from the following

		Marks	CO	BL
1.	Design a rectangular reinforced concrete beam of 6 m effective span simply supported on 300 mm wide supports. The intensity of imposed load on the beam is 50 kN/m. The size of beam is limited to 300 mm x 500 mm. Use M20 concrete mix and HYSD bars of grade Fe415. Check the design for all necessary conditions. Draw to a suitable scale (a) Longitudinal section showing the reinforcement details. (b) The cross section of the beam at salient points, showing reinforcement details	28M	CO3	L4
	OR			
2.	Design a short column under biaxial bending with the following data: Size of column 45 cm X 45 cm; Factored load of 1000 kN; Factored moments are 75 kNm and 60 kNm with respect to x axis and y axis respectively. Assume M25 grade concrete and Fe415 grade steel. (Note: Moments due to minimum eccentricity are less than the values given above.) Sketch the reinforcement details.	28M	CO4	L4

PART-B

Answer any *three* questions from the following (3 x 14 = 42 Marks)

			Marks	CO	BL
3.	a)	Discuss merits and demerits of working stress method and limit state method.	7M	1	L2
	b)	Draw and explain stress- strain curves for concrete and deformed bars.	7M	1	L2
4.		A simply supported R.C.C. beam 230 mm wide and 450mm overall depth is reinforced with four numbers of 16mm diameter bars. Design the shear reinforcement, if the shear force at service state is 190kN. Use M20 grade concrete and Fe 415 grade steel	14M	2	L4
5.		Design a two-way slab for a residential building floor of size 5.5 m x 4.5 m with discontinuous and simply supported edges on all the sides with corners prevented from lifting and supporting a service load of 4 kN/m^2. Consider M20 grade concrete and Fe415 steel.	14M	3	L6
6.		Design a Circular column of 4m high, is effectively held in position at one end and pinned at other end. The diameter of column is 400mm. Calculate the reinforcement if it is required to carry a factored axial load of 1700kN. Use M30 mix and Fe 500 grade steel	14M	4	L6
7.		Design an isolated footing for a circular column 550 mm in diameter transmitting an axial load of 1100 kN. The column is reinforced with longitudinal bars of 12mm dia. The safe bearing capacity of soil is 120 kN/m^2. Use M20 grade concrete and Fe415 steel.	14M	5	L6

*** End ***

Hall Ticket Number :										

R-20

Code: 20A55FT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Data Structures using Python

(Common to CE &ME)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 2 = 10M)		
	a)	Define Data Structure	1	L1
	b)	Define stack data structure	2	L1
	c)	Write recursive function for Fibonacci series	3	L1
	d)	Define binary tree	4	L1
	e)	Define tries	5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT-I			
2.		Explain Multi dimensional arrays in python	12M	1	L2
		OR			
3.		Explain Python - Amortized Analysis	12M	1	L2
		UNIT-II			
4.		Explain the stack and write a program to implement stack	12M	2	L2
		OR			
5.		Explain implementation of Queue ADT using Python List with examples	12M	2	L2
		UNIT-III			
6.		Explain the concept of binary search and write a program to implement binary search using recursion	12M	3	L2
		OR			
7.		Explain Quick sort? Sort the following elements using merge sort. Below is example for Your reference 45 ,23 ,20 ,50, 70, 24, 33, 43, 47	12M	3	L2
		UNIT-IV			
8.		With a neat diagram explain the structure of Priority Queue with examples and also give its applications	12M	4	L2
		OR			
9.		Define heap. Explain heap sort with example	12M	4	L1
		UNIT-V			
10.		Which pattern matching algorithm scans the characters from right to left? Explain it with suitable example.	12M	5	L2
		OR			
11.	a)	What is a binary trie? Construct a binary trie with elements: 0001, 0011, 1000, 1001, 1100, 0010, 1101, 1010.	6M	5	L3
	b)	Draw the flowchart for Knuth-Moriris-Pratt algorithm.	6M	5	L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A152T

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Environmental Engineering

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer *all* the following short answer questions (5 X 2 = 10M)		
a)	To estimate the quantity of water for a city, what information is required?	CO1	L1
b)	List the characteristic of potable water.	CO2	L2
c)	Classify the sedimentation tank based on different criteria.	CO3	L2
d)	Draw the first stage BOD curve.	CO4	L2
e)	A laboratory provides the following solids analysis for a wastewater sample: TS=225mg/L, TDS = 40 mg/L, FSS = 30 mg/L, TSS = 185 mg/L. What is the total volatile suspended solids concentration of this sample?	CO5	L3

