M. Tech.-I (Civil-Hydraulic Engineering) (CBCS – 2015 Course) :
SUMMER - 2019
SUBJECT: IRRIGATION WATER MANAGEMENT

Day: Saturday
Date: 18/05/2019
Time: 11.00 AM TO 02.00 PM
Max. Marks: 60

S-2019-3370

N.B:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Draw diagrams **WHEREVER** necessary.
4) Answer to both the sections should be written in **SAME** Answer book.
5) Assume suitable data if necessary.

SECTION-I

Q.1 Define and explain the following terms: Free water, Saturation of water, wilting point, Field capacity, Hygroscopic water. **(10)**

OR

What is Lysimeter? Explain with sketches. Explain the procedure for observations and the method for analysis of observations.

Q.2 Define and explain the following: **(10)**
i) Farm water requirement ii) Effective Rainfall
iii) Net Irrigation requirement

OR

Discuss the merits and demerits of sprinkler irrigation system and the conditions when the system is not applied in field.

Q.3 List out classifications of: **(10)**
i) Sprinklers and
ii) Methods of application by sprinkler system.
Briefly explain the conditions under which each of them is applied.

OR

Draw a typical sketch of drip irrigation system showing its essential components. Explain the purpose, functioning and design procedure of any two of the components.

SECTION-II

Q.4 a) Determine the water distribution efficiency in a 150 m long straight furrow when the soil sampling after an irrigation at 25m intervals in the furrow showed that the effective depth of water penetration in the 60cm root zone were 56, 54, 52, 50, 49 and 49cm. **(04)**

b) Write short notes on: **(06)**
i) Tracer methods of irrigation water measurement.
ii) Volume metering methods of irrigation water measurement.

OR

Q.4 a) The head of water over a cut throat flume is 300mm, having free flow. The width of maximum contraction is 600 mm. Find the discharge over the flume. Assume the flow coefficient = 0.8, flume coefficient = 0.85. **(02)**

P.T.O.

b) Write short notes on: **(08)**

i) Irrigation water application efficiency
ii) Consumptive use efficiency
iii) Current meter a velocity measuring device
iv) Radio- isotope method of measurement of rate of flow in irrigation channel

Q.5 **a)** The filed capacity and the permanent wilting point for a given soil are 35 and 15 percent, respectively. Determine tu storage capacity of soil within the root zone of the soil which many be taken as 80 cm. At a given time the soil moisture in the field is 20% and a farmer applies 25cm of water. What part of this water would be wasted? Assume porosity of soil as 40% and relative density as 2.65. **(04)**

b) Write short note on: **(06)**

i) Troubles in functioning of underground pipelines
ii) Design of unlined filed channels
iii) Drop structures: Erosion control in irrigation channels

OR

Q.5 **a)** Determine the frequency of irrigation at the following stage of growth of crop **(03)**

Filed capacity of soil	30%
Permanent wilting point	10%
Effective root zone depth	0.75m
Consumptive use	12mm/day
Apparent specific gravity of soil (including effect of porosity)	1.6

b) The consumptive use for a given crop is 90mm. Determine filed irrigation requirement if effective rainfall and irrigation efficiency in the area are 15mm and 60% respectively **(02)**

c) Write short notes: **(05)**

i) Design of lined channels
ii) Check gates: water control structures

Q.6 **a)** Determine the depth of irrigation water which would change 30cm depth of loam soil into saline condition, if the EC of irrigation water is 1 millimhos/cm. The bulk density of soil is 1.2 gm/cm^3 and the density of water is 1 gm/cm^3. The saturation percentage of soil is 40. **(04)**

b) i) Discuss quality of irrigation water in details **(06)**
ii) Discuss plant response to saline and Alkali soils

OR

Q.6 **a)** Discuss reclamation procedure of salt affected soils in general and the specific measures for saline, alkali and saline alkali soils. **(06)**

b) Write short notes on: **(04)**

i) Influence of salts on the physical properties of soils
ii) Drainage of Irrigated lands in relation to salinity control

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