22445

12425

03 Hours / 70 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. Attempt any FIVE of the following : **10**

a) List out the various fluid pressure measuring devices.

b) The pressure in the tyres of four wheeler was measured as 33. State the unit of the pressure in this case. Name the device used to measure this pressure.

c) Define the following terms.

i) Steady and unsteady flow

ii) Uniform and non-uniform flow

d) State any four minor losses.

e) State the necessity of draft tube for every reaction turbine. (Any two)

f) Write Chezy's equation for frictional losses and explain all the terms involved in it.

g) Define priming in pump. State any two methods of priming.

Marks

2. Attempt any THREE of the following : **12**

a) Draw neat sketch of Bourdon tube pressure gauge and state any two advantages of it.

b) Describe with sketch, construction and working principle of venturimeter.

c) A horizontal jet of water is delivered under and effective head of 25 m. Calculate diameter of jet, if the force exerted by the jet on a vertical fixed plate is 2.22 KN. Take coefficient of velocity as 0.99.

d) Explain velocity triangle diagram for the jet striking tangentially at the tips of a moving an unsymmetrical curved vanes.

3. Attempt any THREE of the following : **12**

a) A venturimeter is installed in a pipeline of 30 cm diameter, the difference of pressure at entrance and throat read by mercury manometer is 5 cm. When the water flows at a rate of 0.05 m^3 sec. If the discharge coefficient of meter is 0.96, determine the diameter of throat.

b) Explain the causes of water Hammer in pipes and how its effects can reduce.

c) Compare Francis turbine with Kaplan turbine.

d) Define submersible pump and jet pump with one application.

Marks

4. Attempt any THREE of the following : **12**

a) Explain the working of double acting Reciprocating pump with neat sketch.

b) Draw and explain performance characteristic curve of pelton turbine.

c) A jet of water 10 cm diameter strikes on a flat plate with a velocity of 20 m/s. The plate is moving with a velocity of 10 m/s in the direction of jet and away from the jet. Find the efficiency of jet.

d) Explain the terms hydraulic gradient and total energy lines with diagram.

e) Explain Bernoulli's theorem with sketch. State its assumptions.

5. Attempt any TWO of the following : **12**

a) Explain the construction and working of Francis turbine with neat sketch.

b) A centrifugal pump delivers water against a net head of 14.5 m and a design speed of 1000 rpm. The vanes are curved back at an angle of 30° with periphery. The impeller diameter is 300 mm and outlet width is 50 mm. Determine the discharge of the pump and power required to drive the pump if manometric efficiency is 95% and overall efficiency is 90%.

c) Derive equation for discharge through orifice meter with the help of neat sketch.

6. Attempt any TWO of the following : **12**

a) Centrifugal pump not delivering water, give at least three reasons and remedies.

b) Compare between impulse turbine and reaction turbine (At least six points)

c) Find the maximum power that can be transmitted by a power station though a hydraulic pipe 3 km long and 0.2 m diameter. The pressure at the power station is 60 bars. Take f = 0.0075.