Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 172303 **Date:09/12/2015**

Subject Name: Medical Plastics

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)**	Give a comparison of Thermoplastics and Thermoset plastics , used in medical applications	**07**
	(b)	Give a comparison of various types of PVC resins with its advantages and disadvantages –(for Rigid, Flexible and Chlorinated PVC)	**07**
Q.2	**(a)**	With the help of diagram, give a list of various hard and soft tissues of human body that can be replaced/ treated by various polymers.	**07**
	(b)	List typical metallic and ceramic biomaterials used in human body.	**07**
		OR	
	(b)	What is sterilization? Explain autoclaving and ethylene oxide (EtO) sterilization methods used in medical devices.	**07**
Q.3	**(a)**	List the advantages of Plastics for its use as medical devices.	
	(b)	Give a comparison of Plastics properties to Metals, Ceramics and Glass.	
		OR	
Q.3	**(a)**	Define Leachable Plastics and Extractable Plastics. With the help of various solvents and temperature, conditions explain the mechanism of Leachable and Extractable Plastics.	**07**
	(b)	Explain ISO 10993 as series of standards that detail all characterization and biocompatibility tests needed for medical plastics	**07**
Q.4	**(a)**	Write short note on (i) ISO 10993 Biocompatibility Evaluation Decision Tree. (ii) Self Life and Aging of Plastics in medical application	**07**
	(b)	List the methods used to join Plastics using heat and friction. Discuss each of them in short	**07**
		OR	
Q.4	**(a)**	Explain the various Polymer Additives used to enhance medical properties for medical device applications	**07**
Q.4	**(b)**	Discuss the various precautions to be considered when additives are to be used for medical plastics	**07**
Q.5	**(a)**	How the carbon nano tubes are are superior materials in medical plastics. Give its applications, advantages and disadvantages.	**07**
	(b)	Write a short note on Radiopaque additives.	**07**
		OR	
Q.5	**(a)**	Give Applications, Requirements and materials used as medical device applications for the Polyethylene group materials.	**07**
	(b)	Give various factors of importance in material selection for biomedical	**07**

application (in a tabular form). Give factors affecting its chemical, physical and mechanical properties.