

M.TECH DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2013)

Third Semester

BIOTECHNOLOGY

P13BTE402:Biomedical Engineering and Clinical Research

Time: Three Hours

Maximum Marks: 100

Answer all the Questions

PART A (10 x 2 = 20 Marks)

1. Differentiate piezoresistive and capacitive pressure sensors.
2. Mention the receptors that detect the amount of stretch in blood vessels.
3. Distinguish between Newtonian and Non Newtonian fluids.
4. List the types of mechanical prosthetic cardiac valves.
5. Illustrate the use of biopotential measurements in diagnostics. With an example.
6. What is an automated external defibrillator?
7. How an abnormal heart rhythms are detected?
8. Outline the principle of operation of Positron Emission Tomography [PET].
9. What is meant by human microdosing studies?
10. Which is the National regulatory body for Indian pharmaceuticals and medical devices?

Answer any FIVE Questions

PART B (5 x 16 = 80 Marks)

Q.No:11 is Compulsory

11. (i) Explain the testing of biocompatibility of biomaterials as per ISO 10993 standards. (6)
(ii) Compile the properties of different classes of biomaterials and outline the material selection criteria for hard and soft tissue replacements. (10)
12. (i) How systematic errors are reduced in the output of measuring instruments? (10)
(ii) Distinguish the operation of Doppler shift and transit time Ultrasonic flow meters. (6)

13. (i) Elucidate the mechanical properties of bone. (6)
(ii) Explicate the physical characteristics and flow properties of blood. (10)
14. (i) Enumerate the functions of the components of Heart Lung Machine. (10)
(ii) Infer the electrical activity of the heart from a normal ECG waveform. (6)
15. (i) Write the principle of Magnetic Resonance Imaging. Add notes on safety of MRI. (12)
(ii) What is Digital Radiography? (4)
16. (i) Highlight the points to be considered during initiating a clinical trial of a drug. (8)
(ii) List the role of data manager in clinical research. (8)
