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## Question Paper Code: 52983

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

## Seventh Semester

Electronics and Instrumentation Engineering

## EI 6704 – BIOMEDICAL INSTRUMENTATION

(Common to Electrical and Electronics Engineering, Instrumentation and Control Engineering)

(Regulation 2013)

Time: Three hours

Maximum: 100 marks

Answer ALL questions.

PART A  $-(10 \times 2 = 20 \text{ marks})$ 

- 1. Write the Nernst equation of resting membrane potential.
- 2. Mention the basic components of biomedical systems.
- 3. Write the principle behind the photo plethysomography.
- 4. How will you measure the GSR from a subject?
- 5. Draw the lead I configuration of ECG.
- 6. Define leakage current.
- 7. Mention the applications of endoscopic technique.
- 8. Specify the different modes of ultrasonography.
- 9. Draw the circuit diagram of a DC defibrillator.
- 10. What are Nano robots?

## PART B — $(5 \times 13 = 65 \text{ marks})$

11. (a) Explain the mechanism of generation of action potential and write the necessary equations and mention different stages of action potential.

Or

- (b) Give a brief account on the following transducers
  - (i) Piezo electric transducers
  - (ii) Ultrasonic transducers
- 12. (a) Illustrate the working of spirometer with the experimental set up.

Or

- (b) Explain about the measurement of PCO2 with the neat diagram.
- 13. (a) Draw and explain the block diagram of single ended chopper- stabilized operational Amplifier.

Or

- (b) Describe the lead systems and recording method of ECG.
- 14. (a) Explain the production of X-rays and draw the block diagram of X-ay machine.

On

- (b) Draw and explain the single channel telemetry system suitable for transmission of an ECG.
- 15. (a) Explain the different types of pacemaker with the neat diagram.

Or

(b) Draw and explain the simplified circuit diagram of a microwave diathermy machine.

PART C  $_{-}$  (1 × 15 = 15 marks)

16. (a) Design a mutiparameter patient monitoring system used in ICCU unit.

Or

(b) Describe the application of advanced 3D surgical techniques.