BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH   SEMESTER : VI
BRANCH: CIVIL   SESSION : SP/2024

SUBJECT: CE417 DESIGN OF HYDRAULIC STRUCTURES

TIME: 3 Hours   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	What are the modes of failure of gravity dams? Briefly discuss any two modes of failure.	[5]	CO1	2
Q.1(b)	What should be the maximum height of elementary profile of a dam, if the allowable stress should not exceed 4 N/mm^2? Assume G = 2.25. Determine base width also. If the uplift is considered with C = 0.8 and factor of safety is 1.5, determine B and H.	[5]	CO1	3

| Q.2(a) | Discuss the Bligh's creep theory for design of impervious floor of a weir. What are the limitations of Bligh's creep theory? | [5] | CO2 | 2 |
| Q.2(b) | The depth of water on the upstream of a weir is 3 m. The depth of upstream and downstream sheet piles are 4 m and 6 m respectively. The length of the impervious floor is 22 m. The weir is located 6 m from the upstream end of the floor. Calculate the average hydraulic gradient. Find the uplift pressure and the thickness of floor at points 6 m, 12 m, and 18 m from the upstream end of the floor. | [5] | CO2 | 3 |

| Q.3(a) | With the help of sketches, show different type of canal falls. | [5] | CO3 | 2 |
| Q.3(b) | What are canal regulators? Differentiate between canal regulator and cross regulator. | [5] | CO3 | 2 |

| Q.4(a) | How do you select a suitable type of cross drainage work? | [5] | CO4 | 2 |
| Q.4(b) | Discuss the features of design of cross drainage work. | [5] | CO4 | 2 |

| Q.5(a) | Define the following parameters related to canal outlet. (i) flexibility, (ii) proportionality, (iii) setting, and (iv) sensitivity | [5] | CO5 | 2 |
| Q.5(b) | Design a submerged pipe outlet for the following data. Discharge through outlet = 0.04 cumec. FSL of distributing canal = 100.00 m. FSL of water course = 99.90 m. Full supply depth in distributing canal = 1.1 m. Assume an average value of coefficient of discharge as 0.7. | [5] | CO5 | 3 |

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