Paper / Subject Code: 88885 / Water Resource Engineering - I

T.E/Civil/ Sem VI/WRE-1/CBCS 03 JUN 2019

(Time: 3 hours) Total marks: 80

N.B: (1)Question no. 01 is compulsory.
(2)Attempt any 3 questions out of the remaining 5 questions.
(3)Assume data wherever necessary and clearly mention the assumption made.
(4)Draw neat figures as required.

Q1:- Attempt Any Four (20)

a) Define irrigation and discuss in brief the benefits and ill effects of irrigation.
b) Write a note on sub surface irrigation , stating clearly the conditions under which this method is suitable.
c) What are the factors affecting duty?
d) Explain hydrologic cycle with neat sketch .
e) State and discuss assumptions and limitations of Dupuit's theory.
f) Write short note on reservoir sedimentation.

Q2:-

a) i)Describe the salient features of National Water Policy 1987. (05)
ii)What are the advantages and disadvantages of Bandhara irrigation (05)
b) Discuss in brief various methods of surface irrigation. (10)

Q3:-

a) i)Define the term duty and derive the relationship between duty delta and base period . (05)
ii)What do you understand by crop rotation ? What are its advantages . (05)
b) The base period , intensity of irrigation and duty of water for various crops under the canal system are given .Determine the reservoir capacity , if the culturable command area is 40000 hectares , canal losses are 25% and reservoir losses are 15% . (10)

Crop	Base period(days)	Duty at field (Ha/cumec)	Intensity of irrigation
Wheat	120	1800	25%
Sugarcane	360	1700	20%
Cotton	180	1400	10%
Rice	120	800	15%
Vegetables	120	700	15%

Q4:-

a) Describe various methods of computing average rainfall over a basin . (10)
b) Find out the ordinates of a storm hydrographs resulting from a 3 hour storm with rainfall 3, 4.5 and 1.5 cm during subsequent 3 hour intervals. The ordinates of unit hydrograph are given in the table below. (10)

Hours	0	3	6	9	12	15	18	21	24	27	30	33	36
Ordinates of unit hydrograph (cumecs)	0	90	200	350	450	350	260	190	130	80	45	20	0

Assume an initial loss of 5mm , infiltration index of 5mm / hour and base flow of 20 cumecs

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Q5:-

a) i) Derive an expression for discharge from a well fully penetrating a confined aquifer. (05)

ii)Define aquifer , aquiclude, specific yield, specific retention and perched aquifer. (05)

b) A 30 cm diameter well penetrates 25 m below the static water table . after 24 hours of Pumping at the rate of 5400 liters/minutes , the water level in a test well at 90 m is lowered by 0.53 m , and in a well 30 m away the drawdown is 1.11 m . (10)

i)What is the transmissibility of the aquifer ?

ii)Also determine the drawdown in main well.

Q6:-

a) i)State the factors affecting selection of site of a reservoir. (05)

ii) Discuss various zones of storages with neat sketch. (05)

b) Fix the control levels of a medium size reservoir from the following data. (10)

i) Effective storage required for crops = 32 Mm^3

ii) Tank losses = 20% of effective storage

iii) Carry over allowance = 10% of effective storage.

iv) Dead storage = 10% of gross storage.

v) Length of waste weir = 100m

vi) Maximum flood discharge = 500 cumec.

vii) Francis formula $Q=1.84\ LH^{3/2}$.

viii)Wind velocity V= 70 KMPH.

ix)Fetch length F = 30 KM.

Contour RL(m)	250	253	256	-	278	281	284
Storage (Mm^3)	3.3	4.1	5.25	-	42.65	47.3	55.12

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