

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2024)**

**CLASS: B.TECH.
BRANCH: CIVIL**

**SEMESTER : VI
SESSION : SP/2024**

SUBJECT: CE417 DESIGN OF HYDRAULIC STRUCTURES

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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|--------|--|---------|----|
| Q.1(a) | With the help of a sketch, explain the hydrostatic force acting on a gravity dam. | [2] CO1 | 2 |
| Q.1(b) | Discuss various combination of forces for design of gravity dam. | [3] CO1 | 1 |
| Q.2(a) | What do you mean by elementary profile of a gravity dam? | [2] CO1 | 1 |
| Q.2(b) | Draw the uplift pressure diagram for a dam holding 60 m water depth at upstream vertical face. The top and bottom widths are 8 m and 32 m respectively. Uplift may be considered to be acting on 75 % of the area of section. Tail water depth is 3 m. Also draw the uplift pressure diagram if there is a drainage gallery at 8 m from the upstream face. | [3] CO1 | 3 |
| Q.3(a) | With the help of a sketch, show the practical profile of a gravity dam. | [2] CO1 | 2 |
| Q.3(b) | What are the causes of failure of weirs? What are their remedies? | [3] CO2 | 2 |
| Q.4(a) | Discuss briefly the Bligh's creep theory. | [2] CO2 | 1 |
| Q.4(b) | A weir is having heading up of water up to 6 m above the floor level. The depth of upstream and downstream sheet piles are 5 m and 8 m respectively. The total length of the impervious floor is 24 m having 8 m on the upstream side. Calculate the average hydraulic gradient. Find the uplift pressure and thickness of floor at points 8 m, 12 m, 16 m, and 20 m from the upstream end of floor. | [3] CO2 | 3 |
| Q.5(a) | What are the limitations of Bligh's creep theory? | [2] CO2 | 2 |
| Q.5(b) | Discuss briefly the Khosla's theory for design of impervious floor. | [3] CO2 | 2 |

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