C14-M-**405**

4481

BOARD DIPLOMA EXAMINATION, (C-14)

MARCH /APRIL-2019

DME - FOURTH SEMESTER EXAMINATION

FLUID MECHANICS & HYDRAULIC MACHINERY

Time: 3 Hours] [Max. Marks : 80

PART -A **3x10=30M**

Instructions: 1) Answer **all** the questions. Each question carries **Three** marks.

2) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1) Define (a) Incompressible fluid (b) Compressibility.

2) Calculate the density and weight of one litre of petrol of specific gravity 0.7.

3) Write any three differences between laminar from turbulent flows.

4) Define coefficient of contraction (C_c) for the folw through orifice.

5) Represent the hydraulic gradient line and total energy line for flow of liquid in a pipe graphically.

6) What is Syphone and state its function.

7) Write the expression for normal force exerted by the jet on stationary inclined flat plate.

8) State the function of following parts of pelton wheel turbine

(a) Runner (b) Casing.

9) Write the classification of hydraulic turbines according to the direction of flow of water in the runner.

10) State the uses of Air vessel in reciprocating pumps.

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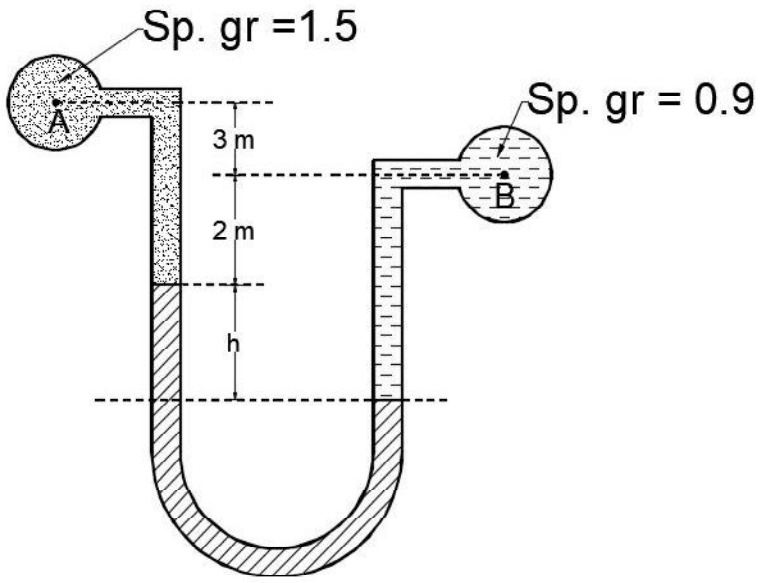
PART-B **10x5=50M**

Instructions: 1) Answer any **five** questions.

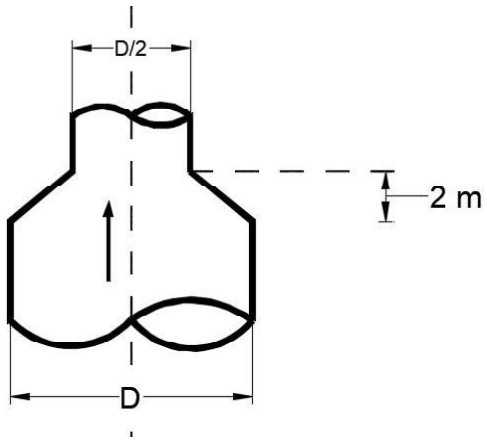
2) Each question carries **ten** marks.

3) Answers should be comprehensive and the critertion for valuation is the content but not the length of answer.

11) A differential manometer is connected at two points A and B of two pipes as shown in the fig. 1. The pipe A contains a liquid of Specific gravity 1.5, While pipe B contains a liquid of specific gravity 0.9. The pressures at A and B are 9.81 X 10^4 N/m^2 and 17.66 X 10^4 N/m^2 respectively. Find the difference in mercury level (h) in the differential manometer.



12) Water flows through a vertical contraction from a pipe of diameter 'd' to another pipe of diameter 'd/2' as shown in fig.2. The water velocity at inlet to contraction is 2 m/s and pressure is 200 KN/m2. If the height of contraction is 2 m. Find the pressure at the exit of contraction.



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13) Find the power transmitted through hydraulic pipe 1 Km long and 150 mm diameter discharging 0.1m^3/s of water. The pressure at the supply end (power station) is 6 N/mm^2 and coefficent of friction, f= 0.0075. Find also efficiency of transmission.

14) A jet of water of diameer 10 cm strikes a flat plate normally with a velocity of 15 m/s. The plate os moving with a velocity os 6 m/s in the direction of the jet and away from the jet. Find

(a) Force exerted by the jet on the plate. 4+3+3=10M
(b) Work done by the jet on the plate per second.
(c) Efficiency of the jet.

15) (a) Derive an expression for the normal force and work done by jet on a inclined plate moving in the direction of jet. 5M

(b) What is a draft tube? Why it is sued in a reaction turbine? 5M

16) Explain the construction details and working of Francis Turbine with a neat sketch.

17) A double acting single cylinder reciprocating pump has the following specifications: 4+3+3=10M
Cylinder diameter = 200mm, Stroke = 300mm,
Gross height to which water is lifted = 20m,
Speed = 40 rpm
Determine :
(a) Theoretical Discharge
(b) Theoretical power required to drive the pump
(c) Coefficient of discharge and Slip, if the actual discharge is 12litres/sec.

18) Explain the working of submersible pump with a neat sketch. Write the applications. 6+4=10M

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