BE - Irrigation Engineering

P. Pages : 2

GUG/W/16/6528

Time : Three Hours

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4700

Max. Marks : 80

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Notes : 1. All questions carry equal marks.
2. Answer all questions.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Illustrate your answers wherever necessary with the help of neat sketches.
6. Use of non programmable calculator is allowed.

1. a) Enumerate the various methods of Irrigation & explain in detail drip irrigation system. **8**

b) Find field capacity of a soil if root zone depth = 2.5 m, existing water content = 7.5%, dry density of soil = 1.5 gm/cm^3, water applied to the soil = 600 m^3, water losses due to evaporation = 15% and area of plot = 1000 sq.m. **8**

OR

2. a) Define : **8**
   i)   Delta   ii) Duty
   iii) Culturable commanded area   iv) Intensity of irrigation

b) After how many days the farmer should apply water to his field to ensure efficient use of irrigation water, if the field capacity is 27%, permanent wilting point 14%, density of soil 1500kg/m^3, effective root zone depth is 0.75 m & daily consumptive use of water is 11mm. **8**

3. a) What do you understand by storage zone of a reservoir ? Discuss live storage & dead storage. Does dead storage constitute a loss in a reservoir feeding a hydel power plant. **8**

b) Work out the life of a reservoir before its capacity is reduced to 20% of the initial capacity from the following sedimentation data. Catchment area is 1,000 sq km, reservoir capacity is 10,000 ham, average annual flow amounts to 15 cm of runoff, average annual sediment inflow is 0.36 million tonnes. **8**

OR

4. a) What are the effects of water logging ? What measures are adopted to reclaim the water logged area. **8**

b) Define river training. Describe various types of river training & protection works. **8**

5. a) Distinguish between : **8**
   i)   Gravity dam & Earthen Dam
   ii) Elementary profile of gravity dam & practical profile of gravity dam.

b) Illustrate with neat sketch the following parts of an earthen dam & state their functions briefly. **8**
   i)   Rock toe   ii) Horizontal drainage blanket
   iii) Cutoff   iv) Riprap

6. a) A concrete dam can be assumed to be trapezoidal in sections having a top width of 2m and **16** bottom width of 10 m. Its height is 12m & the upstream face has a batter of 0.9. Give an analysis of the stability of the dam for the base section for overturning and sliding in the fill reservoir condition assuming no free board allowance but allowing for uplift pressure. Assume uplift intensity factor as 100% also determine the compressive stress at the toe and the heel ad major principal & shear stress developed at the toe. Assume weight of concrete to be 2.4 t/m^s unit shear strength of concrete to be 140 t/m^2, and the coefficient of friction between concrete and foundation soil to be 0.7.

7. a) Write a note on : **8**

   i)   Schedule of area statistics.

   ii) Balancing depth.

   b) Design a canal by Lacey's theory for 40 cumics discharge and f = 0.9. **8**

OR

8. a) Distinguish between Initial regime & final regime. **6**

   b) Design an irrigation channel section for the following data : **10**
   Discharge = 30 cumecs
   Silt factor = 1.0
   Side slop = $\dfrac{1}{2} : 1$
   Draw the complete channel cross section assuming it to be in part cutting and part fitting.

9. a) State the functions of the following in a headworks with illustrative sketches. **8**
   i)   weir   ii) divide wall
   iii) underslice   iv) fishladder.

   b) Discuss in brief various causes of failure of weir & their remedies. **8**

OR

10. a) What is meant by Canal falls ? Why are falls constructed in modern canal system. **5**

   b) What are the functions of head regulator & cross regulator explain with neat sketch. **5**

   c) Draw a neat sketch to illustrate syphon aqueduct. **6**

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