

B.Tech Sem – V (2007 Course) (Civil Engg.) : SUMMER - 2019

SUBJECT: FLUID MECHANICS-II

Day: Tuesday
Date: 14/05/2019

S-2019-3060

Time: 10.00 AM TO 01.00 PM
Max Marks: 80

N.B.:

- 1) **Q.No.1 and Q. No.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 **SAME** answer books.
- 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 conditions for rectangular channel to be hydraulically most efficient? **(05)**
b) Derive $\frac{dy}{dx} = \frac{S_o - S_f}{1 - Fr^2}$ in case of G.V.F. **(05)**
c) What are assumptions in theory of hydraulic jump? **(04)**
- Q.2** a) Find rate of flow for rectangular channel 6m wide and depth of flow is 1.5m. **(07)**
The channel is having bed slop of in 5000. Take Manning constant $\frac{1}{n} = 50$.
b) What is specific energy curve? **(06)**
- Q.3** a) Draw a neat diagram showing profiles on mild slope. **(07)**
b) Write steps for direct step method. **(06)**
- Q.4** a) What is skin friction drag and pressure drag. **(06)**
b) A flat plate 1.5m x 1.5m moves at 5m/s normal to its plane find resistance to **(07)**
its motion when,
i) plate moves through air
ii) plate moves through water
 $C_d = 1.1$ and $\rho_{air} = 1.2 \text{ kg/m}^3$, $\rho_{water} = 1000 \text{ kg/m}^3$

SECTION-II

- Q.5** a) What is monometric efficiency and volumetric efficiency of centrifugal pump? **(05)**
b) What are gross head and net head in case of turbine? **(05)**
c) What is water hammer phenomenon? **(04)**
- Q.6** a) Show what for under shot wheel maximum efficiency is 50%. **(06)**
b) A jet of water 10 cm in dia. moves at velocity 20m/s and strikes normally on **(07)**
series of flat plates fixed on periphery of wheel. Due to impact, the wheel
rotates at 900 rpm. Calculate,
i) Force exerted by jet on plate ii) Work done on the plate.
- Q.7** a) Explain with help of neat sketch working of a centrifugal of pump. **(06)**
b) What is importance of priming in centrifugal pump? **(07)**
- Q.8** a) State functions of a draft tube in case of reaction turbine. **(06)**
b) Following data pertains to a Pelton wheel, **(07)**
i) Head -60m ii) $N=200 \text{ rpm}$ iii) overall efficiency =85%
iv) Shaft power 125 kw v) Velocity of bucket 0.45 times velocity of jet
vi) Coefficient of velocity =0.98. Find diameter of the jet, diameter of wheel,
width & depth of bucket.

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