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## Question Paper Code : X 20516

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020  
Seventh Semester

Electronics and Instrumentation Engineering  
EI 6704 – BIO MEDICAL INSTRUMENTATION

(Common to Electrical and Electronics Engineering, Instrumentation and  
Control Engineering)  
(Regulations 2013)

(Also Common to PTEI 6704 – Biomedical Instrumentation for B.E. (Part-Time) –  
Sixth Semester – Electrical and Electronics Engineering – Regulations 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Sketch the action potential waveform.
2. Write the principle of piezo electric transducer.
3. Differentiate between heart sound and murmurs.
4. Give the normal value of pH, pCO<sub>2</sub>, pO<sub>2</sub> in human blood.
5. Draw the lead I configuration of ECG.
6. Define leakage current.
7. Define contrast.
8. What is biometrics ?
9. Differentiate peritoneal dialysis and hemodialysis.
10. What are the requirements of oxygenator ?

**PART – B****(5×13=65 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

(7)

ii) Ultrasonic transducers.

(6)

12. a) i) What is cardiac output ? Explain in detail any one method used for cardiac output measurement.

(7)

ii) What are the causes of heart sounds and how they are related to the function of cardiovascular system ?

(6)

(OR)

b) i) Explain in detail the measurement of  $pO_2$ ,  $pCO_2$  blood.

(6)

ii) What is ESR and GSR ? Explain the techniques used to measure them.

(7)

13. a) Discuss the standard 12 lead systems in ECG waveform recording with neat diagram.

(OR)

b) Describe the 10 – 20 electrode system used in EEG and its recording mode.

14. a) Draw and explain the different components involved in fluoroscopic techniques.

(OR)

b) Explain with a neat block diagram, the principle and image acquisition method of Thermography.

15. a) Draw the block diagram of a ventilator along with its accessories and explain its function.

(OR)

b) What is dialysis ? Explain the principle of operation of dialyser machine with a neat block diagram.

**PART – C****(1×15=15 Marks)**

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

(OR)

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

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