PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.TECH MID SEM EXAMINATION 2022-23

SUBJECT NAME (CODE): FFM (203101215)　　　　　BRANCH: Aeronautical

DATE: 05/08/2022　　　　TIME: 02:30 TO 04:00 PM　　　TOTAL MARKS: 40

Sr. No.	Marks

Q.1 (A) Compulsory Question (5 MCQ)　　　　　　　　　　　　　　　05

1. The magnitude of the buoyant force can be determined by
   a) Newton's second law of motion
   b) Archimedes principles
   c) Principle of moments
   d) None

2. The term _____ means the study of pressure exerted by a fluid at rest.
   a) Hydrostatics
   b) Fluid Mechanics
   c) Continuum
   d) Kinetics

3. In which of the following measuring devices Bernoulli's equation is used
   a) Venturimeter
   b) Orificemeter
   c) Pitot tube
   d) All

4. The Bourdon tubes are generally made of
   a) Copper
   b) Tin
   c) Mild steel
   d) Bronze or nickel steel

5. The value of bulk modulus of elasticity _____ with increase of pressure.
   a) Increases
   b) decreases
   c) either of above
   d) None

(B) Compulsory Question (5 Fill in the Blanks)　　　　　　　　　　05

1. The piezo metric head is the summation of _____.

2. Velocity head is given by _____ .

3. "The intensity of pressure at any point in a liquid at rest is the same in all directions." The above statement is known as _____ .

4. _____ possesses no definite volume and is compressible.

5. The path followed by fluid particle in motion are called a _____ .

Q.2   Attempt any four(Short Questions)   12

   (1) Define the following heads:
     (i)   Potential head
     (ii) Velocity head
     (iii) Datum head

   (2) Define the following terms:
     (i)   Total Pressure, and
     (ii)   Centre of pressure

   (3) A weight of 100kN is moved through a distance of 8 m across the deck of a pontoon of 7500kN displacement floating in water. This makes a pendulum 2.5 m long to move through 120mm horizontally. Calculate the metacentric height of the pontoon.

   (4) Explain briefly the following:
     (i) Surface tension
     (ii) Compressibility.

   (5) Explain Pathline and Streamline.

Q.3   Attempt any two   08

   (1) A rectangular plate 3m long and 1 m wide is immersed vertically in water in such a way that its 3 m side is parallel to the water surface and is 1m below it. Find (i) Total pressure on the plate and (ii) Position of center of pressure.

   (2) Define and explain Velocity potential.

   (3) Define and explain Stream function.

Q.4 (A) In a two-dimensional incompressible flow, the fluid velocity components are given by u = x - 4y and v = -y – 4x. Show that velocity potential exists and determine its form as well as stream function. (Compulsory)   05

   (B) Derive Bernoulli's Equation.   05

                                        OR

   (B) Derive Euler's Equation of motion.   05