17452

21415

3 Hours / 100 Marks **Seat No.** | | | | | | | | |

Instructions : (1) All Questions are *compulsory*.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-Programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Solve any FIVE : **20**

(a) Differentiate between idea fluid and real fluid.

(b) A liquid weighs 30 kN and occupies 7.5 m^3. Find its specific weight, mass density and specific gravity.

(c) (i) Define pressure and state its S.I. unit.

(ii) State Pascal's Law.

(d) Define steady and unsteady flow. Give practical example of each.

(e) State minor losses with expressions.

(f) Define Froude's number. State its significance to decide various types of flow.

(g) Differentiate between volute casing and vortex casing.

2. Solve any TWO : **16**

(a) Explain with a neat sketch the working of Bourdon's pressure gauge.

(b) (i) A venturimeter fitted in pipe of dia. 30 cm and has throat dia. 10 cm. If the manometer reading is 6 cm, find discharge through pipe. Take $C_d = 0.98$.

(ii) Differentiate between Orifice and Notches.

(c) (i) What is meant by Moody's diagram ? State its uses.

(ii) A rectangular channel with base width 8 m has bed slope 1 : 1000 and depth of flow 5 m. Find the discharge through the channel, if Chezy's constant C = 50.

3. Solve any TWO : **16**

(a) (i) State Bernoulli's theorem and state the assumptions made in it.

(ii) A horizontal pipe carrying water tapers from 20 cm dia. of A to 10 cm dia. at B in a length of 2 m. The pressure at A is 10 N/cm^2. If the discharge is 600 lit/min, calculate the pressure at B in N/cm^2. Neglect losses.

(b) Explain the term water hammer in pipes. State the effects of water hammer and remedial measures to be taken for it.

(c) Define hydraulic jump. State its uses.

4. Solve any TWO : **16**

(a) Three pipes A, B, C are connected in series with following details :

Pipe	Dia. (cm)	Length (m)
A	45.0	800
B	37.5	500
C	30.0	250

Find the diameter of equivalent pipe to replace the compound pipe, keeping the total length unchanged.

(b) Define

(i) Hydraulic radius

(ii) Wetted area

(iii) Wetted perimeter

(iv) Prismatic channel section

(c) (i) State the factors on which selection of pump depends.

(ii) What is cavitation ?

5. Solve any TWO : **16**

(a) Define and write S.I. units of

(i) Mass density

(ii) Weight density

(iii) Surface tension

(iv) Dynamic viscosity

(b) (i) Define hydraulic coefficients of orifice. State relationship between them.

(ii) Determine the discharge through 60° triangular notch when the surface level is kept constant at a height of 200 mm.

Assume $C_d = 0.6$

(c) (i) Explain working principles of any two special pumps.

(ii) Define slip and state negative and positive slip.

6. Solve any TWO : **16**

(a) A circular plate 3 m in dia. is immersed in water, such that greatest and least depth below free surface of water are 4.5 m and 2 m respectively. Determine total hydrostatic pressure on disc.

(b) Draw a neat sketch of centrifugal pump showing its component parts.

(c) Explain with neat sketch the working of single acting reciprocating pump.

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