



C16-M-402

**6447**

**BOARD DIPLOMA EXAMINATION, (C-16)**

**AUGUST/SEPTEMBER—2021**

**DME - FOURTH SEMESTER EXAMINATION**

**HYDRAULICS AND FLUID POWER CONTROL SYSTEMS**

*Time : 3 hours ]*

*[ Total Marks : 80*

**PART—A**

3×10=30

- Instructions :**
- (1) Answer **all** questions.
  - (2) Each question carries **three** marks.
  - (3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Calculate the mass density, specific weight and specific volume of a fluid having specific gravity 0.8.
2. Write any three limitations of Bernoulli's theorem.
3. Define HGL and TEL.
4. Derive an expression for the force exerted by water jet on a fixed vertical plate.
5. Define specific speed of a turbine.
6. What is negative slip? When it happens in reciprocating pumps?
7. List the basic components of OH power system in a hydraulic circuit.
8. Distinguish between hydraulics and pneumatics.
9. List any six areas of application of pneumatic power systems.
10. State the functions of filter.

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## PART—B

10×5=50

- Instructions :** (1) Answer *any five* questions.  
(2) Each question carries **ten** marks.  
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. Explain how pressure is measured by inverted U-tube differential manometer when different fluids flow through in two pipes.
12. The diameter of a pipe changes gradually from 150 mm at point A to 100 mm at point B which are situated at 20 m and 16 m respectively above the datum. The pressure at A is  $0.2 \text{ N/mm}^2$  and velocity of flow at A is 1.1 m/sec. Neglecting the losses between A and B, determine the pressure at B in bars.
13. Water flows through a pipe of 200 mm diameter and 60 m long with velocity of 2.5 m/sec. Find the loss of head due to friction by using the following :
- (a) Darcy's formula,  $f = 0.005$   
(b) Chezy's formula,  $C = 55$
14. A jet of water at 30 m/sec flows over a curved vane moving with a velocity of 10 m/sec. The jet makes an angle of  $23^\circ$  at inlet with the direction of motion of vane and  $130^\circ$  while leaving. Determine (a) blade angles at inlet and outlet, (b) work done per kg of water and (c) efficiency.
15. Describe the working of Kaplan turbine with neat sketch.
16. A single acting single cylinder reciprocating pump has a plunger diameter 600 mm, stroke 360 mm, speed 75 r.p.m., static lift 12 m and discharge 6872 lt/min. Determine (a) coefficient of discharge, (b) slip and (c) power required, if pump efficiency is 80%.
- \* 17. Explain the working of pressure compensated flow control valve.
18. Describe the working of lubricator with neat sketch.

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