

**RVK/KW/13/3284/3618**

**Faculty of Engineering & Technology**  
**Eighth Semester B.E. (Electrical Engg.)/Eighth**  
**Semester B.E.P.T. (Electrical) Examination**  
**BIO-MEDICAL ENGINEERING**  
**Elective—II**  
**Sections—A & B**

Time—Three Hours]

[Maximum Marks—80

**INSTRUCTIONS TO CANDIDATES**

- (1) All questions carry marks as indicated.
- (2) Answer **THREE** questions from Section A and **THREE** questions from Section B.
- (3) Due credit will be given to neatness and adequate dimensions.
- (4) Assume suitable data wherever necessary.

**SECTION—A**

1. Discuss in detail, the problems encountered in measuring living system. 13
2. (a) How Biopotentials are developed ? Explain action and resting potential. 6

- (b) What are the standard potentials measured in ECG, EEG and EMG ? Explain with suitable waveform. 7

3. (a) Explain how ultrasound can be used for blood flow measurement. 6

- (b) Explain different methods of respiration rate measurement ? 7

4. (a) Explain conducting system of heart. Also explain how depth heart rate can be measured. 7

- (b) Define Bio-Medical Engineering and explain physiological system of body. 6

5. Write short notes on :— 14

- (1) Electromyography  
(2) Electroretinography  
(3) Electrocardiography.

### SECTION—B

6. (a) What is pacemaker ? Explain working of any one external pacemaker with block diagram. 7

- (b) Briefly explain dc defibrillator discharge wave with voltage and current rating. 6

7. (a) Explain the difference between direct and indirect method of Blood pressure measurement. 7

- (b) Explain briefly, blood pH measurement. What is its utility ? 6

8. (a) What is respiration ? What chemical action takes place in human body during respiration ? 7

- (b) What do you mean by systemic temperature and surface or skin temperature ? Explain. 6

9. (a) What do you mean by stimulator ? Explain muscle stimulator. 6

- (b) What is defibrillator ? Also explain the difference between surgical and therapeutic defibrillator. 7

10. Write short notes on (any TWO) :—

- (1) GSR Mobility of internal organs  
(2) Blood pump respiration controller  
(3) Nerve stimulator. 14