Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 170301 **Date: 12/12/2015**

Subject Name: Biomechanics

Time: 10:30am to 1:00pm **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)**	Write a comparative note on the kinetic energy (scalar) and momentum (vector) with appropriate examples.	**07**
	(b)	Explain below mechanical characteristics of muscle. 1.Force–Velocity Relationship 2. Force–Length Relationship 3. Force–Time Relationship	**07**
Q.2	**(a)**	Explain the instrumentation of force platform. Describe the procedure to measure various forces.	**07**
	(b)	Explain various mechanical properties of fluid acting along the wall of artery during blood flow.	**07**
		OR	
	(b)	Describe the viscoelastic behavior of bone using Boltzmann superposition integral.	**07**
Q.3	**(a)**	Describe the material properties of Tendon and Ligament.	**07**
	(b)	Explain the principal of sphygmomanometer with supplementary examples.	**07**
		OR	
Q.3	**(a)**	Write a short note on cardiac cycle with necessary sketches.	**07**
	(b)	Explain the dynamic behaviors of solid and fluids with example and appropriate equations.	**07**
Q.4	**(a)**	Explain Rigidity & Wear with appropriate examples.	**07**
	(b)	Describe the heat transfer through heat insulator. What materials could be used as insulators?	**07**
		OR	
Q.4	**(a)**	Explain mathematical model of bioheat transfer.	**07**
	(b)	Draw & briefly explain the Inverted Pendulum model.	**07**
Q.5	**(a)**	Draw and explain the GAIT postures during human walking.	**07**
	(b)	What is branching? Describe the laminar & turbulent flow in blood vessels.	**07**
		OR	
Q.5	**(a)**	Describe variations in bending stiffness of bone plates with thickness.	**07**
	(b)	Explain the Extrinsic & Intrinsic mechanical properties of fluid in detail.	**07**

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