Reg. No.															

Question Paper Code	13512

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Electronics and Instrumentation Engineering

(Common to Instrumentation and Control Engineering)

20ICPC602 - BIOMEDICAL INSTRUMENTATION

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	_____is an electrical pulse generator that starts or maintains the normal heart rhythm (a) Defibrillator (b)Pacemaker (c) Hemodialysis (d) Lithotripsy	1	K1	CO1
2.	Which one carry the pure blood from the heart? (a) Pulmonary vein (b) Inferior vena cava (c) Superior vena cava (d) aorta	1	K1	CO1
3.	What do you mean by cardiac output? (a) the volume of blood received in the atrium (b) the volume of blood received in ventricles (c) the volume of blood ejected from the atrium to the ventricles (d) the volume of blood ejected from ventricles to the aorta and pulmonary artery	1	K1	CO2
4.	_____ accounts for 60% of blood volume. (a) Blood cells (b) Water (c) Carbon Dioxide (d) Blood Plasma	1	K1	CO2
5.	The frequency range of ECG is _____ (a) 0.05-150 HZ (b) 500-1500 Hz (c) 5-500 kHz (d) 0.5-150 MHz	1	K1	CO3
6.	Which type of electrodes is employed to study the electrical activities of individual cells? (a) milli-electrodes (b) micro-electrodes (c) surface-electrodes (d) pre-jelled electrodes	1	K1	CO3
7.	Why is contrast used in CT scan? (a) To suppress particular tissues (b) To enhance a particular tissue (c) To ensure correct tissue is being imaged (d) To reduce bone interference	1	K1	CO4
8.	Name the medical technique which is used for remote measurement (a) LASER (b) Telemetry (c) LIDAR (d) RADAR	1	K1	CO4
9.	Dialysis commonly refers to _____ (a) haemodialysis (b) chemo dialysis (c) liver dialysis (d) pancreatic dialysis	1	K1	CO5
10.	Identify the fixed rate pacemaker (a) Ventricular asynchronous pacemaker (b) Ventricular synchronous pacemaker (c) Ventricular inhibited pacemaker (d) Atrial synchronous pacemaker	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Discuss the origin and significance of bioelectric potentials in biological systems.	2	K2	CO1
12.	Interpret the "All or Nothing" principle in neural conduction and its physiological impact.	2	K2	CO1
13.	Illustrate how piezoelectric transducers convert mechanical forces into electrical signals.	2	K2	CO1
14.	Interpret the significance of mean arterial pressure (MAP) in cardiovascular health.	2	K2	CO2
15.	Discuss the application of body plethysmography in evaluating lung function.	2	K2	CO2
16.	Describe the role of galvanic skin response (GSR) in physiological studies.	2	K2	CO2
17.	Outline the different types of surface electrodes and their applications.	2	K2	CO3
18.	Outline the importance of leakage current monitoring in biomedical equipment.	2	K2	CO3

19.	Compare radiography and fluoroscopy in medical imaging.		*2*	*K2*	*CO4*
20.	Illustrate the working principle of an endoscope and its role in medical diagnosis.		*2*	*K2*	*CO4*
21.	Illustrate the principle of diathermy in therapeutic heating applications.		*2*	*K2*	*CO5*
22.	How robotic surgery improves precision in minimally invasive procedures?		*2*	*K1*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Interpret the selection criteria for physiological Transducers.	*11*	*K2*	*CO1*
		OR			
	b)	Discuss Piezoelectric and ultrasonic transducers with neat sketch.	*11*	*K2*	*CO1*
24.	a)	Summarize the methods used to measure cardiac output, including invasive and non-invasive techniques.	*11*	*K2*	*CO2*
		OR			
	b)	Describe the working principle of body plethysmography and its role in lung volume measurement.	*11*	*K2*	*CO2*
25.	a)	Discuss the placement of EEG electrodes and their role in measuring brain activity.	*11*	*K2*	*CO3*
		OR			
	b)	Summarize the key safety measures taken to prevent electrical hazards in hospitals.	*11*	*K2*	*CO3*
26.	a)	Outline the operating principle of MRI and illustrate it with a labeled diagram.	*11*	*K2*	*CO4*
		OR			
	b)	Rephrase and explain the principle, construction, and working mechanism of endoscopy.	*11*	*K2*	*CO4*
27.	a)	Discuss the function of defibrillators, their types, and their role in managing cardiac arrhythmias.	*11*	*K2*	*CO5*
		OR			
	b)	Describe the components and working of an ICCU patient monitoring system and explain its significance in critical care.	*11*	*K2*	*CO5*
28.	a) (i)	Describe the advantages of Thermographic imaging over conventional diagnostic techniques.	*6*	*K2*	*CO4*
	(ii)	Illustrate the working principle of extracorporeal shock wave lithotripsy (ESWL) and summarize its benefits over traditional surgical methods.	*5*	*K2*	*CO5*
		OR			
	b) (i)	Explain the role of IRIS recognition in biometric authentication.	*6*	*K2*	*CO4*
	(ii)	Summarize the advancements in robotic surgery, identify its advantages, and discuss its role in minimally invasive procedures.	*5*	*K2*	*CO5*