

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
 TEST -3 EXAMINATION- December 2021
 B.Tech VII Semester

COURSE CODE: 18B1WCE736

MAX. MARKS: 35

COURSE NAME: Dams and Reservoir Design

COURSE CREDITS: 03

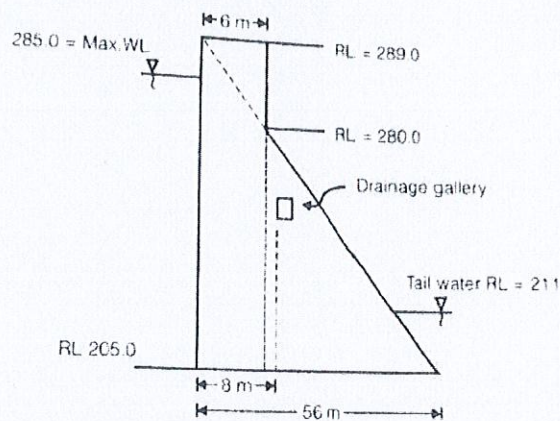
MAX. TIME: 2 Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume suitable data wherever required.

Q.1 Answer the following in brief: (1x5=5)

- Discuss the critical combination of earthquake acceleration in vertical and horizontal directions for a reservoir full condition in a gravity dam?
- Elucidate the significance of middle-third rule in the analysis of a gravity dam.
- Briefly explain the requirement of transition zone in an earthen dam.
- Work out the maximum permissible height of a low gravity dam having elementary profile made up of concrete of relative density 2.5 and safe allowable stress of foundation material 3.87 MPa without considering the uplift force.
- Explain with the help of a graphical representation the effect of formation of a dam reservoir on the normal outflow of a river.

Q.2 The figure below shows the section of a gravity dam built up of concrete. Calculate the maximum vertical stresses at the heel and toe of the dam. Take concrete density as 23.5 kN/m^3 . Neglect seismic effects.



(10)

Q.3 A homogenous earthen dam has a total height of embankment as 14m and water column of depth 12 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 $8 \times 10^{-5} \text{ m/sec}$. Determine the phreatic line and the discharge through the dam. Show proper calculations. (8)

Q.4 Derive the expression for the base width and the principal stress for an elementary profile of a dam for a reservoir full condition. (6)

Q.5 Describe the following with figures:
 (a) Hydraulic failure in earthen dams
 (b) Foundation grouting in gravity dams (3+3=6)