

## GANPAT UNIVERSITY

B. Tech. Semester: VII – ( Civil Engineering)

Regular Examination Nov – Dec 2015

2CI 709 Water Resource Engineering-I

Max. Time: 3 Hours

Max. Marks: 70

- Instructions: - (1) Answer to the two sections must be written in **separate** answer books.  
 (2) Figures to the **right** indicate **full** marks.  
 (3) Assume suitable data if required.

## Section - I

- 1 (A) Define: Routing, Explain Modified Pulse method for channel routing. (6)  
 (B) A portion of the inflow hydrograph to a reach of channel is given below. If the travel time is  $K=1$  unit and the weighting factor is  $X=0.30$ , then find the outflow from the reach for the period shown below. (6)

Time	Inflow	$C_0I_2$	$C_1I_1$	$C_2O_1$	Outflow
0	4				4
1	5				
2	9				
3	8				
4	7				
5	6				

OR

- 1 (A) Explain : Muskingum method  
 (B) 8 unbiased coins are tossed simultaneously. Find probability of obtaining (i) Exactly 4 heads (ii) At least 4 heads (iii) Not more than 2 heads (iv) No heads. (6)  
 2 (A) Define: Chance Flood and explain Gumbel's method for probability distribution (6)  
 (B) Explain main causes of Failure of Earthen dam. (5)  
 OR  
 2 (A) Explain Disaster management plan for dam failure occurrences. (6)  
 (B) For a river, the estimated flood peaks for two return periods by the use of Gumbel's method, are as under. (5)

Return Period in Years	Peak Flood ( $m^3/s$ )
80	460
50	425

- What flood discharge in this river will have a return period of 800 years?  
 3 (A) State the different disciplines of WRE. State in brief the scope of each of these disciplines. (6)  
 (B) Derive the Dupit's equation for discharge through an unconfined aquifer. (6)

## Section - II

- 4 (A) Define: Flume. State the different usages of flumes. Also state the shapes and material of construction of flumes. (6)  
 (B) Water is to be supplied to the inhabitants of a college campus through a supply main. The data are: (1) Distance of the reservoir from the campus=3000 m, (2) Number of inhabitants=4000, (3) Per capita Consumption of water=180 lpd, (4) Loss of head due to friction=18 m, (5) Co-efficient of friction of pipe  $f=0.007$ . If the half of the daily supply is pumped in 8 hrs, Determine the size of the supply main. (6)



OR

- 4 (A) What is a 'Stilling Basin'? Draw a schematic diagram of a stilling basin structure showing different components. State the locations of a stilling basins (6)
- (B) A 3.6 m wide rectangular channel conveys 9 Cumecs of water with a velocity of 6 m/s. (6)  
Is there a condition for hydraulic jump to occur? If so, calculate the height of jump, Length of jump, and strength of jump. And what is the loss of Energy per kg of water?
- 5 (A) What we mean by 'Unsteady Flow'? State the adverse effects caused by 'Unsteady Flow' in a pipe line. (5)
- (B) A Well of diameter 25 cm, is completely penetrates an unconfined aquifer of saturated depth of 50 m and Steady State was reached to 1650 lpm. Drawdown observed in two wells located at 30m and 90m far from the pumping well were found to be 4.0 m and 3.0 m respectively.[a] Determine the Transmissivity of the aquifer.[b] What is the drawdown at pumping well? (6)

OR

- 5 (A) Define a "Pump". Which are the pump characteristics? Draw a typical Characteristic curve of a Centrifugal Pump (6)
- (B) Two reservoirs have a constant difference of levels of 70 m and are connected by a 250 mm dia pipe which is 4 km long. The pipe is tapped mid-way between the reservoirs and water is drawn at the rate of  $0.04 \text{ m}^3/\text{s}$ . Assuming friction factor as 0.04, determine the rate at which water enters the lower reservoir. Use the Data:[i] Dia of pipe  $D=250 \text{ mm}=0.25 \text{ m}$  [ii] Difference of level  $=70 \text{ m}$ , [iii] Friction factor  $4f=0.04$  (5)
- 6 (A) Define the Aeration Zone . State the different stages of it and state their characteristics. (4)
- (B) What is 'Hydraulic Jump'? Give the examples of its occurrence. (4)
- (C) Find the rate of flow and conveyance for a rectangular channel 7.5 m wide for uniform flow at a depth of flow 2.25 m. The channel is having bed slope as 1 in 1000. Take Chezy's constant  $C=55$ , Also state whether the flow is tranquil or rapid. (4)

END OF THE PAPER