Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – December 2022

Programme Name: B Tech (ME)

Semester: III

Subject Code: UG11T4303

Subject Name: Fluid mechanics

Date: 14.12.2022	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions

(i) All Sections (A, B & C) are to be attempted.
(ii) Options, if any, are specified in respective section.

Section A

Ten MCQs/Fill in the Blanks/ True or False(T/F) of 01 Mark each – Choose the correct answer for MCQ(only write the option a/b/c/d) or Fill with correct answer or Mark (T/F), as applicable. All Questions compulsory.

1. For full flow which type of valve are used?
   a) gate valve b) globe valve c) butterfly valve d) relief valve

2. Bilge system on ship have SDNR valve (T/F).

3. Application of bernoullis equation to which of following measuring device is correct?

   a) Venturimeter b) orifice meter c) pitot tube d) all of the above.

4. Manometric head is defined as head against which _____ pump has to work.
   a) Centrifugal b) Receprocating c) Rotary d) piston

5. Which among the following is main part/parts of centrifugal pump?
   a) Impeller b) Casing c) Suction pipe d) All of the above

6. Ratio of head imparted by impeller to water to manometric head is manometric efficiency. (T/F)

7. Mechanical efficiency is ratio of power available at shaft to the power available at impeller (T/F).

8. Overall efficiency is ratio of power output of pump to power input (T/F).

9. Vortex casing is circular chamber introduce between the casing and the impeller (T/F).

10. The sum of suction head and delivery head is known as static head (T/F).

Section B

Five Questions of 02 Marks each. All Questions compulsory.

11 What are assumptions of Bernoulli's equation?

12. Define Newtonian fluid and Non Newtonian fluid?

13 What is purpose and application of quick closing valve?

14. Define kinematic viscosity and reynolds number?

15. Define mass density and specific gravity?

Section C

Seven questions of 10 Marks each of which any 05 questions to be answered. All sub-questions, if any, carry equal marks.

16. a) Define absolute pressure, gauge pressure, vacuum pressure and pressure at a point in a fluid?

b) A hydraulic press has a ram of 20 cm diameter and a plunger of 3 cm diameter. It is used for lifting a weight of 30 kN. Find the force required at the plunger.

17. A centrifugal pump delivers water against a net head of 14.5 meter and a design speed of 1000 r.p.m. The vanes are curved back to an angel of 30° with the periphery. The impeller diameter is 300 mm and outlet width is 50 mm. Determine the discharge of the pump if manometric efficiency is 95%.

18.a) Define volumetric efficiency ,mechanical efficiency, overall efficiency ,manometric efficiency of centrifugal pump .

b) Explain the features of globe and gate valve and sketch the globe valve?

19.Explain venturimeter? and derive expression for rate of flow through venturimeter?

20.

(a) Define rate of flow through pipe and explain continuity equation with diagram of fluid flow through pipe?

(b) Diameters of a pipe at the sections 1 and 2 are 10cm and 15cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is m/s. Determine also the velocity at section 2.

21. a) What is hydraulic lift ? Explain its types?

b) Explain in brief what is priming and cavitation in centrifugal pump ?

22. In a 100 mm diameter horizontal pipe a venturimeter of 0.5 contraction ratio has been fixed. The head of water on the meter when there is no flow is 3 m(gauge) . Find the rate of flow Take atmospheric pressure head = 10.3 m of water.

Sir,

With reference to the UG11T4303 - Fluid Mechanics exam on 14.12.2022 (FN). It is stated that for Q No 20 (b) under section C, the velocity of water flowing through the pipe at section 1 may be assumed as **5 m/s**.

Please advise the students who are attempting this question to clearly state their assumption at the commencement of the answer.

This is for your information and necessary action please.

Thanks & Regards,

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