Master of Biomedical Engineering Examination 2024

(1st Year, 1st Semester)

Biomedical Instrumentation

Time: 3 hours **Full Marks: 100**

Answer **any five** questions

Q-1) (i)	Describe and explain with neat sketches the operation of cochlear prosthesis. Also discuss briefly about the electrodes used in cochlear prosthesis.	15 Marks
Q-1) (ii)	Explain with neat sketches the method of Tympanometry	5 Marks
Q-2) (i)	Describe with neat sketches the principle of optical triangulation for designing mobility aid for a blind person	5 Marks
Q-2) (ii)	Draw the block diagram of LASER cane used as electronic travel aid for blind person and explain its operation. Include circuit diagrams in your answer	15 Marks
Q-3) (i)	Describe and explain with neat diagram the operation of an actuator for myoelectrically controlled prosthesis	10 Marks
Q-3) (ii)	Discuss briefly about the types of electrodes used in myoelectric prosthesis	3 Marks
Q-3) (iii)	Explain how EMG activity measured can be quantified	7 Marks
Q-4) (i)	Discuss briefly with neat sketches the different types of waveforms used in DC-Defibrilllator	8 Marks
Q-4) (ii)	Explain the method of acquisition of Ballistocardiogram	4 Marks
Q-4) (iii)	Explain the operation of demand-type pacemaker and R wave inhibited pacemaker	8 Marks
Q-5) (i)	Describe and explain the operation of bell-jar mechanical spirometer with neat sketch	10 Marks
Q-5) (ii)	Compare the operation between volume limited ventilator and pressure limited ventilator	10 Marks
Q-6) (i)	Explain the term mean arterial pressure (MAP) and explain the principle of measurement of MAP	6 Marks
Q-6) (ii)	Describe and explain with sketches how ultrasonic blood flow meter works.	8 Marks
Q-6) (iii)	Explain the operation of impedance plethysmograph.	6 Marks
Q-7)	Draw the block diagram of an Electrocardiograph and describe and explain with necessary sketches the operation of each block	20 Marks

Q-8) (i)	**Explain with neat sketch the operation of Ground fault interrupter**	**8 Marks**
Q-8) (ii)	**Discuss briefly about the classification of EEG frequency bands**	**5 Marks**
Q-8) (iii)	**Describe in brief with neat sketch about a mobility aid suitable for rising to a standing position**	**5 Marks**
Q-8) (iv)	**Explain the term "Relative Refractory period"**	**2 Marks**