



C16-M-402

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BOARD DIPLOMA EXAMINATION, (C-16)

OCTOBER—2020

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. Differentiate between compressible and incompressible fluids.
2. Define Reynolds number and mention its significance.
3. List out various minor energy losses in pipe flows.
4. Find the force exerted by water jet with diameter 20 mm, moving with 25 m/sec strikes normally on a fixed vertical plate.
5. What is draft tube? Why it is used in reaction turbine?
6. List out main components of centrifugal pump.
7. State the functions of flow control valve.
8. Write any three advantages of positive displacement pumps.
9. List out various types of pneumatic actuators.
10. State the functions of lubricator.

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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 the criteria for valuation are the content but not the length of the answer.

**11.** Two plates are placed at a distance of 0.15 mm. The lower plate is fixed, the upper plate having surface area  $2 \text{ m}^2$  is pulled at 0.5 m/sec. Find the force and power required to maintain this speed, if the fluid between these two plates having viscosity 1.5 poise.

**12.** Explain the working of current meter with a neat sketch.

**13.** A compound piping system consists of 1800 m length of 0.5 m diameter, 1200 m length of 0.4 m diameter and 600 m length of 0.3 m diameter. Pipes are connected in series.

(a) Determine the equivalent length of 0.4 m diameter of pipe.

(b) Determine the equivalent diameter for 3600 m long pipe.

**14.** A jet of water with 50 mm diameter moving with a velocity of 12 m/sec impinges on a series of vanes moving with a velocity of 8 m/sec. Determine—

(a) force on the plate;

(b) work done per sec;

(c) efficiency.

**15.** A Pelton wheel having semi-circular buckets and working under a head 140 m is running at 600 r.p.m. The discharge through the nozzle is 50 lt/sec and diameter of wheel is 60 cm. Find—

(a) power available at nozzle;

(b) hydraulic efficiency if  $c_v = 0.98$ .

Assume bucket angle at outlet  $\phi = 20^\circ$ .

**16.** Describe multistage pump with—

(a) impellers in parallel;

(b) impellers in series.

- \* **17.** Explain the functions of the components of hydraulic circuit with neat sketch.
- 18.** Describe the working of pressure regulator with neat sketch.

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