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53 (IE 801) BIMS

2018

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 transducer and its types.
Specify the transducer used in ultrasound imaging and explain its working. 10
- (b) Explain needle and surface electrodes. 10
2. (a) Draw an instrumentation amplifier using three operational-amplifiers. Derive its output voltage. 10

Contd.

(b) Design a differential amplifier for a gain ; $G = 25$, using operational-amplifier. 6

(c) Explain EEG and EMG. 4

3. (a) Calculate the heart rate for a patient having cardiac output and stroke volume of 3.5 litres/min and 0.0465 litres/beats respectively. 4

(b) Explain heart sounds. 6

(c) With a neat diagram, explain X-ray machine. 10

4. (a) With a neat diagram, explain heart-lung machine. 12

(b) Explain photoplethysmography. 8

5. (a) Explain ultrasound transmission modes. 6

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

(c) Draw a spirogram and label the lung volumes and capacities. 8

6. (a) Explain Biotelemetry. 8

(b) Explain galvanic skin response. 6

(c) With a net diagram, explain synapse. 6

7. Write short notes on : 4×5=20

(a) Fibrillations

(b) Electrical Safety

(c) Pacemaker

(d) Isolation Amplifier.
