

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, B.Tech. (D.T.)

Semester	: I (V Dean)	Academic Year	: 2023-2024
Course No.	: DE-102	Course Title	: Fluid Mechanics
Credits	: 3 (2+1)	Total Marks	: 50
Day & Date	: Thursday; 07/03/2023	Time	: 2.00 hrs.

- Note : 1) All questions from Section 'A' are compulsory.
2) Solve Any Three questions from Section 'B'.
3) Draw neat and well labelled diagram wherever necessary.

SECTION - 'A'

Q. 1 A) Choose the most appropriate answer from the options given below. (05)

- i) Friction factor for laminar flow is given by
 - a) $Re/64$
 - b) $Re/16$
 - c) $64/Re$
 - d) $16/Re$
- ii) Loss of head due to friction is
 - a) Directly proportional to hydraulic radius
 - b) Inversely proportional to velocity
 - c) Inversely proportional to hydraulic radius
 - d) Directly proportional to gravitational constant
- iii) Pressure drop in the following flow measuring devices remains constant irrespective of the rate of flow
 - a) Venturimeter
 - b) Orifice meter
 - c) Rotometer
 - d) None of these
- iv) Which one of the following is the dimension of specific gravity of a liquid?
 - a) $[M^1 L^{-3} T^0]$
 - b) $[M^1 L^0 T^0]$
 - c) $[M^0 L^{-3} T^0]$
 - d) $[M^0 L^0 T^0]$
- v) Pump converts mechanical energy into
 - a) Pressure energy only
 - b) Pressure and kinetic energy
 - c) Kinetic energy only
 - d) Potential energy

B) Match the following. (05)

Coloumn 'A'

- i) SI unit of Dynamic viscosity
- ii) 1 Pa s
- iii) Specific volume
- iv) Manometer
- v) Euler's number

Coloumn 'B'

- a) Inertial force ÷ Pressure force
- b) Pressure measurement
- c) Pascal second (Pa.s)
- d) 100 cP
- e) $1 \div (\text{Mass Density})$

Q. 2 A) Give the formulae for the following. (05)

- i) Friction factor for laminar flow
- ii) Absolute pressure
- iii) Head Loss at the exit of a pipe
- iv) Total head according to Bernoulli's theorem
- v) Reynold's number

P.T.O.

- B) State whether True or False. If false, rewrite the statement after making necessary corrections. (05)
- i) Capillary rise increases with the increase in diameter of tube.
 - ii) Viscosity of gases decreases with the increase in temperature.
 - iii) Priming of centrifugal pumps is done to reduce friction losses.
 - iv) Ideal fluid has no viscosity, incompressible and no surface tension.
 - v) The continuity equation is derived from the law of conservation of fluid.

SECTION –‘B’

- Q. 3 A) Define Buckingham's Π theorem for dimensionless numbers and explain with an example. (05)
- B) With a neat sketch explain the working principle of a centrifugal pump. (05)
- Q. 4 A) Calculate the specific weight, density and weight of one litre of milk of specific gravity is 1.029. (05)
- B) Explain hydraulic coefficients. (05)
- Q. 5 A) Define and explain Froude's number, Euler's number and Reynold's number. (03)
- B) Explain the working principle of venturimeter with a neat sketch. (03)
- C) A pipe contains an oil of specific gravity 0.89. A differential manometer connected at the two points A and B shows a difference in mercury level as 18 cm. Find the difference of pressure at the two points. (04)
- Q. 6 A) State the different types of losses in pipe flow. (03)
- B) Define Newtonian and Non-Newtonian fluids. Write examples. (03)
- C) Distinguish between manometers and mechanical gauges. (04)
- Q. 7 Write the classification of manometers with neat sketches. (10)