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2. a)	Write a note on 'Role of population forecasting in the estimation of water quantity for a city or town'	6M	CO1	L2
b)	Describe any two methods of population forecasting which appeal to you.	6M	CO1	L2
	OR			
3.	The population of a city obtained from census report is as given below find the population P 2021 and P2031 using arithmetic method and geometrical increase method.	12M	CO1	L3

Census year	Population	Census year	Population
1921	20000	1971	41500
1931	22000	1981	47050
1941	25000	1991	54500
1951	27500	2001	61000
1961	34100		

	UNIT–II			
4. a)	Discuss in brief various methods of water distribution?	6M	CO2	L2

	b)	Write a note on water borne diseases and their control.	6M	CO2	L2
		OR			
5.	a)	A town award counselor has suggested that the council would avoid having to comply with surface water rules for water treatment if an infiltration gallery was used instead of a shoreline intake structure on the river water supply for their community. Explain to the council member why this statement may not be true.	6M	CO2	L2
	b)	Explain the Intake works for collection of surface water?	6M	CO2	L2
		UNIT–III			
6.		Enumerate the various operations involved for treatment of public water supplies. Discuss briefly each of these operations.	12M	CO3	L2
		OR			
7.	a)	Write the difference between coagulation and flocculation?	6M	CO3	L2
	b)	Research the use of a filtration method that provides household (point-of-use) treatment in the developing world. Write a one-page report that is clearly referenced. In your report, describe the technology and address these issues: Is the technology affordable to the local population?	6M	CO3	L2
		UNIT–IV			
8.	a)	A local service organization has asked you to make a presentation about a city proposal to address the issues of the combined sewer.	6M	CO4	L2
	b)	Summarize the procedure used for estimation of storm water discharge?	6M	CO4	L2
		OR			
9.		A new sewer line must be designed for the town. Your team leader requested the design of a sewer line for a 350 mm diameter sewer line to flow at 0.35m depth on a grade, ensuring a degree of self-cleansing equivalent to that obtained at full depth at a velocity of 0.8 m/sec. design for the required slope, associated velocity, and the rate of discharge at this depth.	12M	CO4	L3
		UNIT–V			
10.	a)	Investigate the specific mechanisms that your local municipal wastewater treatment plant uses for aeration. Is it surface aeration, fine- or coarse-bubble aeration, or natural aeration?	6M	CO5	L2
	b)	Distinguish between primary and secondary treatment. Draw the flow diagram for sewage treatment using activated sludge process.	6M	CO5	L2
		OR			
11.	a)	Define sludge volume index. What is its importance in sewage treatment?	6M	CO5	L2
	b)	Discuss the effect of pH and temperature on sludge digestion.	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20AE5AT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Human Resource Management

(Common to CE, EEE & ECE)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 2 = 10M)		
	a)	Define Human Resource Management	1	1
	b)	What is Job Analysis?	2	1
	c)	Write a short note on Recruitment.	3	1
	d)	What are the Benefits of Employee Training	4	1
	e)	What is Industrial Relations?	5	1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT–I			
2.		What is meant by HRM? Explain scope and functions of HRM.	12M	1	2
		OR			
3.		Explain Competitive challenges influencing HRM	12M	1	2
		UNIT–II			
4.		Briefly explain the concept of Human Resource Planning? Describe Human Resource Planning Process.	12M	2	2
		OR			
5.	a)	Discuss Human Resource Information System.	6M	2	2
	b)	Explain methods of collecting job data	6M	2	2
		UNIT–III			
6.		What is the process of Recruitment? Explain?	12M	3	2
		OR			
7.		Explain Nature of Selection and Selection Process.	12M	3	2
		UNIT–IV			
8.		Explain the stages of Career Development.	12M	4	2
		OR			
9.		Differentiate between Training and Development. Explain the process of identifying training needs.	12M	4	3
		UNIT–V			
10.		Explain Wage policy in India	12M	5	2
		OR			
11.		Critically evaluate any five performance appraisal methods.	12M	5	2

*** End ***