RollNo. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR/MAY 2025

DEPARTMENT OF BIOMEDICAL ENGINEERING

VI Semester

BM5601 DIAGNOSTIC AND THERAPEUTIC EQUIPMENT – II

(Regulation2019)

Time: 3 hrs Max.Marks: 100

CO1	Explain about measurements of parameters related to respiratory system
CO2	Appreciate the use of advanced laser technology in diagnosis and minimally invasive therapies.
CO3	Analyze different types of diathermy units.
CO4	Understand the concepts of ultrasound equipment.
CO5	Identify the electrical hazards and implement methods of patient safety.

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)

(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	Outline the functions of respiratory systems.	2	1	1
2	State the advantages of interrupter technique over whole body plethysmography.	2	1	1
3	Write the principle of Laser flow cytometry.	2	2	2
4	List the complications of an endoscopy.	2	2	2
5	What are all the types of ultraviolet light therapy used for skin disorders.	2	3	1
6	Differentiate the tissue effects of ultrasound and microwave diathermy.	2	3	2
7	List the various ultrasound frequency ranges used for organs study.	2	4	1
8	What are all the risks involved in the ultrasound imaging?	2	4	2
9	A 5 mWatt laser makes a 2 mm by 3 mm spot on a wall. Find the irradiance.	2	5	2
10	Give the classification of medical equipment according to IEC	2	5	1

PART- B(5x 13 = 65Marks)

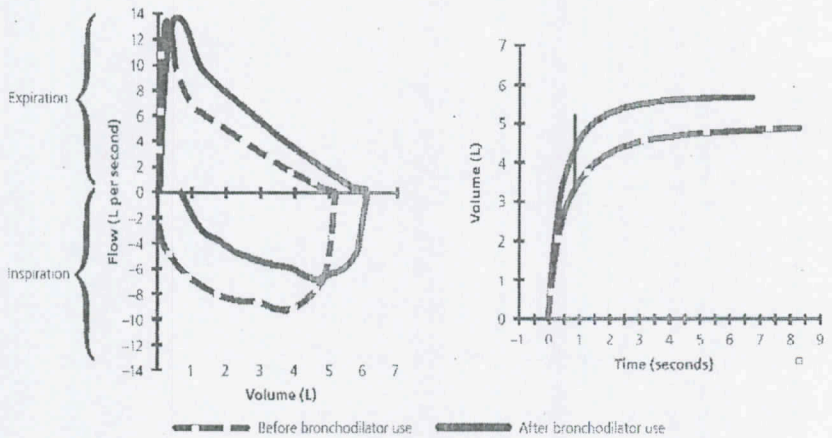
(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a)	Illustrate various pressures and its gradients in respiratory system and discuss how it impacts on the respiratory functions.	13	1	3
	OR			
11 (b)	Summarize the various modes of ventilation with neat graphical explanations.	13	1	3
12 (a)	Analyze how the Laser is interacted with tissue based on time and intensity variations.	13	2	3
	OR			
12 (b)	Enlist the application of LASER in ophthalmology and discuss how Laser is performed in LASIK and glaucoma treatment in detail.	13	2	3

13 (a)	Describe the shortwave diathermy functions used in physiotherapeutic treatment.	13	3	3
	OR			
13 (b)	Illustrate the surgical diathermy machine and write functions of its each part and discuss the various currents used in surgical diathermy procedures.	13	3	3
14 (a)	i) Discuss how Ultrasound is interacted with biological tissue ii) Mention the advantages of ultrasound for soft tissue imaging	6 7	4	2
	OR			
14 (b)	Describe what are all the modes of imaging using ultrasound.	13	4	2
15 (a)	(i) With neat diagrams, discuss the ground fault isolator and isolation transformer. (ii) Discuss macro and micro shock.	6 7	5	4
	OR			
15 (b)	i) A fluid-filled catheter is used to measure blood pressure in the right atrium of the heart. Resistance of the fluid path is 1MΩ. The external end of the catheter is grounded to the equipment ground of a receptacle at the left side of the patient's bed. The patient's right leg is grounded via a patient monitor to another receptacle at the right side of the patient's bed. Because of a malfunction in a vacuum cleaner, a fault current of 10 A flows through the ground wire connecting the two receptacles. What is the maximum allowable resistance for the ground wire connecting the receptacles to prevent exceeding the 10 μA safe current limit for micro shock in the patient? Draw the equivalent circuit and design the necessary resistance value. ii) Mention the various physiological effects of electricity and its significance.	7 6	5	4

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	The persons with asthma have the spirometer graph as shown in fig. Mark and define necessary parameters from the two spirometer graphs. Measure the parameters and write the interpretation based on the results. 	15	1	5