Reg.No.:												

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

Question Paper Code: 12005

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – MAY / JUNE 2024
Sixth Semester
Biomedical Engineering
U19BMV52 – CRITICAL CARE EQUIPMENT
(Regulation 2019)

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.	List the uses of a suction apparatus in intensive care unit (ICU)	2	K1	CO1
2.	Define the gold standard for the diagnosis of osteoporosis.	2	K1	CO1
3.	Identify the equipment that converts the ventricular fibrillation into a more efficient rhythm and list its types.	2	K2	CO2
4.	Peristaltic pumps enable safe delivery of pharmaceuticals and other critical liquids to the patient. State the reason.	2	K2	CO2
5.	List two common application of electrosurgical machine in medicine.	2	K2	CO3
6.	State the function of the vaporizer in the anestheisa machine.	2	K2	CO3
7.	State the importance of a centralized oxygen supply system.	2	K1	CO4
8.	Why is lighting in a surgery room important?	2	K2	CO4
9.	State the condition in which a microshock hazard will occur.	2	K1	CO5
10.	List the applications of optocouplers.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Classify the types of ventilators based on various methods and illustrate the concept that aids in understanding the performance of a ventilator.	13	K4	CO1
		(OR)			
	b)	Classify the types of infusion systems that aids in automated drug delivery. Describe their working mechanism.	13	K4	CO1
12.	a)	Illustrate & explain the principle of dialysis in the artificial kidney and classify the types of dialyzers based on the working mechanism.	13	K4	CO2
		(OR)			
	b)	A heart-lung machine is a piece of equipment that temporarily takes over the work of the heart and/or lungs, providing blood and oxygen to the body. Explain the functions & significance of a heart-lung machine including its components.	13	K5	CO2
13.	a)	Evaluate the importance of sterilization and maintenance protocols for surgical instruments in ensuring patient safety. Discuss common methods of sterilization in health care settings.	13	K5	CO3
		(OR)			
	b)	Illustrate and distinguish between the endoscopic and laparoscopic procedures.	13	K4	CO3
14.	a)	Elaborate the working of the equipment that fuses cutting-edge technology and principles of physics to take images of the inside of the body with an illustration.	13	K4	CO4
		(OR)			
	b)	How effective are the maintenance and working of centralized systems in Indian hospitals? Elaborate on their pros and cons.	13	K5	CO4
15.	a)	The major source of potentially lethal currents in any instrument or equipment is the leakage current. Justify the given statement and describe the types of leakage current.	13	K5	CO5
		(OR)			
	b)	Evaluate and illustrate the various prevention methods of electrical accidents in hospital.	13	K5	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	You have been assigned the task of designing a computerized patient-monitoring system for an Intensive Care Unit (ICU) in a medium-size community hospital. What parameters would you monitor and what will be role of the computer? Draw a block diagram of a typical system and explain the purpose of each block.	15	K6	CO1
		(OR)			
	b)	Medical errors can be defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim. Among the problems that commonly occur during the course of providing health care are adverse drug events and improper transfusions, surgical injuries and wrong-site surgery, suicides, restraint-related injuries or death, falls, burns, pressure ulcers, and mistaken patient identities. High error rates with serious consequences are most likely to occur in intensive care units, operating rooms, and emergency departments.		K6	CO5
		i. Compare & contrast the approaches to electrical safety in patient care environment.	8		
		ii. Discuss the role of healthcare personnel, equipment design, maintenance protocols and regulatory standard in preventing electrical hazards.	7		