

**B.TECH SEM – VII (2007 COURSE) (CIVIL ENGG.) : WINTER -  
2017**

**SUBJECT : ENVIRONMENTAL & WATER RESOURCES ENGINEERING**

Day : **Monday**  
Date : **22/01/2018**

Time **02.30 PM** TO **05.30 PM**  
Max. Marks : **80**

**W-2017-2554**

**N.B.**

- 1) Q.1 and Q.5 are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Use of non-programmable calculator is allowed.
- 5) Assume suitable data if necessary.

**SECTION – I**

- Q.1**
- a) Explain with a neat sketch biological process involved in working of a trickling filter. **(05)**
  - b) Distinguish clearly between the working of an ‘Oxidation ditch’ and ‘Oxidation Pond’? **(05)**
  - c) What do you understand by digestion of sludge? **(04)**
- Q.2**
- a) Compare in a tabular form low rate and high rate tricking filter. **(06)**
  - b) What do you understand by :i) Recirculation ii) Sludge Volume Index **(07)**
- Q.3**
- a) Explain with a neat sketch ‘Algal bacterial symbiosis’. **(07)**
  - b) Explain the working principle, advantages and disadvantages of aerated lagoon. **(06)**
- Q.4**
- a) What is a septic tank? Comment on ‘disposal of septic tank effluent’. **(07)**
  - b) Mention the characteristics of waste from paper and pulp mill. Explain how you treat the waste water. **(06)**

**SECTION – II**

- Q.5**
- a) State applications of hydrology while planning water resources projects. **(05)**
  - b) Explain dilution method of stream flow measurement. **(05)**
  - c) Define duty and delta and derive relationship between them. **(04)**
- Q.6**
- a) State and explain various methods of estimation of average rainfall over a catchment area. **(06)**
  - b) State the factors affective evaporation and explain measurement of evaporation by evaporation pan. **(07)**

P.T.O.

**Q.7 a)** Explain physiographic and climatic factors affecting run off of a catchment area. **(05)**

**b)** Following are the ordinates of 2 hours unit hydrograph. **(08)**

Time (hr)	0	2	4	6	8	10	12	14	16	18	20	22
Ordinates of 2 hr. UH. m <sup>3</sup> /s	0	30	90	225	180	135	99	75	48	30	15	0

Derive the ordinates of 4 hr UH and the ordinates of flood hydrograph due to 3 cm rainfall excess in 4 hours. Assume a constant base flow of 12 cumec.

**Q.8 a)** Derive a discharge equation for well penetrating an unconfined aquifer under steady flow condition. **(06)**

**b)** Table below gives the base period, intensity of irrigation and duty of water for various crops under a canal system. Determine the reservoir capacity if culturable commanded area is 25,000 Ha. Canal losses are 25% and reservoir losses are 15%. **(07)**

Crop	Base Period Days	Duty of water at the field Ha/cumec	Intensity of irrigation
Wheat	120	1600	25%
Sugar cane	360	800	15%
Rice	120	800	20%
Vegetables	120	1000	15%
Pulses	120	800	15%

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