

**GUJARAT TECHNOLOGICAL UNIVERSITY****M. E. I<sup>ST</sup> Semester–Remedial Examination – July- 2011****Subject code: 711202****Subject Name: Hydrology & Watershed Management****Date: 08/07/2011****Time: 10:30 am – 01:00 pm****Total Marks: 60****Instructions:**

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

- Q.1** (a) Define watershed and watershed hydrology in detail. **06**  
 (b) Define CN method for runoff with its parameters. **06**

- Q.2** (a) Explain calibration and validation of a simulation model. **06**  
 (b) Write a brief overview of HEC-HMS model. Also give a flow chart explaining various hydrological processes simulated by it. **06**

**OR**

- (b) Write a brief overview of ARS-SWAT model. Also give a flow chart explaining various hydrological processes simulated by it. **06**  
**Q.3** (a) Differentiate between lumped and physically distributed models. **06**  
 (b) Write applications of remote sensing in watershed management. **06**

**OR**

- Q.3** (a) Explain the effect of size and shape of basin on runoff. **06**  
 (b) Write applications of GIS in hydrology and watershed management. **06**  
**Q.4** (a) Describe spatial variability in hydrology with suitable exemplary data. **06**  
 (b) The following records of maximum flood are available. Estimate the magnitude of flood having frequency equal to 80 years by Gumbel's method. Record collected from 1981 to 1995 is: 3020, 4350, 6200, 3400, 2800, 3800, 3350, 6700, 5340, 3700, 4100, 9100, 4190, 3680, and 5300 cumecs. **06**

**OR**

- Q.4** (a) Write various possible treatments, their role and impact on watershed. **06**  
 (b) A watershed is characterized as follows: drainage area A of 320 acres; time of concentration  $t_c$  of less than the 3-hour rainfall duration; rational method runoff coefficient C of 0.40; CN of 74; rainfall erosivity factor R of 200; soil erodibility factor K of 0.38; topographic factor LS of 0.75; cover management factor C of 0.40; and erosion control practice factor P of 1.0. Determine the sediment yield to result from a storm with 2.5 inches of rain falling in 3.0 hours with an approximately uniform temporal and spatial variation. **06**

- Q.5** (a) Explain California method for flood frequency analysis. **06**  
 (b) Explain Snyder's method for Synthetic unit hydrograph. **06**

**OR**

- Q.5** (a) Explain channel routing by Muskingum method. **06**  
 (b) Define: Sub-watershed, Sink, Stream network, Pour point and HRU. **06**

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