

Seat No.	
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**S.E. (Civil) (Part - II) (Semester - IV) Examination, April - 2016**  
**FLUID MECHANICS - II (Revised)**  
**Sub. Code : 63347**

Day and Date : Sunday, 24 - 04 - 2016

Total Marks : 100

Time : 10.30 a.m. to 01.30 p.m.

- Instructions :
- 1) Question No.1 and No. 5 are compulsory.
  - 2) Out of remaining attempt any two questions from each section.
  - 3) Figures to the right indicate full marks.
  - 4) Assume suitable data if necessary and state it clearly.

**SECTION-I**

**Q1) Attempt all the following: [4×5=20]**

- a) It is required to excavate a canal of rectangular section out of rock to bring  $15\text{m}^3/\text{sec}$  of water. From a distance of 6.4 km with a mean velocity of  $2.25\text{m}/\text{sec}$ . Determine the most suitable section for the channel and its gradient. Take Manning's  $n=0.02$ .
- b) A trapezoidal channel with side slopes of 2H:1V has to carry a discharge of  $20\text{m}^3/\text{sec}$ . if the bottom width is 4m. calculate the bottom slope required to maintain a uniform flow at a depth 1.5m. Take Manning's  $n=0.015$ .
- c) What do you understand by critical, supercritical and sub critical flow in channel section.
- d) State the conditions under which the rectangular section of an open channel will be most economical. Derive these conditions.

**Q2) a) Write a note on [8]**

$M_3$  curve and  $C_3$  curve

**P.T.O.**

- b) Show that for G.V.F. in a wide rectangular channel.

[7]

$$\frac{dy}{dx} = S_0 \frac{1 - \left(\frac{yn}{y}\right)^{\frac{10}{3}}}{1 - \left(\frac{yc}{y}\right)^3}$$

Q3) Write a note on.

- a) "Classification of water surface profiles". [8]  
 b) Show that in hydraulic jump loss of energy. [7]

$$\Delta E = \frac{(y_2 - y_1)^3}{4y_1y_2}$$

Q4) Write detail note on.

[3×5=15]

- a) Types of hydraulic jump.  
 b) Specific energy curve  
 c) Assumption made for SVF with increasing discharge

### SECTION-II

Q5) Write a note on

[4×5=20]

- a) Classification of weir  
 b) Priming of centrifugal pump  
 c) Advantages of hydro-electric plants  
 d) Classification of centrifugal pump

- Q6)** a) What is Board Crested Weir? Derive formula for its discharge. [7]  
b) Explain the terms. [8]  
i) End contractions  
ii) Velocity of approach in weir or notch.
- Q7)** a) A 75 mm diameter jet having a velocity of 30m/sec strikes a flat plate the normal of which is inclined at  $45^\circ$  to the axis of the jet. Find the normal pressure on the plate. [8]  
i) When the plate is stationary  
ii) When the plate is moving with a velocity of 15 m/sec and away from the jet. Also determine power and efficiency.  
b) What are different component parts of a centrifugal pump? Explain their function with a neat sketch. [7]
- Q8)** a) Write a short note on efficiency of centrifugal pump.  
b) What is turbine? How are they classified.  
c) Distinguish between impulse turbines and reaction turbines.

[3×5=15]

