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ECE 1818 PE 33

23/6/22

Roll No. of candidate | | | | | | | | | | |

2022

B.Tech. 8th Semester End-Term Examination

ECE + ETE

BIOMEDICAL ELECTRONICS

(New Regulation 2017-2018) &

(New Syllabus 2018-2019)

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest.

1. Answer the following (MCQ/ Fill in the blanks) : (10 × 1 = 10)

(i) The cardiovascular system is
- (a) a complex closed hydraulic system
- (b) a complex open hydraulic system
- (c) an open hydraulic system
- (d) a hydraulic system

(ii) Who is the father of X-ray technology?
- (a) Dr. Willem Kolff (b) Rune Elmqvist
- (c) Willem Einthoven (d) Wilhelm Rontgen

(iii) An artificial pacemaker which uses
- (a) electrical voltages to regulate the beating of the heart
- (b) electrical currents to regulate the beating of the heart
- (c) electrical impulses to regulate the beating of the heart
- (d) electrical potential to regulate the beating of the heart

(iv) Endocardium is
- (a) the outer layer of the heart
- (b) the inner layer of the heart
- (c) the middle layer of the heart
- (d) none of the above

[Turn over

(v) Bio-electric signals are generated by

(a) nerve cells and muscle cells

(b) nerve cells

(c) muscle cells

(d) none of the above

(vi) The movement of the chest wall in accordance with the respiratory activity produces

(a) bio-electric signals (b) bio-acoustic signals

(c) bio-mechanical signals (d) bio-impedance signals

(vii) The source of bioelectric potentials is ———— in nature

(a) electron (b) proton

(c) potential (d) ionic

(viii) What would be the pulse pressure for a person with a blood pressure reading of 118mm Hg/79mm Hg?

(a) 197mm Hg (b) 118 mm Hg

(c) 39 mm Hg (d) 79 mm Hg

(ix) One type of EEG electrode is

(a) pasteless electrode (b) dry electrode

(c) limb electrode (d) floating electrode

(x) One advantage of the instrumentation amplifier for it's applications in the biomedical field.

(a) High bias and offset voltage

(b) Very low CMRR

(c) Extremely high input impedance

(d) Low slew rate

2. (a) Describe the cardiovascular system in details. Name the four valves associated with the functioning of the heart and mention their function. (10)

(b) Name the three major parts of the brain and their working. What is the function of the spinal cord? (5)

3. (a) Name five types of bio-signals and explain their origin. (10)

(b) Give one example of each five types of bio-signals. (5)

4. (a) What are the various types of electrodes used for recording of ECG signal? Give a brief description of atleast 2 types of electrodes (10)

(b) Draw and explain the Eirthoven's triangle (5)

5. (a) Define "Transducer" What are the performance characteristics of transducers? List them out and define them. (10)

(b) Define a photo-electric transducer. What are the types of photo-electric cells? (5)

6. (a) Explain sources of noise in low level measurement. (5)

(b) Illustrate the working of an instrumentation amplifier with the help of a schematic diagram. What are the advantages of instrumentation amplifier? (10)

7. Write short note for the following (any *three*) : (3 × 5 = 15)

(a) LVDT

(b) Piezo-electric transducer

(c) Magnetic resonance imaging system

(d) Computed Tomography (CT).