Paper Code: **CE-702**	**Roll No.**									

B.TECH.
SEVENTH SEMESTER EXAMINATION, 2016-17
WATER RESOURCES ENGINEERING

[Time: 3 Hours] [Total Marks: 100]

Note: Attempt ***ALL*** questions. Assume suitable data, if required. All question carry equal marks.

1. Attempt any **four** parts of the following:- **(5×4=20)**

(a) What do you understand by precipitation? Explain various types of precipitation.
(b) Describe various methods of computing average rainfall over a basin.
(c) Describe the concept of hydrologic cycle with the help of a neat sketch. What are the different components of the hydrologic cycle?
(d) The normal annual rainfall at stations A, B, C and D in a basin are 80.97, 67.59, 76.28 and 92.01 cm respectively. In the year 1985, the station D was inoperative and the stations A, B and C recorded annual precipitation of 91.11, 72.23 and 79.89 cm respectively. Estimate the rainfall at station D in that year.
(e) Differentiate between PET and AET. Enlist various methods of finding consumptive use.
(f) Write short notes on
    (i) Depth Area Duration curves
    (ii) Hyetogragh

2. Attempt any **two** parts of the following:- **(10×2=20)**

(a) What is run-off ? What are the factors that affect the run-off from a catchment area? Discuss the runoff characterstics of streams.

(b) What do you mean by a hydrograph? Explain its different components. Also describe methods of base flow separation

(c) Water course has a culturable commanded area of 1200 hectares. The intensity of irrigation for crop A is 40 % and for B is 35%. Both the crops being Rabi crops. Crop A has a kor period of 20 days and crop B has kor period of 15 days. Calculate the discharge of the water course if the kor depth for crop A is 10 cm and for B is 16 cm.

3. Attempt any **two** parts of the following:- **(10×2=20)**

(a) 800 m^3 of water is applied to a farmer's rice field of 0.6 hectares. When the moisture content in the soil falls to 40% of the available water between the field capacity (36%) of soil and permanent wilting point (15%) of the soil crop combination, determine the field application efficiency. The root zone depth of rice is 60 cm. Assume porosity = 0.4

(b) What are the advantages and disadvantages of irrigation? What are different types of irrigation? Explain any two.

(c) Using Lacey's theory, design an irrigation channel carrying 30 m^3/sec. take silt factor as 1.0.

4. Attempt any **two** parts of the following:- **(10×2=20)**

(a) What is a canal outlet? Explain its various types. Also discuss the criteria for judging the performance of outlets.

(b) What do you mean by a cross drainage works? Explain in detail its types with neat sketches.

(c) Write short notes on :

(i) Meandering of rivers and meander parameters
(ii) High water , low water and mean water training
(iii) Cut offs and cut off ratio
(iv) Groynes , their types and uses

5. Attempt any **two** parts of the following:- **(10×2=20)**

(a) Write short notes on

(i) Specific capacity
(ii) Perched aquifer
(iii) Well loss
(iv) Specific retention

(b) State Dupuit's assumption for obtaining general equations governing ground water flow. Derive an expression for the confined aquifer.

(c) 60 cm diameter well is being pumped at a rate of 1360 litres/ min. Measurements in a nearby test well were made at the same time as follows. At a distance of 6 m from the well being pumped, the drawdown was 6m, and at 15 m the drawdown was 1.5 m. the bottom of the well is 90 m below the watertable. Find out the coefficient of permeability. (b) if all the observed points were on the Dupuit's curve, what was drawdown in the well during pumping? (c) what is the specific capacity of the well? (d) What is the rate at which water can be drawn from this well?