B.Tech.

(SEM. VII) THEORY EXAMINATION 2011-12

WATER RESOURCES ENGINEERING

Time : 3 Hours Total Marks : 100

Note :— Attempt all the questions. All questions cany equal marks.

Assume any missing data suitably, i. Attempt any four parts : (5x4=20)

(a)Explain the salient features of hydrologic cycle with suitable sketch.

(b)A precipitation station X; was inoperative for some time during which a storm occurred. The storm totals at three stations A, B and C surrounding X, were respectively 6.60, 4.80 and 3.70 cm. The normal annual precipitation amounts at stations X, A, B and C are respectively 65.6, 72.6, 51.8 and 38.2. Estimate the storm precipitation for station X.

(c)What do you understand by consumptive use of water ? State and describe B Laney-Criddte method for the estimation of consumptive use of water for a particular crop.

(d)What is probable maximum precipitation over a basin ? Explain any one of the approaches to estimate the PMP value.

(e)Write about the l.S.I. Evaporated Pan with the help of neat sketch.

(f)The infiltration capacity in a basin is represented by Horton's equation as f = 4.0 + e~3i; where f is in cm/h and t is in hours. Assuming the infiltration to take place at capacity rates in a storm of 60 minutes duration, estimate the depth of infiltration in the first 75 minutes and in the second 45 minutes of the storm.

2. Attempt any four parts : (5x4=20)

(a)What are the factors affecting run-off from a catchment area ?

(b)Describe the estimation of run-off by infiltration method.

(c)What is a hydrograph ? Draw a single peaked hydrograph and explain its various components.

(d)What do you understand by umt-hydrograph ? How it is described ? Explain its use in construction of flood hydrograph resulting from two or more periods of rainfall.

(e)Find out the ordinates of a storm hydrograph resulting from a 3 hours storm with rainfall of 3, 4.5 and 1.5 cm during subsequent 3 hours intervals. The ordinates of unit

Hours	0	05	Of	W	12	15	IS	21	24	03	06	09	12
Ordinates of Unit Hydrograph (Cumecs)	0	<X	200	350	450	150	26(1	190	130	80	45	20	0

hydrograph are given in table given below :

Write a short not on Canal Alignment.

3. Attempt any two parts : (10x2=20)

(a)Using Kennedy's method of channel design; find the dimensions of an irrigation canal to carry a discharge of 1.4 cumecs. Assume N = 0.0225, m = 1 and (B/D) =5.7.

(b)A channel section has to be designed for the following data:

Discharge (Q) = 30 cumecs Silt factor (f) = 1.00 Side slope = 1/2 Find also the horizontal slope.

(c)What do you mean by water logging ? How water-logging becomes a problem ? Describe various methods adopted to prevent water logging.

4. Attempt any two parts : (10x2=20) (a) Differentiate between non-modular and semi-modular

outlets. Explain the Kenneddy's gauge outlet with its relevant uses.

(b)What do you understand by head regulator ? State functions of a distributary head regulator and a cross-regulator.

(c)Classify the river or alluvial plains and on the basis of their classification explain meandering. Give the causes of meandering and write the basic factors controlling the process of meandering.

5. Attempt any two parts : (10x2=20)

(a)Define the following terms in brief : Aquifer, Well loss. Specific capacity, Specific yield. Efficiency of a well and Interference among wells. Give the expression when it shows the interference between two wells.

(b)What are differences between open wells and tube wells by which you can categorise the tube wells ? Also write any one of the method of developing a tube well.

(c)An aquifer of 20 m average thickness is overlain by an impermeable layer of 30 m thickness. A test well of 0.5 m diameter and two observation wells at a distance of 10 m and 60 m from the test well are drilled through the aquifer. After pumping at the rate of 0.1 m3/sec for a long time, the following draw downs are stabilised in these wells : First observation well, 4 m; Second observation well, 3 m. Determine the coefficient of permeability.