



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
 [AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
 Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 120006

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025

Fifth Semester

Biomedical Engineering

U23BM511 – DIAGNOSTIC AND THERAPEUTIC EQUIPMENT – I

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Differentiate between internal and external pacemakers.	2	K2	CO1
2.	State the function of a Holter monitor.	2	K1	CO1
3.	Mention two clinical significances of evoked potentials.	2	K1	CO2
4.	Identify the need for EEG biofeedback instrumentation.	2	K2	CO2
5.	Define electromyography (EMG).	2	K1	CO3
6.	Name two dynamic biomechanical measurements.	2	K2	CO3
7.	Define spirometry.	2	K1	CO4
8.	Identify the main types of ventilators.	2	K2	CO4
9.	List the main function of an audiometer.	2	K2	CO5
10.	Mention the significance of galvanic skin resistance (GSR).	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Explain the working principle of an electrocardiograph (ECG) with a labeled block diagram and interpret a normal P-QRS-T sequence.	13	K2	CO1

(OR)

b)	Discuss the construction and operation of AC and DC defibrillators; analyze the advantages and limitation of each.	13	K2	CO1
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12.	a)	Discuss the clinical applications of EEG in diagnosis and monitoring. Analyze key instrumentation components required to acquire clinical-grade EEG.	13	K2	CO2
		(OR)			
	b)	Describe EEG features typical in temporal-lobe epilepsy. Explain how EEG findings influence clinical management and surgery planning.	13	K2	CO2
13.	a)	Describe static and dynamic biomechanical measurement techniques with examples. Analyze how each technique contributes to clinical assessment.	13	K4	CO3
		(OR)			
	b)	Describe the instrumentation used in gait analysis. Analyze how velocity, acceleration, and limb position data are interpreted to create rehabilitation treatments.	13	K4	CO3
14.	a)	Discuss methods to measure lung volumes and vital capacity; compare direct and indirect methods.	13	K3	CO4
		(OR)			
	b)	Compare pressure-controlled, volume-controlled, and time-controlled ventilators with diagrams. Evaluate pros & cons for long-term support.	13	K4	CO4
15.	a)	Explain instrumentation for measuring basal skin resistance and galvanic skin response. Analyze how these signals change with autonomic activation.	13	K4	CO5
		(OR)			
	b)	Describe slit lamp, applanation tonometer and autorefractor operation. Analyze how each contributes to glaucoma or refractive error assessment.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16.	a) A 30-year-old patient with recurrent seizures undergoes EEG monitoring, which shows abnormal temporal lobe spikes. Explain how EEG assists in diagnosing epilepsy, analyze the instrumentation principles, and suggest additional diagnostic approaches that would complement EEG findings.	15	K2	CO2
	(OR)			
	b) A 45-year-old patient complains of gradual hearing loss and is referred for pure-tone audiometry. Explain the principle and procedure of pure-tone audiometry, analyze how the test differentiates between conductive and sensorineural hearing loss, and interpret how the results guide further clinical management.	15	K4	CO5