Total No. of printed pages = 5

CE 131601

Roll No. of candidate | | | | | | | | | | |

2017

B. Tech. 6th Semester End-Term Examination

IRRIGATION ENGINEERING

Full Marks – 100 Pass Marks – 35 Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : 10×3=30

   (i) Define irrigation and list the aims and objectives of irrigation.

   (ii) List three benefits and three ill-effects of irrigation.

   (iii) How are major, medium and minor irrigation schemes defined ?

   (iv) What is meant by draught and its periodicity ?

   (v) List three advantages of surface irrigation.

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(vi) List three disadvantages of surface irrigation.

(vii) Define soil texture and explain it in relation to sand, silt and clay.

(viii) List three reasons why knowledge of soil texture is important.

(ix) Define soil structure and draw the platy, prismatic and blocky soil structures.

(x) Define gravitational, capillary and hygroscopic water.

2. Answer any *eight* of the following questions : 8×5=40

(i) Explain how the factors "crop growth stage" and "soil texture" affect water requirement of crops.

(ii) Explain Soil Moisture Tension and Soil Moisture Content. Also draw the Soil Moisture Retention Curves for sand, clay, clay-loam and peat soils.

(iii) Explain the terms "gross command area", "culturable command area", "intensity of irrigation", "cropping intensity" and "delta".

(iv) Derive the relation between Base Period, Duty and Delta.

(v) A channel is to be designed for irrigating 5000 ha during kharif season and 4000 ha during rabi season. The water requirement for kharif and rabi are 60 cm and 25 cm respectively. The Kor periods for kharif and rabi are 3 weeks and 4 weeks respectively. Determine the design discharge of the channel.

(vi) What is Consumptive Use of Water ? Explain five major factors that affect it.

(vii) Explain drip system of irrigation and list three major advantages and three major disadvantages of the system.

(viii) Draw a sketch of the cross-section of an irrigation canal in partly cutting and partly filling and level its various parts.

(ix) Name the methods used for designing unlined irrigation canals in alluvial soils. List the steps involved in the design procedure of either of the two.

(x) What is water-logging in an irrigation command ? List three of its causes, three ill-effects and three remedial measures.

3. Answer any *three* of the following questions : 3×10=30

(i) Determine the head discharge of a canal from the following data. The value of Time Factor may be assumed as 0.75 :

Crop	Base Period (days)	Area (ha)	Duty (ha/cumec)
Rice	120	4000	1500
Wheat	120	3500	2000
Sugarcane	310	3000	1200

(ii) Find out the capacity of a reservoir from the following data. The CCA = 80,000 ha.

Crop	Base Period (days)	Duty (ha/cumec)	Intensity of Irrigation (%)
Rice	120	1800	25
Wheat	120	2000	30
Sugarcane	320	2500	20

Assume the canal and reservoir losses as 5% and 10% respectively.

(iii) Calculate the specific capacity of an open well from the following data :

Initial depression head = 5 m

Final depression head = 2 m

Time of recuperation = 2 hrs

Diameter of well = 3 m.

Calculate also the specific yield and yield of the well under a head of 3 m.

(iv) Derive the expression for yield of tube well in unconfined aquifer. Use diagram.

(v) Design an irrigation canal with the following data :

Discharge of the canal = 24 cumec

Permissible mean velocity = 0.80 m/sec

Bed slope = 1 in 5000

Side slope = 1:1

Chezy's constant, C = 44.