53 (IE 801) BMIS

2017

BIOMEDICAL INSTRUMENTATION

Paper : IE 801

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions out of **seven**.*

1. *(a)* Explain the working of human heart. 9

   (b) With a neat block diagram, explain biomedical instrumentation system. 7

   (c) Specify transducer selection criteria. 4

2. *(a)* With a neat circuit diagram, explain differential amplifier. Derive an expression for its output voltage. 10

(b) Explain microelectrodes. 6

(c) Explain fibrillations. 4

3. (a) Explain bipolar limb lead configurations in ECG measurement. 9

(b) Draw an ECG and label its segments. 7

(c) Define cardiac output. Calculate stroke volume for a patient having cardiac output and heart rate of 5 *liters/min* and 75 beats per minute respectively. 4

4. (a) Explain surface electrodes. 6

(b) Explain *two* types of pacemakers. 8

(c) Explain heart sounds. 6

5. (a) Explain the construction and working of a waterless spirometer. 6

(b) Draw a spirogram and label the lung volumes and capacities. 9

(c) A person has a total lung capacity of 5 litres. If the volume of air left in the lungs at the end of maximal expiration is 1·3 litre. What is his vital capacity ? 5

6. (a) Explain plethysmography. 6

(b) Explain GSR. 6

(c) With a neat diagram, explain audiometer. 8

7. Write short notes on : 4×5=20

(a) Instrumentation Amplifier

(b) Isolation Amplifier

(c) Electrical Safety

(d) Synapse.
