JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- MAY 2023

B.Tech-VII Semester (Civil)

COURSE CODE (CREDITS): 18B1WCE736(3) MAX. MARKS: 35

COURSE NAME: DAM AND RESERVOIR DESIGN

COURSE INSTRUCTORS: NIRAJ SINGH PARIHAR MAX. TIME: 2 Hours

Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

1. The yield of the water in Mm^3 from a catchment area during each successive month of an year are given as 1.4, 2.1, 2.8, 8.4, 11.9, 11.9, 7.7, 2.8, 2.52, 2.24, 1.96 and 1.68. Determine the minimum capacity of the reservoir allowing the water to be drawn off at a uniform rate assuming no loss of water over the spillway. **[7]** **(CO1,3)**
2. A concrete gravity dam has a top width of 7 m, a total height of 90 m with 4 m free board. Its upstream face is slanting 1:10 after a height of 26 m from top. The D/s face is also battered 0.7H:1V after a height of 10 m from the top. The horizontal and vertical coefficients of earthquake acceleration are given as 0.1 and 0.05 respectively. The tail water depth is 6 m. The hydrodynamic force and moment comes out to be 3580 kN and 1,26,500 kN-m acting clockwise. Take uplift coefficient as 0.6. The coefficient of friction is given as 0.7. Examine the stability of the section at the base and find out the principal and shear stress near the toe. **[10]** **(CO2,4,5)**
3. Derive the expressions for major stresses for elementary profile of a gravity dam with the help of proper force diagrams. **[8]** **(CO4)**
4. A homogenous earthen dam has a total height of embankment as 14m and water depth as 12 m. The top width of the dam is 4 m. The u/s and d/s slopes are 2.5:1 and 2:1 respectively. It is provided with a d/s filter of 28 m length. The coefficient of permeability is $8x10^{-5}$m/sec. Determine the phreatic line and the discharge through the dam. **[10]** **(CO5)**