Seat No.: _____ Enrolment No._____

# 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
2. Vorticity
3. Homogeneity
4. Inelasticity
5. Viscocity
6. Residual Stress and Strain
7. Thixotropic Fluid
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 muscule stress and strain characteristics. **07**

**(b)** Draw and explain graphs of below listed parameters with respect to cardiac cycle. **07**

1. Aortic Pressure
2. Atrial Pressure
3. Ventricular Pressure
4. Ventricular Volume
5. Electrocardiogram
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**

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