# 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.

**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 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° at inlet with the direction of motion of vane and 130° 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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