Mid-West University

Examinations Management Office

End Semester Examinations 2081

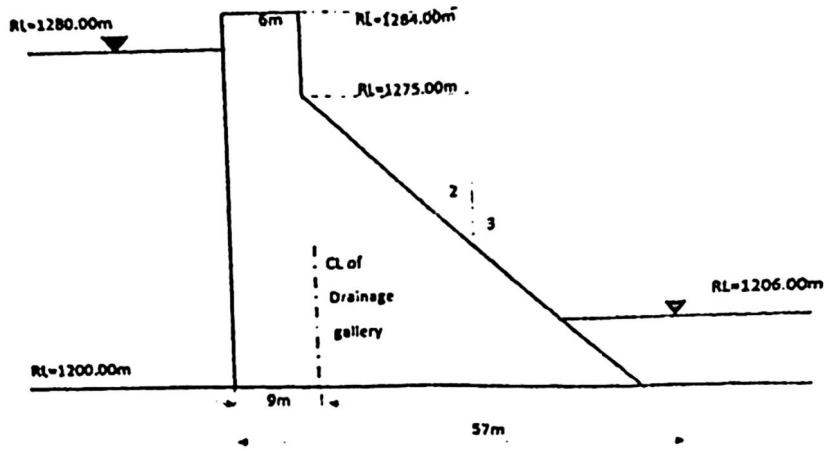
Bachelor level/ B.E. Hydropower/ 6th Semester — Full Marks: 50

Time: 3 hours — Pass Marks: 25

Subject: Design of Hydraulic Structure (HE462/HE310)

- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. Define hydraulic structures. Mention different types of hydraulic structures with sketch and write their functions. **(5)**
2. Enlist types of forces acting on a gravity dam. Check the stability of given dam. (Take permissible compressive stress for the dam is 2500 KN/m^3). **(2+5)**



3. Find out he discharge passing over the spillway from following data. **(4)**
   Head of water over crest of ogee spillway = 3.2 m
   Coefficient of discharge = 2.5
   Length of weir = 110 m
   Height of crest above the base of approach channel = 12 m
   (Note: Width of approach channel is equal to length of weir.)
4. Differentiate between earth and rock fill dam. Describe different types of rock fill dam with neat sketches. **(4)**
5. What area the functions of ideal gate. Explain different types of gates used in Hydropower projects. **(3)**
6. What do you mean by headworks? Explain in details about components of headworks with neat sketches. **(5)**
7. Describe about cross drainage structures. Design a hydropower canal from following data: **(2+5)**
   Design discharge: 30 cumec
   Side slope: 0.5:1
   Bed slope (S): 1 in 5000
   N: 0.023 and m = 1

8. Find out the dimension of settling basin for a high head project in Karnali River which utilize a discharge of 60 cumec and gross head of 300m. The sediment particles larger than 0.15 mm (ω = 1.5 cm/ sec) had to trap in the basin. Consider effects of turbulence as well as. Draw plan and section of the basin showing major component. (5)
9. Enlist different types of auxillary structures in hydropower projects. Design a Forebay for a flow carried by single penstock using following data: (2+4)
   Design discharge of power plant: 2 cumec
   Diameter of penstock :1.6 m
   Detention time: 3 minutes
10. Determine the economic diameter of penstock if design discharge is 30 cumec, net head is 285 m and overall efficiency is 85 %. (4)

The End