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BOARD DIPLOMA EXAMINATION
JUNE - 2019
DIPLOMA IN MECHANICAL ENGINEERING
HYDRAULICS AND FLUID POWER CONTROL SYSTEMS
FOURTH SEMESTER EXAMINATION

Time: 3 Hours **Total Marks: 80**

PART - A (3m x 10 = 30m)

Note 1:Answer all questions and each question carries 3 marks

2:Answers should be brief and straight to the point and shall not exceed 5 simple sentences

1. Define the terms a) viscosity b) surface tension
2. A glass tube with a 90^0 bend is open at both ends. It is inserted into a flowing stream of oil of specific gravity 0.90, so that, one opening is directed upstream and the other is directed upward. Oil inside the tube is 50 cm higher than the surface of flowing oil. What is the velocity measured by the tube? Take co-efficient of meter, c=1
3. Draw Hydraulic Gradient Line and Total Energy Line for an inclined pipe
4. A jet of water diameter 7.5 cm, moving with a velocity of 25 m/s strikes a fixed plate in such a way that the angle between the jet and plate is 60°. Find the force exerted by the jet,
   (i) In the direction normal to the plate, and
   (ii) In the direction of the jet
5. What is the need of governing of water turbines?
6. Write the differences between positive displacement and rotodynamic pumps?
7. State the functions of an oil reservoir in oil power hydraulic system.
8. Write the function of a check volume in a hydraulic circuit.
9. Write the classification of pneumatic seals used in pneumatic actuators.
10. Write the advantages of pneumatic system.

PART - B (10m x 5 = 50m)

Note 1:Answer any five questions and each carries 10 marks

2:The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

11. Explain the construction and working of Bourdon's pressure gauge with a neat sketch

12. A 15 m long pipe is inclined at an angle of 30^0 with the horizontal. The smaller section of the pipe is at lower level is 100 mm diameter and the larger section of the pipe is 300 mm diameter. Determine the difference of pressure between the two sections in N/m^2, if the pipe is uniformly tapering and the velocity of water at the smaller section is 2 m/sec

13. Two reservoirs are connected by a 5000m long and 1.5 m diameter C.I. pipe with f=0.01. The difference in water levels in two reservoirs is 25 m. determine the increase in discharge, if the C.I. pipe is replaced with a smooth steel pipe of same size with f=0.005

14. A jet of water of diameter 5 cm strikes a smooth half/vertical flate with a velocity of 15m/s. Determine the force exerted by the jet on the plate if the plate is at rest and if it moves in the direction of the jet with a velocity of 5 m/s. Also determine the work done in each case and the efficiency of jet in the second case.

15. A Kaplan turbine, operating under a head of 6 m develops 6500KW. The flow velocity is 6.5 m/s. The diameter of boss is 0.35 times that of the runner. The tangential velocity of the runner is 22 m/s. if the overall efficiency is 85%, find the diameter and rotational speed of the runner

16. The impeller of a centrifugal pump has outer diameter of 40 cm and inner diameter of 20 cm. the blade angle at outlet is 30^0. The speed of the impeller is 1450 rpm. The velocity of flow at inlet and outlet is same as 2.2 m/s. if the manometric efficiency is 75%, find a) the head developed b) absolute velocity at outlet c) blade angle at inlet

17. Explain the working of Four way Direction control valve

18. Write the essential elements of a Pneumatic system and state their functions.

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