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10CV65

Sixth Semester B.E. Degree Examination, June/July 2016
Hydraulic Structures and Irrigation Design - Drawing

Time: 4 hrs.

Max. Marks:100

Note: 1. *Answer any TWO full questions, from Part – A*
and any ONE question from Part - B.
2. *Assume missing data suitably.*

PART – A

1 a. Explain the graphical method for the determination of the required storage capacity of a reservoir when the demand is i) Uniform   ii) Non - uniform. **(07 Marks)**
   b. Write short notes on any two of the following : **(04 Marks)**
      i) Flood control reservoir   ii) Distribution reservoir   iii) Multipurpose reservoir.
   c. The construction costs for certain possible heights of a dam at a given site have been estimated and the storage capacity for all these dam heights are tabulated in the table below:

| Sl.No	Height of the dam in meter	Construction cost in million rupees	Storage in million cubic meters
1	10	04	50
2	20	08	100
3	30	12	180
4	40	18	250
5	50	27	350
6	60	39	500
7	64	50	600

Determine the most economical height of the dam. **(04 Marks)**

2 a. Define Gravity dam. Explain with neat sketch the drainage galleries in gravity dam. **(06 Marks)**
   b. Following data were obtained from the stability analysis of a concrete gravity dam :
      i) Total overturning moment about toe = 1.1×10^6 kN-m. **(09 Marks)**
      ii) Total resisting moment about toe = 2.1×10^6 kN-m.
      iii) Total vertical force about base = 54,000 kN.
      iv) Base width of the dam = 50m.
      v) Slope of the D/S face = 0.8H : 1V.
      Calculate the maximum and minimum vertical stress to which the foundation will be subjected to, what is the maximum principal stress at toe? Assume there is no tail water.

3 a. Explain the two different methods which are adopted for constructing earthen dams. Which of these methods would you prefer and why? **(06 Marks)**
   b. What precautions and remedial measures would you undertake to control the seepage through, i) Earthen dam body   ii) The dam foundation. **(09 Marks)**
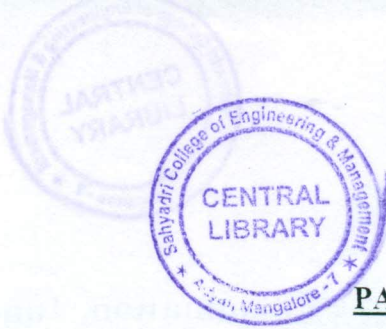
PART – B

4 Design a surplus weir for the following data : Combined catchment area = 51km^2 ;
Intercepted catchment area = 46km^2 ;   Top bund level (TBL) = 100.00m ;
Maximum water level (MWL) = 98.50 m ;   Full tank level (FTL) = 97.5m ;
Average ground level at proposed site = 96.5m   ;   Top width of tank bund = 2m ;
Side slopes of bund on either side = 2:1 ;   Level of hard strata for foundation = 95.00m ;
The ground level below the weir (D/S of weir) slopes to a level of 95.50m in a distance of
about 6m.
Ryve's co-efficient C = 8 ;   Modified Ryve's coefficient C = 2.5.
Provisions may be made to make Kutcha regulating arrangements to store water upto MWL in
terms of necessity.   (25 Marks)
Draw to a suitable scale the following views of the above designed surplus weir.
   a. Cross section of weir.   (10 Marks)
   b. Draw half longitudinal section and half longitudinal elevation.   (15 Marks)
   c. Draw half plan at foundation and half plan at ground level.   (20 Marks)

5 Design a canal regulator –cum – road bridge with the following particulars :
Hydraulic particulars of canal upstream : Full supply discharge = 20m^3/sec ;
Bed width = 15m ; Bed level = 20.0m ;   Full supply depth = 2.0m ;
Full supply level = + 22.0m ;   Top level of bank = + 23.0m.
The right bank is 5m wide and left bank is 2m wide.
Hydraulic particulars of canal downstream : Full supply discharge = 16m^3/sec ;
Bed width = 15m ; Bed level = + 20.0m ;   Full supply depth = 1.75m ;
Full supply level = + 21.75m ;   Top level of bank = + 22.75m.   (25 Marks)
Top width of banks are the same as those on the upstream side. The regulator carries a road way
single lane designed for I.R.C loading class 'A'. Provide clear freeboard of one meter above
F.S.L for road bridge. Good foundation soil is available at +19.00. Assume the ground level site
as +22.00. The co-efficient of drawing ratio for 80% is 1.645, 85% is 1.58 and 90% is 1.358.
Draw :
   a. Cross section showing half elevation and half section.   (10 Marks)
   b. Longitudinal section.   (15 Marks)
   c. Half plan at foundation and half pan at ground level.   (20 Marks)

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