(Subject Code and Roll No. to be filled in your Answer Book)

Roll No. 1 2 0 6 6 3 1 5 0 3

M.Tech.

(SEM. II) 2012–13

BIOMEDICAL ELECTRONICS

Time : 3 Hours *Total Marks : 100*

Note :– (1) Attempt **all** questions.

(2) All questions carry equal marks.

(3) Notations have their usual meanings.

1. Attempt any **two** parts : **(10×2=20)**

(a) What is biometrics ? Draw and explain the block diagram of Man- Instrumentation System.

(b) What are the problems encountered in measuring various physiological parameters in living system ? Explain in detail.

(c) Draw properly labeled electrode-model circuit for a single electrode skin (Electrode-Gel-Epideris) contact and explain in brief.

2. Attempt any **two** parts : **(10×2=20)**

(a) Explain ECG system for stress testing and what is Holter recording explain.

(b) What is the difference between cardiac pacemaker and defibrillator ? Describe external and implantable pacemakers with their performance aspects.

(c) Discuss the calibration and reparability of patient monitoring equipments.

3. Attempt any **two** parts : **(10×2=20)**

(a) Describe the following in respiratory physiology – Minute Volume (MV), Alveolar Ventilation Volume (AV), Inspiratory Capacity (IC), Total Lung Capacity (TLC) and Dead Space.

(b) What is spirometry ? Describe wedge spirometer in detail. Also draw typical flow volume curve.

(c) Write short notes on :

(i) Humidifier, Nebulizer and Aspirators.

(ii) Laser applications in medicine.

4. Attempt any **two** parts : **(10×2=20)**

(a) How retinal potentials are measured with ERG ? Draw the schematic of opthalmoscope and explain its design principle. Also discuss ophthalmic scans (B-scan) using ultrasound.

(b) Discuss various applications of Biotelemetry. Explain the working of Bio-Link PWM Transmitting System.

(c) What is the principle of Computer Aided Tomography (CAT-Scan). Discuss its merits relative to X-ray.

5. Attempt any **two** parts : **(10×2=20)**

(a) Explain the components of a Bio-telemetry System. Explain the steps and procedures involved during ECG measurement for emergency patient monitoring.

(b) Explain the principle of Nuclear Mangnetic Resonance (NMR) technique. Draw block diagram of NMR detection system.

(c) Write short notes on any **two** of the following :

(i) Diathermy

(ii) Hearing aids

(iii) Myoelectric arm.