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Code No. : 15157 (C) N

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD*Accredited by NAAC with A++ Grade***B.E. V-Semester Main Examinations, Jan./Feb:-2024****Introduction to Biomedical Electronics (OE-III)**

Time: 3 hours

Max. Marks: 60

*Note: Answer all questions from Part-A and any FIVE from Part-B***Part-A (10 × 2 = 20 Marks)**

Q. No.	Stem of the question	M	L	CO	PO
1.	Explain in detail “ cell action potential with the help of a typical waveform	2	1	1	1
2.	Write about the classification of biomedical instruments.	2	2	1	1
3.	List various types of biomedical electrodes and give their applications.	2	2	2	1
4.	What are the requirements of a physical transducer and explain the principle of operation of any two physiological transducers.	2	1	2	2
5.	What is the function of synchronous pacemaker?	2	2	3	1
6.	Mention the Instruments used in Ventilators.	2	1	3	3
7.	Define the terms reflection, transmission and absorption of infrared radiation in thermography.	2	2	3	2
8.	Explain the following terms for ultrasound system: (i) Reflection, (ii) Refraction, (iii) Absorption (iv) Scattering.	2	1	4	1
9.	Explain T1 and T2 in MRI.	2	2	4	2
10.	How is the CT scan images reconstructed by back projection method?	2	2	4	2
Part-B (5 × 8 = 40 Marks)					
11. a)	Explain the static and dynamic characteristics of medical instruments	4	1	1	1
b)	Discuss various sources of biomedical signals and classify the same.	4	2	1	1
12. a)	Draw the vital ECG waveforms for normal adult, Myocardial Infraction, coronary insufficiency and ventricular fibrillation.	4	4	2	2
b)	Write about the Specification of EMG machines and the Electrode placement for EMG recording.	4	1	2	2
13. a)	Draw the typical DC defibrillator discharge waveform, truncated defibrillator diagram and explain its significance.	4	2	3	1
b)	Explain the functioning of Hemodialysis machine with necessary diagrams.	4	2	3	3

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14. a)	Describe the Ultrasonic Measurement for Imaging and its applications in medicine.	4	3	4	3
b)	Write the basic principle of operation of an infrared and thermography detector. Mention its applications?	4	3	4	3
15. a)	Explain in detail X-ray emission spectrum along with factors affecting the x-ray emission spectrum.	4	4	4	3
b)	Explain the imaging methods and reconstruction techniques in MRI	4	2	4	3
16. a)	Explain the Electrical equivalent circuit diagram for Electrode – Tissue Interface for a pair of electrodes in Bio potential recording.	4	4	2	2
b)	Illustrate ECG measurement using Einthoven triangle.	4	2	2	2
17.	Answer any <i>two</i> of the following:				
a)	Draw the typical defibrillator circuit and explain its operation.	4	2	3	3
b)	Discuss different types of instruments is used to measure body temperature?	4	3	3	2
c)	How 1D- FFT is used in reconstruction of MRI images?	4	4	4	3

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%
