Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. SEMESTER III–EXAMINATION – WINTER 2015

Subject code: 2733104 **Date: 04/12/2015**

Subject Name: Biodynamics

Time: 2:30 PM to 5:00 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 different types of lever system found in human body. List and explain the anatomical notation used to describe various movements of body parts.	**07**
	(b)	Enlist and explain various joints and their applications in human body.	**07**
Q.2	**(a)**	Define the Structural Stability and Redundancy of human body with consideration of various body movements.	**07**
	(b)	Explain conservation of linear momentum.	**07**
		OR	
	(b)	Relate the center of mass and its motion with human movement.	**07**
Q.3	**(a)**	Elaborate the mathematical model of professional vertical jumper with necessary illustrative diagrams.	**07**
	(b)	Derive and explain a schematic representation of Quadriceps Force Before Kicking a football with proper illustration.	**07**
		OR	
Q.3	**(a)**	Draw and explain the instantaneous center of rotation of an arbitrary rigid body in planar motion.	**07**
	(b)	Derive and explain a schematic representation of Inverse Dynamics for Vertical Jumping with proper illustration.	**07**
Q.4	**(a)**	Describe the Bones, Ligaments and Tendons with respect to their applications in biodynamics.	**07**
	(b)	Draw and explain a free body diagram of a man performing standing lateral raise of weight using deltoid muscle pairs.	**07**
		OR	
Q.4	**(a)**	Draw and explain a free body diagram of flexion of the forearm as a result of contraction of biceps.	**07**
	(b)	Write the Principle of Impulse and Momentum with necessary diagrams.	**07**
Q.5	**(a)**	Draw and explain the Biodynamics of Twisting Somersaults.	**07**
	(b)	Write a brief note on biarticular muscles.	**07**
		OR	
Q.5	**(a)**	Enlist and explain various applications to human body dynamics.	**07**
	(b)	Write a brief note on skeletal muscle.	**07**

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