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C16-M–402

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BOARD DIPLOMA EXAMINATION, (C-16)

JANUARY/FEBRUARY—2022

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. Define the following :

(a) Absolute pressure

(b) Gauge pressure

2. Define the following :

(a) Laminar flow

(b) Turbulent flow

3. If a pipe of length 300 m and diameter 230 mm with $f = 0{\cdot}017$ is to be replaced by 180 mm diameter pipe with $f = 0{\cdot}02$ to carry same discharge and for same loss of head, what length has to be provided.

4. A jet of water of 50 mm diameter strikes a flat stationary plate normally with a velocity 30 m/s. Find the force exerted by the jet on plate.

5. Compare Francis turbine with Kaplan turbine.

6. Compare centrifugal pumps with reciprocating pumps.

7. Give the classification of Hydraulic Actuators.

8. State the various applications of Hydraulic press.

9. State any six differences between hydraulic and pneumatic power systems.

10. List the various types of seals used in Pneumatic actuators.

PART—B

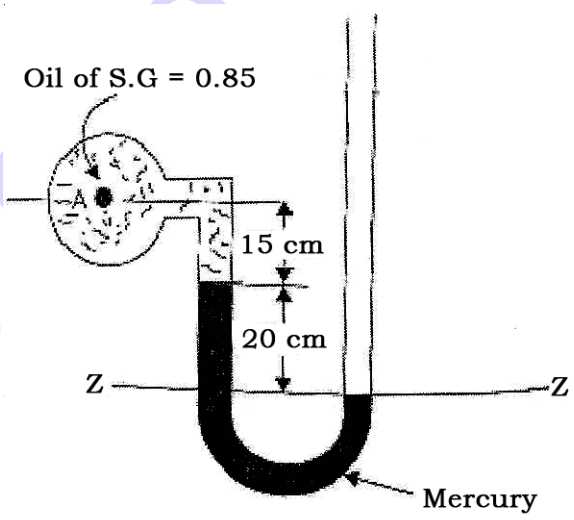
10×5=50

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. A simple manometer containing mercury is connected to pipe in which an oil of specific gravity 0·85 is flowing as shown in the figure. Determine the absolute and gauge pressure in the pipe.



12. A pipe 300 m long has a slope of 1 in 100 taper from 1·5 m at the higher end to 0·75 m diameter at the lower end. The discharge of water through the pipe is 5500 litres/min. If the pressure at the higher end is 100 kPa, then find the pressure at the other end.

13. *(a)* Explain the function of Syphon Pipe with neat sketch. Metion its uses.

(b) Define and sketch graphically the following :

(i) Hydraulic Gradient Line

(ii) Total Energy Line

14. A jet of 100 mm diameter, moving with a velocity 25 m/s strikes a plate. Find the force exerted by the jet on the plate in the following cases :

(a) The plate is normal to the jet and moves with a velocity of 5 m/s in the direction of jet

(b) In the direction of jet and in the direction normal to plate when the plate is stationary and inclined at an angle 30° with the jet

15. Explain the working of Pelton Wheel with a neat sketch.

16. Explain the construction and working of Centrifugal Pump with a neat sketch.

17. With neat sketch explain the construction and working of pressure reducing valve.

18. With neat sketch explain the working of the basic components in a Pneumatic power system.

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