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GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, December – 2020

(Seventh Semester)

**BEIPE7021 / BEIOE 7051 – BIOMEDICAL INSTRUMENTATION  
(AE & IE and Biotechnology)**

Time: 2 hrs

Maximum: 50 Marks

**The figures in the right hand margin indicate marks.**

**PART – A: (Multiple Choice Questions)****(1 x 10 = 10 Marks)**

- Q.1. Answer ALL questions
- |  | [CO#] | [PO#] |
|--|-------|-------|
| a. Electroencephalogram is obtained from bioelectrical signals from the?<br>(i)Brain (ii)heart<br>(iii)Muscles (iv)Retina  | CO1   | PO1   |
| b. The following are the major functional physiological systems of the body except?<br>(i)Cardiovascular system (ii)Respiratory system<br>(iii)Electrocardiogram system (iv)Nervous system   | CO2   | PO1   |
| c. The potentials developed in the brain as the responses to external stimuli is known as<br>(i) External pressure (ii) evoked potential<br>(iii) collective point (iv) elaborated potential   | CO3   | PO1   |
| d. Electrodes in which no net transfer of charge takes place across the metal electrolyte is called as<br>(i) polarized electrodes (ii) non polarized electrodes<br>(iii) rigid conductor (iv) sink  | CO1   | PO1   |
| e. _____ is an instrument used for recording the sounds connected with the sounds connected with the pumping action of the heart.<br>(i) Electrocardiograph (ECG) (ii) Phonocardiograph<br>(iii) Electrooculogram (EOG) (iv) Wenckebach period                   | CO4   | PO1   |
| f. The capacitance of a passive capacitance transducer depends on the following factors, except?<br>(i)Distance between the two parallel plates (ii)The area of the two parallel plates<br>(iii)Relative dielectric constant (iv)Mass of the two parallel plates | CO3   | PO3   |
| g. All the following are methods of blood pressure measurement, except?<br>(i)Sphygmomanometer (ii)Percutaneous method<br>(iii)Hagen-poiseuille analysis (iv)Catheterization   | CO2   | PO2   |
| h. Signal generated by a body signal is known as<br>(i)ionic voltage (ii)Monitory signal<br>(iii)Magnetic signal (iv) Biotelemetry   | CO1   | PO1   |
| i. Hemodialysis is the process of _____<br>(i) producing deep heating directly in the tissues (ii) the separated tissue or nerves can be welded  | CO2   | PO2   |

(iii) removal of chemical substances from the blood by passing it through tubes (iv) process which involves removal of waste products from blood.

- j. Higher action potential propagation rate will be in \_\_\_\_\_ CO3 PO4  
 (i)Nerve cell (ii)Heart muscle  
 (iii)lower arm (iv) lower foot muscle

**PART – B: (Short Answer Questions)**

**(2 x 5 = 10 Marks)**

Q.2. Answer ALL questions

- |  | [CO#] | [PO#] |
|--|-------|-------|
| a. List the normal heart rate for human being according to age group.                  | CO1   | PO2   |
| b. List the different thermal sensors?   | CO2   | PO3   |
| c. Name the factors that are considered in the design of biomedical instrument system. | CO3   | PO1   |
| d. Draw the structure of the Nerve Cell.   | CO4   | PO2   |
| e. Differentiate the FVC and the FRC.  | CO3   | PO4   |

**PART – C: (Long Answer Questions )**

**(6 x 5 = 30 Marks)**

Answer ANY FIVE questions

- |  | Marks | [CO#] | [PO#] |
|--|-------|-------|-------|
| 3. i. Draw the Wave form of the resting and action potential.<br>ii. Give the classifications of biomedical instruments. | (6)   | CO3   | PO4   |
| 4. Draw the EINTHOVEN TRIANGLE and brief the method of ECG measurement.  | (6)   | CO1   | PO1   |
| 5. List the requirements of a good physiological transducer?   | (6)   | CO1   | PO1   |
| 6. Analyse the working principle of an ECG machine with a neat block diagram   | (6)   | CO3   | PO4   |
| 7. Explain the different modes of operation of differential amplifier  | (6)   | CO2   | PO2   |
| 8. Explain the two ways involved in measurement of blood pressure with a catheter?                                       | (6)   | CO4   | PO1   |
| 9. List the limitations of conventional x-ray examination and the advantage of using laser instruments?                  | (6)   | CO3   | PO1   |
| 10. Define oxygenator and Explain the Difference between peritoneal dialysis and hemodialysis?                           | (6)   | CO4   | PO1   |

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