Total No. of Questions : 8]

SEAT No. :

P4529

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M.E. (Civil) (Water resources and Environmental Engineering)
OPEN CHANNEL HYDRAULICS
(2012 Course) (501609) (Semester-II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of logarithms tables, slide rule, Mollier charts, electronic pocket calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION-I

Q1) a) A discharge of 20 m^3/s flows in a rectangular channel 10 m wide set to a slope of 10^{-4}. Find the normal depth of flow if n=0.012 **[8]**

b) Define conveyance, second hydraulic exponent, normal depth, critical depth in relation with open channel flow. **[8]**

Q2) a) Write in detail about control of jump by abrupt rise in bed. **[8]**

b) Derive relation between conjugate depths for a sloping channel. **[8]**

Q3) a) Integrate the dynamic equation of GVF by Chow's method and derive equation for distance between two sections across a profile. **[8]**

b) Explain M_2, S_1 and A_2 profile with a neat sketch. **[8]**

P.T.O.

Q4) Write short notes on (any three) **[18]**

a) Assumptions involved in the analysis of GVF.

b) Characteristics of hydraulic jump on sloping floor.

c) Relation between Manning's 'n' and Chezy's C.

d) Velocity distribution in open channel.

SECTION-II

Q5) a) What is spatially varied flow? Explain its different types with sketches. State the assumptions made for deriving the dynamic equation for spatially varied flow. **[8]**

b) Derive De-Marchi equation for side weirs. **[8]**

Q6) a) Explain method of characteristics for flood routing. **[6]**

b) Route the following flood through a reach for which K=12 h and x=0.2. At t=0 the outflow discharge is 10 m^3/s. Use Muskingum method **[12]**

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

Q7) a) Derive dynamic equation of monoclonal rising wave. **[8]**

b) A rectangular channel 3 m wide has a flow of 3.6m^3/s with a velocity of 0.8m/s. If a sudden release of additional flow at upstream end of the channel causes the depth to rise by 50% determine the absolute velocity of resulting surge and new flow rate. **[8]**

Q8) Write short notes on **[16]**

a) Assumptions made in deriving equation for spatially varied flow Pwith increasing discharge.

b) Bottom rocks.

c) Dam break problem.

d) Solitary wave.

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