

01255

B.Tech-VIEP CIVIL ENGINEERING

Term-End Examination

June, 2012

**BICE-025 : HYDRAULICS AND HYDRAULIC
MACHINES**

Time : 3 Hours

Maximum Marks : 70

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- Note :**
- (i) *Answer to be written in English only.*
 - (ii) *Answer any seven questions.*
 - (iii) *Non-programmable calculator allowed.*
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- 1. (a) Give difference between open channel flow and pipe flow. 4
- (b) Discuss Manning formula for discharge through open channel. Also what are the influencing factors of Manning's 'n' ? 6
- 2. A trapezoidal channel has side slop $1\frac{1}{2} : 3$ i.e. 10
(vertical ; Horizontal). It is discharging water at the rate of 20 cumec with a bed slope 1 in 2000. Design the channel for most efficient section. Use Manning's formula. Take $N = 0.01$.

3. Show that for a wide rectangular channel the critical depth is given by $Y_c = \left[\frac{q^2}{g} \right]^{1/3}$, when q is the discharge per unit width of the channel. Also prove that critical depth is equal to one and a half times minimum specific energy. **10**
4. A rectangular channel 6 m wide discharges 1440 litre of water into a 6 m wide apron, with no slope, with a mean velocity of 6 m/s. What is the height of the jump ? How much energy is absorbed in the jump ? **10**
5. Define Hydraulic jump ? Derive formula of loss of Energy due to hydraulic jump for non uniform stream flow. **10**
6. (a) Discuss the condition which may lead to the formation of surge waves in open channel. **5+5**
 (b) Write brief descriptions of streaming flow, critical flow and shooting flow in open channel.
7. The over all efficiency of a Pelton wheel is 86% when the power developed is 500 KW under a head of 80 m. **10**
 If the co-efficient of velocity for the nozzle is 0.97. Find the diameter of the nozzle.

8. Obtain an expression for the hydraulic efficiency **10**
for a Francis Turbine having velocity of flow
through runner as constant, and having radial
discharge at outlet. Guide blade angle is α and
runner vane angle is θ .
9. Write short notes on : **5x2=10**
- (a) Different Efficiencies of Impulse Turbine.
 - (b) Derive conditions of most efficient channel
section of Rectangular.
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