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



**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **18CE3036** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SURFACE FLOW HYDROLOGY** | **Max. marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Develop the various processes undergone by water in the surface, subsurface and in the atmosphere. Explain with a diagram the complete circulation processes. | CO1 | 10 |
| b. | Appraise hydrologic budget or water balance of drainage basin. | CO1 | 6 |
|  |  |  |  |  |
| 2. | a. | The annual peak discharge of a river follows the Gumbel’s distribution with a mean of 10,000 m3/s and a standard deviation of 3000 m3/s. What is the probability that the annual peak discharge is more than 15,000 m3/s? What is the magnitude of the peak discharge with an exceedence probability of 0.1? | CO5 | 10 |
| b. | Explain the various types of distributions used to represent hydrologic variables and also the suitability of these distributions for various hydrologic processes. | CO5 | 6 |
|  |  |  |  |  |
| 3. | a. | List the considerations you will make for selecting a precipitation measurement site. | CO2 | 8 |
| b. | The average annual rainfall in cm at four existing raingauge stations are 105, 79, 70 and 66. If the average depth of rainfall over a basin is to be estimated within 10 % error, determine the additional number of gauges needed. | CO2 | 8 |
|  |  |  |  |  |
| 4. | a. | Explain the different components of runoff cycle. | CO3 | 6 |
| b. | The rainfall at station X, is missing and the rainfall at the surrounding stations along with the absolute coordinates with reference to station A whose coordinates are taken as (0,0) is shown in the following table. Estimate the rainfall at the station X.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Station | X | A | B | C | D | E | F | | Rainfall(cm) | ? | 4.5 | 5.0 | 4.6 | 5.2 | 5.0 | 5.5 | | x | 0 | 7 | 2 | 5 | 5 | 4 | 3 | | y | 0 | 3.5 | 10 | 3 | 5 | 3 | 4 | | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | State the applications of current meters. | CO4 | 8 |
| b. | Differentiate various types of stages used for discharge measurement. | CO4 | 8 |
|  |  |  |  |  |
| 6. | a. | Describe the procedure of preparing the Depth-Area-Duration curve in hydrologic analysis. | CO2 | 10 |
| b. | Enumerate the triple circulation model. | CO1 | 6 |
|  |  |  |  |
| 7. |  | Given below are the observed flows from a storm of 4-h duration on a stream with a drainage area of 1600 km2. Derive and plot the 4-hr unit hydrograph assuming a constant base flow of 100 m3/sec.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Time(day) | 1 | 2 | 3 | 4 | | | 5 | | | 6 | 7 | | 8 | | 9 | | Flow(m3/sec) | 100 | 1000 | 830 | 630 | | | 520 | | | 420 | 350 | | 280 | | 218 | |  |  | |  | |  | | |  | | | |  | | | Time(day) | 10 | 11 | 12 | 13 | | 14 | | | | Flow(m3/sec) | 180 | 155 | 130 | 110 | | 100 | | | | CO6 | 16 |
|  | | | | |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | Elucidate the term evaporation in water bodies. | CO1 | 2 |
| b. | Explain the various factors affecting evaporation. | CO6 | 6 |
| c. | An infiltration test on a ring with 35cm diameter yielded the following data: volume in cm3   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Time | 0 | 2 | 5 | 10 | 20 | 30 | 60 | 90 | 150 | 210 | | Vol. | 0 | 278 | 658 | 1173 | 1924 | 2500 | 3345 | 3875 | 4595 | 5315 |  1. Determine the infiltration capacity rates for the time intervals in the experiment. 2. What is the ultimate infiltration capacity rate fc? 3. What is the average infiltration capacity for the first 10 minutes and for the first 30 minutes of the experiment? | CO6 | 12 |