Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

**UNIVERSITY**



(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14CE3027** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Hydrologic Processes** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Explain the various types of distributions used to represent hydrologic variables and also the Suitability of these distributions for various hydrologic processes. | CO 1 | 20 |
| **(OR)** | | | | |
| 2. | a. | A small catchment of area 150 ha received a rainfall of 10.5 cm in 90 minutes due to a storm. At the outlet of the catchment, the stream draining the catchment was dry before the storm and experienced a runoff lasting for 10 hours with an average discharge value of 2.0 m/s. The stream was again dry after the runoff event. (a) What is the amount of water which was not available to runoff due to combined effect of infiltration, evaporation and transpiration? What is the ratio of runoff to precipitation? | CO 1 &3 | 12 |
|  |  | Give the steps followed in estimating the average precipitation over an area using Thiessen polygon. | CO 1 | 8 |
|  |  |  |  |  |
| 3. | a. | How will you estimate precipitation using radar and satellites? | CO 1 & 3 | 5 |
|  | b. | What are the factors influencing interception? Give a brief description on the techniques followed to measure interception in the field? | CO 1 & 3 | 7 |
|  | c | Explain the various types of rain gauges used for measuring precipitation. | CO 1 | 8 |
| **(OR)** | | | | |
| 4. | a. | Explain in detail about Double Mass curve analysis and its importance in hydrologic design. | CO 1 | 7 |
|  | b. | Explain the various methods used for estimating missing rainfall data and also enumerate the benefits and limitations of each method. | CO 1 | 6 |
|  | c. | Theissen polygon constructed for a network of 10 rain gauges in a river basin yielded Theissen weights of 0.10, 0.16, 0.12, 0.11, 0.09, 0.08, 0.07, 0.11, 0.06 and 0.06. If the rainfalls recorded at the rain gauges during a cyclonic storm are 132, 114, 162, 138, 207, 156, 135, 158, 168 and 150 mm respectively determine the average depth of rainfall by Theissen mean and arithmetic mean methods. Also determine the volume of surface runoff at the basin outlet if 35% of the rainfall is lost as infiltration. Take the area of the basin as 5800 km 2. | CO 1 | 7 |
| 5. | a. | Explain the various sources of stream flow and types of flow occurring on the surface due to this. | CO 1 & 3 | 8 |
|  | b. | List the various factors influencing the runoff. | CO 1 & 3 | 6 |
|  | c. | Explain the rating curves. | CO 2 | 6 |
| **(OR)** | | | | |
| 6. | a. | Show the various subsurface zones with a neat sketch and explain their classification | CO 3 | 8 |
|  | b | What are the characteristics of saturated zone? Define and discuss their application in ground water study | CO 3 | 12 |
| 7. | a. | Estimate the daily evaporation from a water surface using the Penman’s approach, at a place of Latitude 20 o N from the following data.  Air temperature = 26 o C  Saturation vapour pressure at 26 o C = 33.608 mb  Vapour pressure of air = 13.25 mm of mercury  Number of sunshine hours = 7.6  Maximum probable bright sunshine hours =13.2  Solar radiation = 958 cal/cm/day  Wind velocity at 2 m height = 2.5 m/s  Atmospheric pressure = 752 mm of mercury | CO 1 & 2 | 14 |
|  | b. | With the help of a sketch, describe the parts of Class A Evaporation Pan. How will you use the Pan data to obtain the evaporation from a lake under similar climate and exposure condition? |  | 6 |
| **(OR)** | | | | |
| 8. | a. | Explain the factors influencing the infiltration | CO 1 &2 | 12 |
|  | b. | What do you understand by base flow? Explain with schematic diagram | CO 1 | 8 |
|  | | **Compulsory:** |  |  |
| 9. | a. | With the help of a sketch, describe the land-based components of the hydrologic cycle | CO 3 | 12 |
|  | b. | Give a brief description of application of hydrology in engineering | CO 2 & 3 | 8 |

ALL THE BEST