Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**PDDC - SEMESTER – III • EXAMINATION – SUMMER 2014**

**Subject Code: X30601** **Date: 18-06-2014**

**Subject Name: Hydrology and Water Resources Engineering**

**Time:02:30 pm to 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.**

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| **Q.1** | **(a)** | (i) Define hydrology and give the scope of hydrology. (ii) Give as percentage of total water on earth's surface as ground water, water in glaciers and icecaps and percentage of water in lakes and rivers. | **07** |
| | **(b)** | Enlist different types of precipitations. Explain convectional precipitation. Illustrate which type of precipitations are significant to the civil engineer. | **07** |
| **Q.2** | **(a)** | Explain a method of estimating missing rainfall data and a method of checking consistency of rainfall records. | **07** |
| | **(b)** | Enlist and explain the hydrological data to be collected for hydrologic project. | **07** |
| | | **OR** | |
| | **(b)** | What factors do you consider for selecting a site for rain gauge station? Explain how rainfall measurement by radar complements the rainfall records by rain gauge. | **07** |
| **Q.3** | **(a)** | Draw proportionate sketches to explain the importance of depth area duration curves. Which data are needed for preparing depth area duration curves. | **07** |
| | **(b)** | The following were the monthly pan evaporation data in certain year in the vicinity of the lake from the month of January to December: 15.7, 14.1, 16.9, 24.0, 27.5, 21.4, 15.7, 16.2, 16.2, 20.5, 15.7 and 15.4.cm The total water spread area in January is 3.2 $km^2$ . The water spread area in the beginning of December is 2.6 $km^2$. Calculate the loss of water in $Mm^3$ due to evaporation in that year. Take pan coefficient of 0.72. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Enlist and explain the measures to reduce lake evaporation. | **07** |
| | **(b)** | Successive hourly rainfall of 1.5 ,5 and 3 cm occur over a 25 hectare area for which 5 ha ,ø = 4 cm/hr, 12 ha , ø = 3cm/hr, 8 ha of ø = 1 cm/hr. Derive the net rain in successive hours and total net rain in 3 hours. | **07** |
| **Q.4** | **(a)** | Enlist the various methods for determination of infiltration. State the conditions under which you will use the single and double ring infiltrometer. Draw a proportionate sketch showing infiltration time curve. | **07** |
| | **(b)** | In an area of 100 ha the water table dropped by 4.5 meter due to continuous ground water pumping. If porosity is 26% and specific retention is 10% determine the specific yield of the aquifer and the decrease in the ground water storage. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Enlist the basin characteristics and the storm characteristics that affecting run off and discuss basin characteristics. | **07** |
| | **(b)** | Draw sketches to draw stage discharge curves and explain stage discharge curves during rising stage , falling stage and constant stage | **07** |
| **Q.5** | **(a)** | Define unit hydrograph. Explain clearly the assumptions made in the unit hydrograph theory and the limitations of the unit hydrograph theory | **07** |

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| | **(b)** | (i) Define reservoir routing , the input data required for reservoir routing and the output data obtained. (ii) Explain design flood. | **07** |

**OR**

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|---|---|---|---|
| **Q.5** | **(a)** | Define simulation. Explain different type of simulations and their uses in water resources. | **07** |
| | **(b)** | Explain the nature of ground water flow. Explain the laws governing the ground water flow with their limitations. | **07** |

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