[4860]-1052

M.E. (Civil) (Water Resources and Environmental Engg.)
OPEN CHANNEL HYDRAULICS
(2013 Credit Pattern)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) *Answer any five questions.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of logarithmic tables, slide rule, electronics pocket calculator is allowed.*
5) *Assume suitable data if necessary.*

Q1) a) Show that maximum velocity in a circular channel happens when $y/D = 0.8$ 1. **[6]**

b) Explain the characteristics of M_1 profile and state one example of its occurrence. **[4]**

Q2) a) Derive Chezy's formula. Also derive relation between Chezy's 'C' and Manning's 'n'. **[5]**

b) Explain method of direct integration for gradually varied profile computation. **[5]**

Q3) a) Classify hydraulic jump using the Froud No. Draw the sketch of each jump and state the energy dissipation possible. **[4]**

b) A triangular channel has a side slope of 1:1 and longitudinal slope of 1/1000. Determine whether the channel is mild, steep or critical when discharge of $0.25 m^3/s$ flows through it. Take Manning's n = 0.0 15. Also state for which range of depths the flow will be in Zone 1, Zone 2 and Zone3. **[6]**

Q4) a) State applications of hydraulic jump. **[2]**

   b) A rectangular channel 20 m wide flow with normal depth of 2 m with a slope of bed 1 in 6400. At a certain section, the flow depth is 3 m. How far upstream or downstream of this section will the depth be 2.6 m. Use step method and take only two steps. Take Manning's coefficient = 0.015. Sketch and mention the profile. **[8]**

Q5) a) Derive De Marchi equation for side weir. **[6]**

   b) Write short note on solitary wave. **[4]**

Q6) a) Classify the SVF profiles. **[4]**

   b) Derive dynamic equation of uniformly progressive wave. **[6]**

Q7) a) Write in brief about alluvial channel bed forms. **[4]**

   b) Discuss the development of Muskingum method of flood routing stating the equations and algorithm. **[6]**

Q8) a) Derive Rouse equation for suspended bed load. **[6]**

   b) Explain method of characteristics for flood routing. **[4]**

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