B.TECH
(SEM VII) THEORY EXAMINATION 2017-18
WATER RESOURCES ENGINEERING

Time: 3 Hours   *Total Marks: 100*
Note: 1.   Attempt all Sections. If require any missing data; then choose suitably

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x10 = 20**
   a.   What is hydrologic cycle? Write different components of hydrologic cycle.
   b.   What is transpiration? What are different factor that affect transpiration?
   c.   Write short note on Standard project flood (SPF).
   d.   What is Phreatic line? What is its use?
   e.   What is crop rotation?
   f.   Discuss the economic viability of lining of canal.
   g.   What are the basic principles of regulation of a canal system?
   h.   Write short note on well loss and well efficiency.
   i.   What is water logging?
   j.   What is Dupit's theory?

SECTION B

2.   **Attempt any *three* of the following:**   **10 x 3 = 30**
   a.   What is S-hydrograph? How would you derive a S-hydrograph? Discuss the procedure of derivation of the unit hydrograph from a S- hydrograph.
   b.   Determine the optimum number of rain gauges for the a basin with the following data:
           Number of existing gauges=6
           Allowable percentage error = 8%
           The average rainfall at the existing gauges = 90, 100, 85, 65, 55 and 46 cm.
   c.   Design an irrigation channel to carry a discharge of 30 cumec by Kennedy's theory. Take B/D ratio as 8.0, N= 0.0225 and m = 1.0.
   d.   What are different types of pumps used for tube wells? What are their limitations and relative advantages and disadvantages?
   e.   What are the various purposes for which river training work is required? What are different types of river training works?

SECTION C

3.   **Attempt any *one* part of the following:**   **10 x 1 = 10**
   (a)   What is infiltration capacity? What are the different factors affecting infiltration rates? Describe infiltration indices which are commonly used.
   (b)   What do you understand by the rainfall intensity? Explain the methods for the preparation of the intensity duration curves and the intensity duration curves. What are their uses?

4.   **Attempt any *one* part of the following:**   **10 x 1 = 10**
   (a)   The ordinate of a 4 hour unit hydrograph are given below. Using the principle of superposition construct an S hydrograph and calculate the discharge at equilibrium stage and the time of its occurrence from the beginning of direct runoff.

Time (hour)	0	4	8	12	16	20	24
cumec	0	4	12	6	3	1	0

(b)   What do you understand by consumptive use of water? How it different from evapotranspiration?

5.   **Attempt any *one* part of the following:**   **10 x 1 =10**
  (a)   Describe different methods of irrigation in brief. What are the advantages and disadvantages of irrigation?
  (b)   The ordinates of a 3 hour unit hydrograph are following:

Time (hr)	0	3	6	9	12	15	18	21	24	27	30
Discharge (cumec)	0.0	3.08	4.94	8.64	9.88	7.41	4.94	3.70	2.47	1.23	0.0

Develop a unit hydrograph of 6 hour unit hydrograph.

6.   **Attempt any *one* part of the following:**   **10 x 1 = 10**
  (a)   What are the basic principles of regulation of a canal system? Explain the various method of regulation of canal system.
  (b)   Explain semi-module, rigid module and their types. Describe a semi-module consisting of a submerged pipe.

7.   **Attempt any *one* part of the following:**   **10 x 1 = 10**
  (a)   Derive the basic equation of unsteady flow. What are the various assumptions? What are advantages of non equilibrium equation over the steady flow equation?
  (b)   Differentiate between open wells and tube well. What are the advantages of tube well over open well?