

**April 2018****Time - Three hours**  
**(Maximum Marks: 75)**

**IN.B: (1) Q.No. 8 in PART - A and Q.No. 16 in PART - B are compulsory.**  
**Answer any FOUR questions from the remaining in each PART - A and PART - B**

**(2) Answer division (a) or division (b) of each question in PART - C.**

**(3) Each question carries 2 marks in PART - A, 3 marks in Part - B and 10 marks in PART - C.]**

**PART - A**

1. Define: Specific volume.
2. Define: Pressure head of a liquid.
3. What is meant by stream line?
4. List out the minor energy losses.
5. A jet of water 0.25m diameter is moving with a velocity of 30m/sec. Find the force exerted by the jet on a fixed plate held normal to the jet.
6. List few machines using hydraulic intensifiers.
7. What is the use of quick exhaust valve?
8. What is meant by cavitations.

**PART - B**

9. Express 125kN/m<sup>2</sup> of pressure in 'm' of water and 'mm' of mercury.
10. What are the assumptions of Bernoulli's theorem?
11. Compare piston pump and plunger pump.
12. Explain quick exhaust valve.
13. Describe with a sketch about external gear pump.
14. What are the advantages of mechanical gauges?
15. Water flows with a velocity of 5m/sec. in a pipe of 1m diameter and 1km long. Find Chezy's constant, if the loss of head due to friction is 10m of water.
16. Explain shuttle valve with a neat sketch.

**PART - C**

17. (a) State Pascal's law. Give any two examples where this principle is applied.

(Or)

- (b) A simple U-tube mercury manometer is used to measure the pressure of water in a pipeline. The mercury level in the open tube is 70mm higher than that on the left tube. The height of water in the left tube is 50mm. Find the pressure in the pipe in (a) metre of water (b) kN/m<sup>2</sup>.

18. (a) A 10cm diameter orifice fitted to a tank discharges 2.34m<sup>3</sup>/min of water under a constant head of 3m. The diameter of the jet at vena-contracta is found to be 8.25cm. Find  $C_d$ ,  $C_v$  and  $C_c$ .

(Or)

- (b) Two reservoirs are connected by a pipe line of length 500m. The difference in water level between the reservoirs is 10m. The maximum discharge is 20m<sup>3</sup>/sec. Find the required size of the pipe, if the co-efficient of friction is 0.02.

19. (a) State the types of surge tank. Draw a neat sketch of any two types and explain their working principles.

(Or)

- (b) Explain with a neat sketch about the construction and working of air vessel.

20. (a) Explain the working principle of a pressure reducing valve with a neat sketch.

(Or)

- (b) Draw a pneumatic circuit diagram for the direct control of single acting cylinder and explain.

21. (a) Explain about the different types of directional control valves with neat sketches.

(Or)

- (b) Draw a hydraulic circuit of a shaping machine and explain its working.