Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- VIIth SEMESTER–EXAMINATION – MAY/JUNE- 2012

Subject code: 170301 **Date: 24/05/2012**

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)**	Explain three mechanical characteristics of muscle. 1. Force–Velocity Relationship 2. Force–Length Relationship 3. Force–Time Relationship	**07**
	(b)	Compare the kinetic energy (scalar) and momentum (vector) with necessary examples.	**07**
Q.2	**(a)**	Describe the stiffness & Mechanical Strength of musculoskeletal system of human.	**07**
	(b)	Explain Ground Reaction Forces acting along the ankle during human running with necessary graphs.	**07**
		OR	
	(b)	Give a brief description to the uses of composite materials for prosthesis.	**07**
Q.3	**(a)**	What are the different techniques used for Analysis of Motion?	**07**
	(b)	Explain the mechanical properties acting along the wall of artery during blood flow.	**07**
		OR	
Q.3	**(a)**	Briefly explain the joint moments & Power during locomotion of human.	**07**
	(b)	Draw & explain the pressure changes at aortic valve during heart cycle.	**07**
Q.4	**(a)**	What is dynamic electromyography (EMG)? Explain the use of this method for GAIT analysis.	**07**
	(b)	"Bone is a viscoelastic material". Justify the statement with proper equations.	**07**
		OR	
Q.4	**(a)**	Define Buoyancy of fluid & what is its importance in fluid mechanics?	**07**
	(b)	What is Inertia? Explain the contact forces acting along the mass inertia.	**07**
Q.5	**(a)**	Explain the intrinsic mechanical properties of fluid.	**07**
	(b)	What is the turbulence effect? Explain the applicability in aerodynamics.	**07**
		OR	
Q.5	**(a)**	Describe the heat transfer through heat insulator. What materials could be used as insulators?	**07**
	(b)	What is the fundamental principle of displacement of mass? Give an example of mass transfer.	**07**

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