*3506*

C09-M-406

# 3506

## BOARD DIPLOMA EXAMINATION, (C-09)
## OCTOBER/NOVEMBER-2018
## DME-FOURTH SEMESTER EXAMINATION

HYDRAULICS & FLUID POWER SYSTEMS

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

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### PART-A

3X10=30

***Instructions :***
1. Answer **All** questions.
2. Each question carries **Three** marks.
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. State any two differences between compressible and incompressible fluids.
2. State the Bernoulli's theorem and write the equation.
3. Write the equation for power transmission through pipes and mention what for each letter stands and state their units.
4. Derive the equation for the force applied at the fixed plate.
5. A turbine develops 600KW power. The net head available is 40cm. if the overall efficiency of the turbine is 0.8, what is the discharge through the turbine.
6. Why the blades of Pelton wheel are made as double hemi-spherical shape?
7. Define Manometric efficiency and mechanical efficiency of a centrifugal pump.
8. State the purpose of the following fluid reservoir elements.
   i. Air vent ii) Baffles.
9. List at least six elements of pneumatic system.
10. Briefly explain air controlled hydraulic valve.

## PART-B

10X5=50

***Instructions :***

1. Answer any **Five** questions
2. Each question carries **ten** marks.
3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Explain U-tube manometer with a sketch.
12. Petroleum oil (specific gravity = 0.9) and viscosity 13 centipoises flows through a horizontal 5 cm pipe. A pilot tube is inserted at the centre of pipe and its leads are filled with the same oil and attached to U tube containing mercury. The reading on the manometer is 10cm. Calculate (a) Velocity of oil in m/sec. (b) Volumetric flow in $m^3$/sec. the coefficient of pilot tube is 0.98.
13. A pipeline is connecting tow reservoirs. Its diameter is reduced by 15% over a length of time due to the deposition of sediments. For a given head difference in the reservoirs, what is the percent reduction in discharge? Assume friction factor remains same.
14. A 20cm diameter jet of water strikes a curved vane with a velocity of 30m/s. The inlet vane angle is zero and the outlet angle is $25^0$. Find the resultant force on the vane.
    i. When the vane is fixed
    ii. When the vane is moving with a velocity of 15m/s in the direction of jet.
15. Explain construction and working of pelton wheel with a sketch.
16. A single cylinder, single acting reciprocating pump has the following specifications
    Plunger diameter = 500mm
    Stroke = 300mm
    Static lift = 12m
    Speed = 12 rpm
    Discharge = 3357 lit/min, determine (a) Coefficient of discharge (b) Power required to drive the pump of efficiency is 85%.
17. Explain the following spool type director control valves. (a) Two way (b) Four way.
18. Explain the working principle of following pneumatic clamps with neat sketches
    i. Lever clamp
    ii. Toggle Clamp
    iii. Wedge clamp

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