

17426

16172

3 Hours / 100 Marks

Seat No.

--	--	--	--	--	--	--	--	--

- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any SIX :

12

- (a) Define absolute viscosity and kinematic viscosity.
- (b) Calculate friction factor when Reynold's number is 15000.
- (c) Draw the diagram of four types of pipe fittings.
- (d) State the significance of Reynold's number.
- (e) Give the classifications of pumps.
- (f) Distinguish between laminar flow and turbulent flow.
- (g) Define vacuum.

- (B) Attempt any TWO :** **8**
- (a) Derive the equation of continuity.
 - (b) Draw the diagram of Gate valve.
 - (c) Distinguish between positive displacement pump and centrifugal pump.
(4 points)
- 2. Attempt any FOUR :** **16**
- (a) Draw the diagram of well type and inclined tube manometer.
 - (b) Explain briefly the characteristics curves of centrifugal pump with diagram.
 - (c) Distinguish between Diaphragm valve and Ball valve.
 - (d) Derive Hagen Poiseuille's equation.
 - (e) Explain the construction of a centrifugal pump.
 - (f) Explain the significance of terms used in Bernoulli's equation.
- 3. Attempt any FOUR :** **16**
- (a) State and explain Newton's law of viscosity.
 - (b) Give industrial applications of blower and compressor.
 - (c) Draw the diagram of rupture disc and explain its working.
 - (d) Distinguish between variable head meter and variable area meter.
 - (e) Derive the equation for calculating NPSH.
 - (f) Distinguish between Newtonians and non-Newtonians fluids.

4. Attempt any FOUR :**16**

- (a) A simple U tube manometer is installed across a pipeline. The manometer fluid is mercury (Sp. gravity 13.6) and flowing fluid is CCl_4 (sp. gravity 1.6). Manometer reads 175 mm. What is the pressure difference over the manometer in N/m^2 ?
- (b) Draw the diagram of rotameter. Write construction and working of rotameter.
- (c) Write the formula to calculate frictional loss due to sudden contraction and explain the terms involved in it.
- (d) Give the specific applications of tee, elbow, cross and plug.
- (e) Explain :
 - (i) air binding
 - (ii) priming
- (f) Draw the diagram of gear pump and screw pump.

5. Attempt any TWO :**16**

- (a) Derive the equation to calculate volumetric flow rate using venturimeter.
- (b) Fluid is to be pumped at a rate of $1.5 \text{ m}^3/\text{min}$ through a 50 mm id, 100 m long pipe. Density of the fluid is 1050 kg/m^3 and kinematic viscosity of the fluid is $2.35 \times 10^{-6} \text{ m}^2/\text{s}$. What is the pressure drop in the pipe ?
- (c) With the help of a diagram, explain working of double acting reciprocating pump.

P.T.O.

6. Attempt any TWO :**16**

- (a) Derive the Bernoulli's equation.
 - (b) Draw the diagram of steam jet ejector. Give its applications.
 - (c) Toluene is flowing at a rate of 12 lit/sec through a 3 cm diameter pipe. Density of toluene is 870 kg/m^3 . Calculate
 - (i) 'Q' in m^3/sec
 - (ii) 'M' in kg/sec
 - (iii) 'U' in m/sec
 - (iv) 'G' in $\text{kg}/\text{m}^2 \text{ sec}$
-