

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – III • EXAMINATION – WINTER • 2014****Subject code: 731201****Date: 27-11-2014****Subject Name: Water Supply and Drainage****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Write short note on planning of water supply scheme. **07**
 (b) Write detailed note on Design of underground reservoir. **07**

- Q.2** (a) What are the main classifications of pumps? Explain in brief. **07**
 (b) Explain: Hardy cross method for analysis of pipe networks. **07**

OR

- (b) Describe centrifugal pumps with advantages and disadvantages. **07**
- Q.3** (a) Explain: Typical River intake structure with sketch and design criteria. **07**
 (b) Describe any one device for measurement of flow of water in pipes. **07**

OR

- Q.3** (a) Write detailed note on Fire Hydrants **07**
 (b) The catchment area of a city is 300 hectares. Assuming that the surface on which the rain falls is classified as follows: **07**

Type of surface	% Area	Runoff coefficient
Roof	20	0.9
Pavement and yards	15	0.9
Lawns, gardens	30	0.15
Macadamised roads	20	0.40
Vacant Plots	15	0.10

Calculate the impervious factor. If the maximum intensity of rainfall is 50 mm/hour, calculate the quantity of storm water which will reach sewer lines. Use rational formula.

- Q.4** (a) Describe various formulas for determining storm water runoff. State the limitations of each one. **07**
 (b) Find the velocity and discharge of the flow in a sewer when it is running one half full. The Diameter of sewer is 160 cm and sewer is laid at 1 in 550 Slope. Assume $N=0.012$ in Manning's Formula. **07**

OR

- Q.4** (a) Explain the importance of the following in the design of sewers. **07**
 (1) Self cleaning velocity.
 (2) Non scouring velocity.
 (b) Describe the procedure for hydraulic design of storm sewer. **07**
- Q.5** (a) Define the following terms. **07**
 (1) Hydraulic jump.
 (2) Froude numbers.

- (b) Define the following terms. 07
(1) Uniform flow and non uniform flow.
(2) Super critical and sub critical flow.

OR

- Q.5** (a) State the expressions for losses in pipes in terms of $V^2/2g$.for 07
(1) Elbows
(2) Valves
(3) Sudden expansion
(4) Sudden contraction
- (b) Draw the neat sketch of Water meter and explain in brief. 07
