

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMEISTER END THEORY EXAMINATION, B. Tech. Dairy Technology 2019-20

Semester	: I (New Syllabus)	Academic Year	: 2019-2020
Course No.	: DE-103	Course Title	: Fluid Mechanics
Credits	: 2+1=3	Total Marks	: 50
Day & Date	: Friday, 10.01.2020	Time	: 11.00 to 13.00 Hrs.

- Note :** 1) Section "A" is Compulsory.
2) Solve **Any five** questions from Section "B".
3) The use of scientific tables, charts and calculator is allowed in case of engineering courses.

SECTION - 'A'

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

- i) The discharge of Q in M-L-T system would be
 - a) LT^{-1}
 - b) L^3T^{-1}
 - c) $ML^{-1}T^{-2}$
 - d) $ML^{-1}T^{-2}$
- ii) The tendency of a fluid to uplift a submerged body, because of the upward thrust of the fluid is known as
 - a) Buoyancy
 - b) Gravitational force
 - c) Drag
 - d) None of these
- iii) The falling drop of water becomes sphere due to
 - a) Surface tension of water
 - b) Compressibility of water
 - c) Viscosity of water
 - d) Capillarity of water
- iv) A U-tube manometer is used to measure
 - a) Positive pressure
 - b) Negative pressure
 - c) Atmospheric pressure
 - d) Both a) and b)
- v) The loss of head due to sudden enlargement in a pipeline is equal to
 - a) $(v_1-v_2)/2g$
 - b) $(v_1-v_2)^2/2g$
 - c) $(v_1^2-v_2^2)/2g$
 - d) $(v_1^2+v_2^2)/2g$

B) Do as directed. (05)

- i) State the function of "Tee Joint"
- ii) State relation between Absolute Pressure, Gauge Pressure and Atmospheric Pressure
- iii) Define Coefficient of velocity
- iv) Define manometric efficiency of a centrifugal pump
- v) Define Viscosity

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

- i) Euler's number
- ii) Continuity equation
- iii) Chezy's formula for discharge through an open channel
- iv) Loss of head due to friction according to Darcy's formula
- v) Bernoulli's equation

(P.T.O.)

B) Define

- i) Orifice
- ii) Potential Energy
- iii) Dimensionless Number
- iv) Pump
- v) Nappe

SECTION – 'B'

- Q.3 Derive an expression for discharge through orifice meter (06)
- Q.4 With neat sketch explain construction and working of differential manometer. (06)
- Q.5 A 63 mm diameter pipe carrying liquid at the rate of $10 \text{ m}^3/\text{h}$ bifurcates into 22 mm diameter and 31 mm diameter pipes. If the velocity of the liquid through 22 mm diameter pipe is 4 m/s, find the discharge through another pipe. (06)
- Q.6
- a) Write down the continuity equation with units of various terms. (02)
 - b) Prove that Reynold's number is a dimensionless quantity. (02)
 - c) Find the discharge from a 100 mm diameter pipe carrying water at the velocity 4 m/s. (02)
- Q.7
- a) Give the comparison of centrifugal and reciprocating pumps. (03)
 - b) Draw the diagram of rotameter and discuss its working in brief. (03)
- Q.8
- a) Give the various types of head losses in fluid flow. (02)
 - b) Explain the term "Specific weight". Give its dimension in S.I. system. (02)
 - c) A jet of water issues from an orifice of diameter 20 mm under a head of 1 m. What is the coefficient of discharge for the orifice, if actual discharge is 0.85 litres/second. (02)
- Q.9
- a) Enlist the efficiencies of centrifugal pump. (02)
 - b) Explain the working of reciprocating pump with neat diagrammatic representation. (04)
