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**CE-602 (GS)****B.E. VI Semester**

Examination, December 2017

**Grading System (GS)****Water Resources and Irrigation Engineering**

Time : Three Hours

Maximum Marks : 70

**Note:** i) Attempt any five questions.

ii) All questions carry equal marks.

1. The base period, intensity of irrigation and duty of various crops under a canal system are given in the table below. Find the reservoir capacities if the canal losses are 20% and reservoir losses are 12%.

| Crop       | Base period (days) | Duty at field (Hectares /cumecs) | Area under the crop (Hectares) |
|------------|--------------------|----------------------------------|--------------------------------|
| Wheat      | 120                | 1800                             | 4800                           |
| Sugarcane  | 360                | 800                              | 5600                           |
| Cotton     | 200                | 1400                             | 2400                           |
| Rice       | 120                | 900                              | 3200                           |
| Vegetables | 120                | 700                              | 1400                           |

2. Define duty and delta of water. Derive the relation between them. Discuss the methods of improving duty.
3. A well of 30cm diameter fully penetrates a confined aquifer of thickness 20m.
- Calculate the discharge from the well if the drawdown is 4m. Take the radius of influence as 300m, and  $k = 60\text{m/day}$ .
  - Calculate the percent decrease in discharge if another indential well is drilled at a distance of 100m and the drawdown at the well remains the same.

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4. What are the various classifications of wells? Describe a dug well with the help of a neat sketch.
5. What are the different methods of estimating aerial mean rainfall over a catchment area? Explain any two methods in detail.
6. The rainfall rates for successive 30 minutes intervals upto 4 hours are given below. If the surface runoff is 3.6cm. Determine  $w$  and  $\phi$  index.

| Time (minutes)               | 0 | 30  | 60  | 90  | 120 | 150 | 180 | 210 | 240 |
|------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|
| Rainfall intensity (cm/hour) | 0 | 1.3 | 2.8 | 4.1 | 3.9 | 2.8 | 2.0 | 1.8 | 0.9 |

7. What is a canal fall? Why is it necessary? What are different systems of classification of fall?
8. Answer any four of the following:
- Describe permanent wilting point, field capacity and optimum moisture content with neat sketch.
  - State Darcy's law and its limitations.
  - What is unit hydrograph? Discuss its uses and limitations.
  - What do you understand by canal lining? What are its advantages?
  - Describe the limitations of flood frequency analysis.
  - Briefly explain the benefits of flood control.

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