B. Tech. 4th Semester Civil Engg. F Scheme

Examination, May–2014

FLUID MECHANICS–II

Paper–CE-204-E

Time allowed : 3 hours]   [Maximum marks : 100

Note : (i) Attempt five questions in all.

 (ii) **Question No. 1 is compulsory.**

 (iii) Attempt **one** question from each section.

 (iv) All questions carry equal marks.

1. Write short notes on any *ten* of the following :

 (i) Turbulent Flow

 (ii) Water Hammer

 (iii) Non-uniform Flow

 (iv) Surge in open channel

 (v) Critical depth velocity

 (vi) Impulse turbine

 (vii) Speed Regulation

 (viii) Type of Drag

 (ix) Air vessals

 (x) Total head in pumps

(xi) Shut off head

(xii) Syphon.   10×2=20

Section–A

2. (a) Explain pipe in series and parallel with diagram with expression.   10

   (b) Derive an equation for velocity distribution for turbulent flow in pipe.   10

3. Water is pumped through a 600 mm diameter pipe with a head loss of 20m. It is intended to reduce the power consumption by laying another parallel pipe of appropriate diameter laid by the side of the existing pipe line with the same overall length and the same friction factor by reducing the head loss to 10m, but still delivering the same discharge jointly through both pipes. What should be the diameter of the additional pipe ?   20

Section–B

4. A channel carries a discharge of 5 cumec with a flow depth of 1m. The side slopes are 1 : 1 and bed slope 1 in 3520. Find bed width and its velocity. The value of

Chezy's constant C for this channel for different values of hydralic radius R are as tabulated below :　　20

Hydraulic Radius R	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4
Chezy's C	34	35	37	38	39	40	41	41

5. (a) Derive the condition for most economical rectangular section (channel).　　10

   (b) Explain classification of surface profiles.　　10

Section–C

6. A pipe line 1200 m long supplies water to three single jet of pelton wheels. The head above the nozzles is 360m. The velocity coefficient for the nozzle is 0.98 and coefficient of friction for the pipe line is 0.2. The turbine efficiency based on the head at the nozzle is 0.85. The specific speed of each turbine is 15.3 (in m, kW, rpm units) and the head lost due to friction in the pipe line is 12m of water. The operating speed of each turbine is 560 rpm, determine :

   (i) The total power developed

   (ii) Diameter of each nozzle

   (iii) Diameter of pipe line

   (iv) Volume of water used per sec.　　20

7. (a) What is cavitation and their effects and how it can be presented ?   10

   (b) Explain characteristics curves of reaction turbine.   10

Section–D

8. Explain various type of centrifugal pumps and also their principle of working.   20

9. Explain different types of reciprocating pump and derive expression for their work done.   20