

Total number of printed pages-3

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 noninvasive biopotential electrodes. 6
- (b) Explain resting potential of the cell. 6
- (c) Explain biotelemetry. 8
2. (a) Design an instrumentation amplifier for a gain; $G = 2500$, using three operational amplifiers. 12

Contd.

- (b) Explain invasive biopotential electrodes. 8
3. (a) Explain limb lead configurations in ECG measurement. 12
- (b) How an ECG is generated? 8
4. (a) Explain the construction and working of a heart-lung machine. 12
- (b) Explain the need of the following :
 $2 \times 4 = 8$
 (i) Pacemaker
 (ii) Defibrillator.
5. (a) Explain the construction and working of *any two* types of spirometer. 12
- (b) Explain an indirect method of measuring human blood pressure. 8
6. (a) Explain *any two* scanning modes in ultrasound. 6
- (b) Explain ultrasound modes of transmission. 6

(c) With a neat diagram, explain X-ray machine. 8

7. Write short notes on : 4×5=20

(a) Nerve cell

(b) DC Defibrillator

(c) Audiometer

(d) Action potential.