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C16-M-402

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BOARD DIPLOMA EXAMINATION, (C-16)
OCT/NOV—2018
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

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[*Contd...*

3. If a pipe of length 300 m and diameter 230 mm with $f = 0.017$ is to be replaced by 180 mm diameter pipe with $f = 0.02$ 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 the plate.
5. Give any three comparisons between Francis turbine and Kaplan turbine.
6. Give any three comparisons between centrifugal pumps and reciprocating pumps.
7. Give the classification of hydraulic actuators.
8. What is a flow control valve? State its functions.
9. Draw the layout of pneumatic circuit indicating the basic components.
10. Draw the symbols for the following :
 - (a) Air filter
 - (b) Lubricator

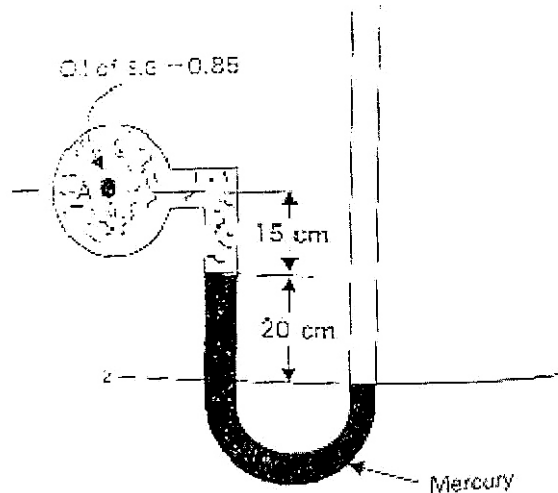
PART—B

10×5=50

- Instructions** : (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) The answers should be comprehensive and the 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 below.

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Determine the absolute pressure and gauge pressure in the pipe.



12. A pipe 300m long has a slope of 1 in 100 taper from 1.5 m diameter at the higher end to 0.75 m diameter at the lower end. The discharge of water through the pipe is 5500 litre/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. Mention its uses.

(b) Define and sketch the following graphically :

(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 a Francis turbine with a neat sketch.
16. Explain the construction and working of centrifugal pump with a neat sketch.
17. Explain the working of the following hydraulic actuators with neat sketch :
- (a) Double acting cylinder
 - (b) Telescopic cylinder
 - (c) Tandem cylinder
18. With a neat sketch explain the working of pressure regulator.

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