

Roll No.

24196

B. Tech Civil Eng 4th Sem. (Civil Engg.)

Examination – May, 2012

FLUID MECHANISM-II

Paper : CE-204-F

Time : Three hours]

[Maximum Marks : 100

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complain in this regard, will be entertained after examination.

Note : Attempt *five* questions. Each question carries equal marks. Question no. **1** is *compulsory*. Attempt *one* question from each Section.

1. Short notes :

10 × 2 = 20

- (i) Branching of pipes.
- (ii) Transmission of power through pipelines.
- (iii) Uniform flow.
- (iv) Efficient channel section.

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- (v) Brink depth analysis.
- (vi) Specific speed & unit quantities.
- (vii) Draft tube theory.
- (viii) Cavitations & drag on a flat plate.
- (ix) Priming.
- (x) Coefficient of discharge & slip.

SECTION – A

2. (a) Derive equation for sudden expansion and contraction in pipe. 10
- (b) What do you understand by Water Hammer? Derive equation for Water Hammer under quick closure condition. 10
3. Power is to be transmitted hydraulically to an accumulator at a distance of 8 KM by means of a number of 100 mm pipes laid horizontally, for which the coefficient of friction may be taken as 0.03. The pressure at the accumulator is maintained constant at 6524 Kn/m^2 . Determine the minimum number of pipes required to ensure an efficiency of at least 92 percent when the power delivered is 162 Kw. Also determine the maximum power that can be transmitted in this case. 20

SECTION - B

4. Water flows at a uniform depth of 2m in a trapezoidal channel having a bottom width 6m, side slope 2 horizontal to 1 vertical if it has to carry a discharge of $65 \text{ m}^3 / \text{sec}$, compute the bottom slope required to be provided. Take manning's $n = 0.025$. 20

5. Explain gradually varied flow. Show

$$\frac{dy}{dx} = \frac{S_0 - S_f}{1 - \frac{\phi^2 T}{gA}} \quad 20$$

SECTION - C

6. (a) What is meant by cavitation ? What is Thoma's cavitations factor, and what its significance for water turbine ? 10

- (b) Explain performance of characteristic curve of turbine :

(i) Pelton wheel turbine

(ii) Reaction turbine 10

7. Experiment were conducted in a wind tunnel with a wind speed of 50 km/h on a flat plate of size 2m long and 1m wide. The specific weight of air is 11.282 N/m^3 . The plate is kept at such an angle that the coefficients of lift and drag are 0.75 & 0.15

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respectively. Determine (I) lift (II) Drag (III) resultant force (IV) power (V) power exerted by the air stream on the plate. 20

SECTION – D

8. A pump operates at a maximum efficiency of 82 percent and delivers $2.25 \text{ m}^3/\text{sec}$ under a head of 18 m while running at 3600 rpm speed. Compute the specific speed of the pump. Also determine the discharge, head and power input to pump at a shaft speed of 2400 rpm cite the assumption made, if any. 20
9. (a) Explain working principle of Reciprocating Pump with sketches. 10
- (b) Explain function of air vessel in reciprocating pump. 5
- (c) Why is a reciprocating pump called positive displacement pump ? 5