

**B.TECH SEM – V (2007 COURSE) (CIVIL ENGG.) : WINTER -  
2017**

**SUBJECT : FLUID MECHANICS – II**

Day : **Thursday**  
Date : **18/01/2018**

Time : **02.30 PM TO 05.30 PM**  
Max. Marks : **80**

**W-2017-2452**

**N.B.**

- 1) Q.1 and Q.5 are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Use of non-programmable calculator is allowed.
- 5) Assume suitable data if necessary and state it clearly.

**SECTION – I**

- Q.1**
- a) What are factors affecting Manning's roughness coefficient? **(05)**
  - b) What are basic assumptions in Gradually Varied Flow? **(05)**
  - c) What are practical applications of Hydraulic Jump? **(04)**
- Q. 2**
- a) What is most efficient channel section in Rectangular Channel? **(06)**
  - b) Determine most economical section of rectangular channel carrying water at rate of  $0.5 \text{ m}^3/\text{sec}$ . Bed slope of channel being 1 in 2000. Take Chezy's constant  $C = 55$  **(07)**
- Q. 3**
- a) Derive differential equation of Gradually Varied Flow. **(06)**
  - b) Explain with neat sketch Mild Slope profiles. **(07)**
- Q.4**
- a) What are assumptions in theory of Hydraulic Jump? **(06)**
  - b) Explain the procedure for location of Hydraulic jump. **(07)**

**SECTION – II**

- Q.5**
- a) What is specific speed of Centrifugal Pump? **(05)**
  - b) What are functions of Draft Tube? **(05)**
  - c) What are assumptions made in rigid column theory? **(04)**
- Q. 6**
- a) What is Water Hammer? **(06)**
  - b) A jet of water having velocity  $2 \text{ m/s}$  strikes a curved plate tangentially, moving with velocity of  $0.75 \text{ m/s}$  in the direction of jet. The vane is so shaped that, the jet is deflected through  $135^\circ$ . The diameter of jet is  $50 \text{ mm}$ . Assuming vane to be smooth find force exerted by jet on the vane and power exerted on vane. **(07)**
- Q. 7**
- a) What are cavitations in turbine? State effects and methods to avoid cavitations. **(06)**
  - b) Find diameter of wheel and diameter of jet and number of jets required for Pelton Wheel with following data. Jet ratio 12, Power out put  $7000 \text{ kW}$ ,  $C_v = 0.98$ , Speed ratio  $0.46$ , Overall efficiency  $90\%$ . Head =  $320 \text{ m}$ ,  $N = 850 \text{ rpm}$  **(07)**
- Q. 8**
- a) What is Mechanical Efficiency and Overall Efficiency of a Pump **(06)**
  - b) It is required to deliver  $0.045 \text{ m}^3/\text{sec}$  of water at height of  $25 \text{ m}$  through a  $125 \text{ mm}$  diameter pipe which is  $120 \text{ m}$  long. If overall efficiency of pump is  $75\%$  and coefficient of friction for pipe is  $0.01$  find power required to drive the pump. **(07)**

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