

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII • EXAMINATION – SUMMER • 2014****Subject Code: 170301****Date: 22-05-2014****Subject Name: Biomechanics****Time: 02:30 pm - 05:00 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 Vorticity and Viscoelasticity of fluid. Explain their importance in fluid mechanics. **07**

(b) Draw necessary graphs of Joint moments & Power during locomotion. **07**

Q.2 (a) Draw & briefly explain the spring-mass model. **07**

(b) Define heat transfer and explain all modes of heat transfer with appropriate equations. **07**

OR

(b) Explain the intrinsic mechanical properties of the fluid. **07**

Q.3 (a) What is haematology? Briefly describe the elements of blood. **07**

(b) Briefly explain axial, flexural, torsional load sharing by total hip prosthesis and femur. **07**

OR

Q.3 (a) Explain variations in bending stiffness of bone plates with thickness. **07**

(b) Draw and explain GRF graphs during human walking and running. **07**

Q.4 (a) Explain the different characteristics of UHMWPE. **07**

(b) Draw & explain the inverted pendulum model. **07**

OR

Q.4 (a) Enlist and explain the different techniques of Motion analysis. **07**

(b) Give a difference of Hysteresis loop for Thixotropic Fluid (Blood) & Newtonian Fluid. **07**

Q.5 (a) Explain behavior of solid and fluids with example and appropriate equations. **07**

(b) Explain basic determinations of myocardial stress and strain characteristics. **07**

OR

Q.5 (a) Derive equations for muscular stress and strain characteristics. **07**

(b) Write a short note on dynamic electromyography for analysis of locomotion. **07**
