

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (AE) (2018 Batch) (Sem.-3)
FLUID MECHANICS AND FLUID MACHINES
Subject Code : BTAE303-18
M.Code : 76401

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A**Answer briefly :**

1. What is Friction Factor?
2. State the assumptions of Bernoulli's equation.
3. Explain the phenomena of capillarity.
4. What is a Continuum? Is Air a continuum?
5. Define the following and give one practical example for each: Laminar flow, Turbulent Flow, Unsteady Flow and Uniform flow.
6. What is the difference between 'Pump' and 'Turbine'?
7. State the conditions of Equilibrium of a floating body.
8. What do you mean by ideal and real fluids?
9. Distinguish between steady and unsteady flow.
10. Define Compressible Flow.

SECTION-B

11. Derive continuity equation for a three dimensional steady or unsteady flows in cartesian coordinate system.
12. A centrifugal pump delivers $1.27 \text{ m}^3/\text{minute}$ at 1200 rpm. The impeller dia is 35 cm and breadth at outlet is 12.7 mm. the pressure difference between inlet and outlet of the pump casing is 272 KN/m^2 . Calculate impeller exit blade angle if manometric efficiency is 63%.
13. In a steady flow, the velocity components are: $u = 2kx$; $v = ky$ and $w = -4kz$. Find the equation of streamline passing through the point (1,0,1).
14. Show that the Pelton turbine is low specific speed turbine.
15. A jet 8 cm dia at 20 m/sec strikes a curved vane moving at 7 m/sec. the vanes are arranged such that each vane appear before the jet in the same position at the same velocity. The jet is deflected through 160° . Find the efficiency of the system.

SECTION-C

16. With the help of a neat diagram explain the working principle of centrifugal pump.
17. What is the difference, between axial radial and mixed flow turbine?
18. A Kaplan turbine is to be designed to develop 7357.5 KW shaft power. The available head is 5.5 m assume speed ratio 2.09, flow ratio 0.68 and overall efficiency is 60 %. The BOSS diameter is 1/3rd of the runner diameter. Find diameter of the runner and speed of turbine.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.