

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH
BRANCH: CIVIL

SEMESTER : VI
SESSION : SP/2024

SUBJECT: CE302 WATER RESOURCES ENGINEERING

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

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- Q.1(a) List out various practical applications of hydrology. [5] 1 2
- Q.1(b) At a given instant, a river reach of length 10 km and the water spread area of 8 km² has the storage of 25.5 ha-m. What would be the storage in the reach after 6 hrs if inflow and outflow are 16.2 m³/s and 11.3 m³/s respectively and evaporation rate during the period is 0.1mm/hr. Neglect other losses. [5] 1 5
- Q.2(a) Describe physiographic factors affecting flood hydrograph. [5] 2 3
- Q.2(b) A storm with 20 cm of precipitation produced a direct runoff of 11.6 cm. the duration of the rainfall was 16 hours, and its time distribution is given below: [5] 2 4
- | | | | | | | | | | |
|--------------------------|-----|-----|-----|-----|------|------|------|------|------|
| Time from start (h) | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
| Cumulative Rainfall (cm) | 0.0 | 0.8 | 2.6 | 5.6 | 10.2 | 13.8 | 17.0 | 19.0 | 20.0 |
- Estimate the ϕ -index of the storm.
- Q.3(a) Describe inundation method of irrigation along with its merits and demerits. [5] 3 2
- Q.3(b) A channel carrying 2.5 cumecs of water is able to command 1500 hectares of culturable land. The Intensity of irrigation is 55% and the base period for the crop is 130 days. In another system, the channel carrying 0.60 cumecs irrigates 270 hectares of land. Here also the base period is 130 days. Compare duties of the two systems. [5] 3 4
- Q.4(a) Design an irrigation channel to carry 40 cumecs of discharge. The channel is to be laid at slope of 1 in 5000. The critical velocity ratio for the soil is 0.9. Use Kutter's rugosity coefficient as 0.023. [5] 4 4
- Q.4(b) What is meant by 'Water Logging'? what precautions & measures should be taken to prevent water logging of irrigated lands? [5] 4 3
- Q.5(a) Describe the different storage zones of a reservoir with the help of a neat sketch. [2] 5 2
- Q.5(b) The mean monthly discharge (X100 Cumec) of a river is as given below: [8] 5 5
- | | | | | | | | | | | | | |
|------|----|----|----|----|-----|----|----|----|----|----|----|----|
| Year | J | F | M | A | M | J | J | A | S | O | N | D |
| 1956 | 25 | 22 | 14 | 8 | 6.5 | 19 | 28 | 54 | 44 | 32 | 29 | 31 |
| 1957 | 30 | 25 | 18 | 12 | 10 | 25 | 39 | 60 | 51 | 32 | 29 | 32 |
- Determine the storage requirement of a planned reservoir to meet a constant demand of 200 m³/s.

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