

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII • EXAMINATION – WINTER • 2014****Subject Code: 170301****Date: 25-11-2014****Subject Name: Biomechanics****Time: 10:30 am - 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Define: **07**
- | | |
|-----------------|-------------------------------|
| 1. Buoyancy | 5. Viscosity |
| 2. Vorticity | 6. Residual Stress and Strain |
| 3. Homogeneity | 7. Thixotropic Fluid |
| 4. Inelasticity | 8. Incompressibility |
- (b)** Blood is Newtonian or Non-Newtonian fluid? Give proper justification. **07**
- Q.2 (a)** Draw and explain electrical model of blood flow mechanics. **07**
- (b)** Define heat transfer from a black body. Explain the modes of heat transfer briefly. **07**
- OR**
- (b)** Enlist modes of mass transfer. Explain any three in detail with necessary figures. **07**
- Q.3 (a)** Explain the stiffness & Mechanical Strength of musculoskeletal system of human. **07**
- (b)** Explain the control of body pressure by baroreceptors. **07**
- OR**
- Q.3 (a)** Derive equations for skeletal muscle stress and strain characteristics. **07**
- (b)** Draw and explain graphs of below listed parameters with respect to cardiac cycle. **07**
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|-------------------------|-----------------------|
| 1. Aortic Pressure | 4. Ventricular Volume |
| 2. Atrial Pressure | 5. Electrocardiogram |
| 3. Ventricular Pressure | 6. Heart Sound |
- Q.4 (a)** Explain the method of accelerometry & electrogoniometry for analysis of GAIT motion. **07**
- (b)** Define friction. Describe Solid and Fluid friction with appropriate diagrams. **07**
- OR**
- Q.4 (a)** Draw and explain Joint moments & Power during locomotion. **07**
- (b)** Write a note on turbulence effect. **07**
- Q.5 (a)** What do you mean by Fatigue Failure of Bone? Suggest the methods to overcome it. **07**
- (b)** Write a note on structural and material properties of bone. **07**
- OR**
- Q.5 (a)** Describe the axial, flexural, torsional load sharing by total hip prosthesis and femur in detail. **07**
- (b)** Write a note on structural and material properties of Articular Cartilages. **07**
