Total No. of Questions – [6]

Total No. of Printed Pages: 1

| G.R. No. | |
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Q.P. code- P122-221 PSE/ESE

# May 2022 / INSEM+ENDSEM

## F. Y. M. TECH. (WREE) (SEMESTER – II)

## COURSE NAME: Open Channel Hydraulics

## COURSE CODE: CVPA12201

## (PATTERN 2020)

Time: [3 Hours] [Max. Marks: 60]

**(*) Instructions to candidates:**

1) **All Questions are compulsory**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1 a A most economical trapezoidal channel has side slopes equal to 3 (H):4 (V) and bed slope of 1 in 2500. Find the optimum dimensions if it is to carry a discharge of 0.6 m3/s. Assume C=75 6

b A rectangular channel is to carry a certain discharge at critical depth. If the section is to have a minimum perimeter show that yc= 3B/4 4

Q.2 a In a rectangular horizontal channel a hydraulic jump occurs such that the depths before jump and after the jump are 0.5 m and 1.2 m respectively. Find the critical depth 6

b Discuss hydraulic jump in a gradually expanding channel 4

Q.3 a A river 100 m wide and 3.0 m deep has an average bed slope of 0.0005. Estimate the length of GVF profile produced by a low dam which raises the water surface just upstream if it by 1.50 m. Assume n = 0.035. Take 4 steps. 10

Q.4 a Show that a uniformly discharging side weir can be obtained by linear reduction in the area of flow. 4

b Classify bottom racks in four categories. Draw spatially varied flow profiles for flow over bottom rack 6

Q.5 a Derive equation for velocity and discharge for a dam break problem 4

b Derive continuity equation for gradually varied unsteady flow 6

Q.6 Route the following flood through a river reach for which K=12 h and X=0.2. At the start of the inflow the outflow discharge is 10 $m^3/s$. Plot the inflow and outflow hydrograph 10

| Time (h) | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|
| Inflow m3/s | 10 | 20 | 50 | 60 | 55 | 45 | 35 | 27 | 20 | 15 |