Register Number: ……..

M.TECH DEGREE EXAMINATIONS: JUNE 2013

Second Semester

BIOTECHNOLOGY

BTY559: Biomedical Engineering and Clinical Research

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

1. Define MDRA. List its functions.
2. What are the factors to be considered on a biomedical instrument? List them.
3. What are Young modulus and Poison ratio? Write an equation.
4. What is biocompatibility? What should be the characteristics of a biocompatible material?
5. What is the importance of blood flow in the body?
6. Define a pacemaker. Mention its applications.
7. Explain the principle of ultrasound imaging.
8. Mention the image reconstruction techniques in MRI.
9. List the different steps in the discovery and development of new drugs.
10. Explain the term: blinding in clinical trial design. Differentiate between single and double blinded trials.

PART B (5 x 16 = 80 Marks)

11. a) (i) Discuss the modern day health care systems and flow of information in these systems (12)

    (ii) What is NHRM? What are its functions? (4)

(OR)

    b) (i) Describe the regulation of medical device innovation and role played by MDRA. (12)

    (ii) List the different areas of biomedical engineering where biomedical engineers play a role. (4)

12. a) (i) Describe the mechanical properties of blood vessels. (10)

    (ii) Write a short note on blood rheology. (6)

(OR)

    b) (i) Explain Newton's first and second law. (3)

    (ii) Write on skin substitutes focusing on burn dressing and soft tissue replacements. (13)

13.	a)	(i)	Discuss the different methods of blood pressure measurement.	(12)
		(ii)	Write the applications of ECG and EEG instruments.	(4)
			(OR)	
	b)		Explain the principle, instrumentation and application of pacemakers and defibrillators.	
14.	a)	(i)	Describe the principle and applications of echocardiogram and echoencephalogram	(12)
		(ii)	What are the advantages and disadvantages of ultrasonography?	(4)
			(OR)	
	b)	(i)	Discuss in detail on PET and its medical applications.	(13)
		(ii)	Write the principle behind radio imaging systems	(3)
15.	a)		What are the ethical guidelines to be followed in clinical research? Give 2 examples of case studies where ethics were violated.	
			(OR)	
	b)	(i)	How is quality control maintained in clinical trials?	(8)
		(ii)	Describe how would you design clinical trials?	(8)

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