University of Mumbai

Program: Instrumentation Engineering
Curriculum Scheme: Rev 2016
Examination: BE Semester VII
Course Code: ISC702 and Course Name: Biomedical Instrumentation
Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
	(20 MCQ of total 40 Marks)
1.	A membrane potential is the difference in electrical charge between
Option A:	potassium and sodium ions
Option B:	the inside and outside of the cell
Option C:	phosphoric acid and glycolipid layers
Option D:	resting and action potentials
2.	Which of following method not used to measure cardiac output?
Option A:	Flicks method
Option B:	Ultrasonic method
Option C:	Dye dilution method
Option D:	Thermal indicator method
3.	Which of the following is considered to be the primary pacemaker of the heart?
Option A:	sino-atrial node
Option B:	atrio-ventricular node
Option C:	purkinje fibres
Option D:	bundle of his
4.	What does "MRI" stand for?
Option A:	Magneto-Ray Idometry
Option B:	Medical Radiometry Instrument
Option C:	Magnetic Resonance Imaging
Option D:	Maximal Radiology Imaging
5.	What is the frequency range of ECG?
Option A:	70-120 Hz
Option B:	0.05-120 Hz
Option C:	5-120 Hz
Option D:	12-120 Hz
6.	Which of the following physiological parameter is most difficult to measure accurately?
Option A:	Blood pressure
Option B:	Blood Flow
Option C:	Blood Volume
Option D:	Skin color
7.	Which electrodes can work even after being induced to large electric discharge such as defibrillation?

Option A:	polarizing electrodes
Option B:	magnetic electrodes
Option C:	non-polarizing electrodes
Option D:	electrolytic electrodes
8.	What does hemodialysis removes other than harmful wastes?
Option A:	Protein
Option B:	Salt
Option C:	Insulin
Option D:	Glycogen
9.	In a normal X-Ray machine, X – Rays are produced by _____
Option A:	bombardment of cathode rays on a radioactive material
Option B:	nuclear fission
Option C:	nuclear fusion
Option D:	super heating of an element
10.	As an ultrasound pulse moves through tissue in a patient's body it will undergo a change in:
Option A:	Frequency
Option B:	Pressure
Option C:	Temperature
Option D:	Intensity
11.	Einthoven's law states that at any given movements the voltage in:
Option A:	Lead I equals the sum of voltage in lead II and lead III
Option B:	Lead III equals the sum of voltage in lead I and lead II
Option C:	Lead II equals the sum of voltage in lead I and lead III
Option D:	Lead II should equal lead III
12.	In voluntary contraction of the skeletal muscles, the muscle potential ranges from _____
Option A:	50 µV – 5 mV
Option B:	50 mV – 5 V
Option C:	0.05 µV – 2 mV
Option D:	50 mV – 500 mV
13.	The maximum volume of air contained in the lung by a full forced inhalation is called
Option A:	Vital capacity
Option B:	Tidal volume
Option C:	Total lung capacity
Option D:	Inspiratory capacity
14.	Which of the following pair is correctly matched?
Option A:	Dub- Sudden opening of semilunar valves at the beginning of ventricle diastole
Option B:	Lub- Sharp closing of AV valves at the beginning of ventricular systole
Option C:	Pulsation of radial artery valves in blood vessels
Option D:	Initiation of heart beat- Purkinje fibers

15.	Which is called competitive pacemaker?
Option A:	Demand type pacemaker
Option B:	Fixed rate pacemaker
Option C:	Standby pacemaker
Option D:	R wave triggered pacemaker
16.	Blood pressure is measured in terms of _____
Option A:	mm Hg
Option B:	Mm
Option C:	cm Hg
Option D:	Hg
17.	Which is component of Heart lung machine?
Option A:	Electrode
Option B:	Oxygenator
Option C:	Battery
Option D:	Capacitor
18.	All electrode potentials are measured with respect to which reference electrode?
Option A:	hydrogen electrode
Option B:	platinum electrode
Option C:	calomel electrode
Option D:	hydrogen absorbed on platinum electrode
19.	The minimum current that the person can detect is called
Option A:	Threshold of perception
Option B:	Let go current
Option C:	Holding current
Option D:	Switching current
20.	The current generation CT scanner use _____ for scanning
Option A:	pencil beam and stationary detectors
Option B:	pencil beam and rotating detectors
Option C:	fan beam and detectors
Option D:	electron beam and detectors

Q2	***Total 20 marks***
A	**Solve any Two** **5 marks each**
i.	Write short note on Action Potential & its Propagation
ii.	Explain the concept of Electrode –Electrolyte Interface.
iii.	List out brain waves & their frequency.
B	**Solve any One** **10 marks each**
i.	Explain in detail the different types of electrodes used for bio-medical applications.

ii.	Explain with diagram the 12-lead configuration of ECG measurement.

Q3.	***Total 20 marks***
A	**Solve any Two** **5 marks each**
i.	Why SA node is called natural pacemaker.
ii.	Discuss the working of "Hemodialysis" machine
iii.	Write Short Note on Ultra sound imaging.
B	**Solve any One** **10 marks each**
i.	What is NMR? Explain MRI with its application.
ii.	State & explain the methods of accident prevention through electrical safety.