b) State dupuits assumptions for obtaining general equations governing ground water flow. Derive an expression for the confined aquifer. How can the expression be used to evaluate the aquifer permeability? 7

Or

10. a) Explain followings: 7

i) Types of canal alignment

ii) Canal escapes

iii) Canal head regulator

b) Compare "Kennedy" and "Lacey's" silt theories and explain which theory is better. 7

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**Roll No** .....

# CE - 602

## B.E. VI Semester

Examination, June 2014

## Water Resources and Irrigation Engineering

***Time : Three Hours***



***Maximum Marks : 70***

*Note:* Attempt one full question from each unit. All full questions carry equal marks. Assume suitable data wherever necessary.

### Unit - I

1. a) Write down general expression for intensity duration relationship of rainfall? Explain the necessity for frequency analysis. 7

b) What is a S-curve hydrograph? How it is constructed and where it is used? 7

Or

2. a) In a typical 4 hours storm producing 50mm of excess rain from a basin, the following flows in the stream are recorded:

| Time in hours | Flow in cumec |
|---|---|
| 0 | 0.0 |
| 2 | 1.22 |
| 4 | 4.05 |
| 6 | 6.75 |
| 8 | 5.70 |
| 12 | 3.40 |
| 16 | 1.35 |
| 20 | 0.0 |

Plot the unit hydrograph of runoff for this storm. 7

b) Explain followings: 7

i) Infiltration indices

ii) Raingauge net works.



## Unit-II

3. a) Why ground water recharge is necessary? Explain in short, different methods of improving ground water storage. 7

b) Explain the phenomenon of water logging. What are their causes and how it is prevented? 7

Or

4. a) Define "flood frequency" and "return period". Explain in detail, any one method of flood frequency analysis. 7

b) Explain followings: 7

i) Hydraulics of wells under steady flow condition.

ii) Salt-efflorescence.

## Unit-III

5. a) In connection with water resource project planning- 7

i) What steps would you take for economical study?

ii) How would you control cost-benefit ratio, annual costs and capital recovery factor?

b) Explain followings: 7

i) Rain-water harvesting.

ii) Impact assessment of water resources projects.

Or



6. a) How linear programming approach is made applicable for water resources projects planning? 7

b) Describe in brief various investigations required for reservoir planning. 7



## Unit-IV

7. a) Define "Duty of water". What are the factors affecting duty of water and how duty of water is improved? 7

b) Explain in brief the followings: 7

i) Wilting coefficient

ii) Field capacity

iii) Crop ratio

Or

8. a) A field channel has culturable command area of 3000 hectares. The intensity of irrigation for gram is 30% and for wheat is 50%. Gram has a kor period of 18 days and kor depth of 12 cm, while wheat has a kor period of 15 days and a Kor depth of 15 cm. Calculate the discharge of the field channel. 7

b) What is meant by consumptive use of water? How it is determined? 7

## Unit-V

9. a) Design an irrigation canal to carry a discharge of 20 cumecs. Assume, N = 0.0225, m = 1, and B/D = 5.0 7