C 22570 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2017

Civil Engineering

CE 14 603—HYDROLOGY AND IRRIGATION ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. (a) Describe the components of hydrological water balance equation.

   (b) How will you classify the run-off ?

   (c) List the ill-efffects of irrigation.

   (d) Distinguish between silt excluder and silt extractor.

   (e) Discuss the causes of reservoir sedimentation.

   (f) How canals are classified based on their alignment ?

   (g) State the necessity of lining in canals.

   (h) What are the advantages of open drainage system ?

   (i) Write short note on the objectives of river training.

   (j) Discuss the purposes of canal escapes.

[8 × 5 = 40 marks]

Part B

2. (a) (i) How will.you estimate the average rainfall over a basin ? Explain.

   (ii) The average annual rainfalls in cm at 4 existing raingauge stations in a basin are 105, 79, 70 and 66. If the average depth of rainfall over the basin is to be estimated within 10 % error, determine the additional number of gauges needed.

(7 + 8 = 15 marks)

Or

(b) (i) Discuss the various factors affecting the evaporation.

(ii) The total observed run-off volume during a 6 hour storm with a uniform intensity of 1.5 cm/hr is 21.6 x 10^6 m^3. If the area of the basin is 300 km^2, find the average infiltration rate for the basin.

(7 + 8 = 15 marks)

Turn over

3. (a) (i) List the advantages of furrow method of irrigation.

(ii) The discharge available from a tube well is 120 m^3 /hr. Assuming 3200 hr. of working of the tube well for a year, estimate the culturable area that this tube well can command. The intensity of irrigation is 50 % and average depth of Rabi and Kharif crop is 48 cm.

(7 + 8 = 15 marks)

Or

(b) (i) How will you select a site for a reservoir ? Explain.

(ii) Discuss the causes of failures of weirs and their remedies.

(7 + 8 = 15 marks)

4. (a) (i) What are the causes of water logging ? Explain.

(ii) Design a canal by Lacey's theory for 40 cumecs capacity. The side slopes may be assumed 1H:1V. The average size of the bed material may be taken as 0.8 mm.

(8 + 7=15 marks)

Or

(b) (i) Discuss the different types of canal outlets.

(ii) Design a trapezoidal shaped lined canal to carry 100 cumec at slope of 1/4000. The slope is 1.5 H: 1 V. The value of n = 0.016. Assuming limiting velocity as 1.5 m/sec.

(7 + 8 =15 marks)

5. (a) (i) Describe any two methods of separating the base flow from the total run-off.

(ii) A catchment area of 120 hectares is drained by storm run-off which over a duration of 45 minutes results in 3 cm. of rainfall. The area has a time of concentration of 30 minutes and run-off coefficient of 0.3. Estimate the resulting maximum rate of flow.

(7 + 8 = 15 marks)

Or

(b) (i) State the uses and limitations of unit hydrograph.

(ii) Explain the different types of groynes used in river training works.

(7 + 8 = 15 marks)

[4 × 15 = 60 marks]