SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF MEDICAL ELECTRONICS

QUESTION BANK

V SEMESTER-
MEDICAL ELECTRONICS

1910501 – THERAPEUTIC EQUIPMENTS

Regulation – 2019

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Prepared by

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Branch – MEDICAL ELECTRONICS

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SUBJECT : 1910501 THERAPEUTIC EQUIPMENTS

SEM / YEAR : V / III

UNIT I – CARDIAC ASSIST DEVICES			
Cardiac pacemakers-Need, types and functional characteristics, AC Cardiac defibrillators, disadvantages, DC defibrillator, types- Instantaneous, Cardioverter.			
PART – A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Classify the types of pacemakers.	**BTL 2**	**Understanding**
2.	Why do we require a synchronization function in defibrillator?	**BTL 1**	**Remembering**
3.	List the types of batteries used for implantable pacemaker.	**BTL 1**	**Remembering**
4.	Define counter shock.	**BTL 1**	**Remembering**
5.	Indicate the advantages and disadvantages of standby pacemakers.	**BTL 2**	**Understanding**
6.	Examine important factors that demand internal pace maker's usage.	**BTL 4**	**Analyzing**
7.	Construct the block diagram of automatic defibrillator.	**BTL 3**	**Applying**
8.	How are pulses generated in competitive pace makers?	**BTL 1**	**Remembering**
9.	Name the electrodes used for defibrillation.	**BTL 1**	**Remembering**
10.	Interpret the need for using a cardiac pacemaker.	**BTL 2**	**Understanding**
11.	Write down the advantage of DC defibrillator over AC defibrillator.	**BTL 4**	**Analyzing**
12.	Identify the cause of fibrillation.	**BTL 2**	**Understanding**
13.	Differentiate between AC and DC defibrillators.	**BTL 4**	**Analyzing**
14.	Choose the difference between external and internal pacemaker.	**BTL 3**	**Applying**
15.	Calculate the energy stored in 16μF capacitor of a DC defibrillator that is charged to a potential of 5000 V dc.	**BTL 4**	**Analyzing**
16.	Analyze the phenomenon of fibrillation.	**BTL 4**	**Analyzing**
17.	Distinguish between internal and external defibrillator.	**BTL 4**	**Analyzing**
18.	Identify the type of defibrillator preferred in cardiac emergencies.	**BTL 3**	**Applying**
19.	Mention the classification of pacing modes.	**BTL 2**	**Understanding**
20.	Outline the usage of demand pacemaker.	**BTL 3**	**Applying**
21.	Infer the significance of heart simulation during T-wave	**BTL 4**	**Analyzing**
22.	Enlist the effects of the AV block in human heart.	**BTL 1**	**Remembering**
23.	Sketch the phenomenon of premature ventricular contractions in ECG.	**BTL 3**	**Applying**
24.	Draw the condition of ventricular tachycardia in a ECG waveform	**BTL 3**	**Applying**
PART B			
1.	What is pacemaker? How pacemakers are classified based on the modes of operation? Explain in detail. (13)	**BTL 1**	**Remembering**
2.	Illustrate the following techniques. (i) Demand pacemaker. (6) (ii) Atrial synchronous pacemaker. (7)	**BTL 3**	**Applying**
3.	Explain the principle and operations of DC defibrillators. (13)	**BTL 3**	**Applying**
4.	Examine about a cardioverter with the help of block diagram. (13)	**BTL 3**	**Applying**

5.	(i) Demonstrate the principle and operations of dual peak DC defibrillators. (8) (ii) Identify the advantages and disadvantages of DC defibrillator. (5)	**BTL 3**	**Applying**
6.	Write a brief note on implantable defibrillators. (13)	**BTL 1**	**Remembering**
7.	Indicate ventricular asynchronous pacemaker with the help of square wave generator and monostable multivibrator circuit. (13)	**BTL 2**	**Understanding**
8.	Draw a block diagram of the automatic defibrillator and analyze the importance of each block. (13)	**BTL 2**	**Understanding**
9.	Construct the circuit diagram of fixed rate pacemaker and explain its working principle. (13)	**BTL 4**	**Analyzing**
10.	(i) Distinguish between internal and external pacemaker. (7) (ii)Analyze the working principle of ventricular synchronous pacemaker. (6)	**BTL 4**	**Analyzing**
11.	Write the function of a typical modern pacemaker with the help of block diagram. (13)	**BTL 1**	**Remembering**
12.	Indicate the components, specification and method of stimulation of pacemaker. (13)	**BTL 2**	**Understanding**
13.	(i) When to use a defibrillator system? (6) (ii) explain the need of cardiac pacemaker. (7)	**BTL 2**	**Understanding**
14.	Review the working principle synchronized DC defibrillator. (13)	**BTL 2**	**Understanding**
15	Write different codes for the commercially available pacemaker. (13)	**BTL 1**	**Remembering**
16	Inspect the constructional details for a implantable pacemakers. (13)	**BTL 4**	**Analyzing**
17	Examine the problems associated with the leads and electrodes of a pacemaker. (13)	**BTL 4**	**Analyzing**
	PART C		
1.	(i) Classify the types of implantable pacemakers and explain their functions with necessary diagrams. (10) (ii) Demonstrate the two types of electrode system used in implantable pacemaker. (5)	**BTL 3**	**Applying**
2.	Categorize the different types pacemaker with suitable diagram. (15)	**BTL 4**	**Analyzing**
3.	Infer the following in detail, (i) AC defibrillator (7) (ii) DC defibrillator (8)	**BTL 2**	**Understanding**
4.	Write the discharge control and recording circuitry of a microprocessor-based defibrillator monitor. (15)	**BTL 1**	**Remembering**
5.	Sketch a system to analyze the operational functioning of a defibrillators. (15)	**BTL 3**	**Applying**
	UNIT II – DIATHERMY AND MEDICAL STIMULATORS		
	IR and UV lamp and its application. Short wave diathermy, ultrasonic diathermy, Microwave diathermy, Electro surgery machine - Current waveforms, Tissue Responses, Electro surgical currentlevel, Hazards and safety procedures. Electric stimulators- current waveforms-Galvani, Faradic, exponential surged-IFT and TENS-Lithotripsy- Therapeutic applications of laser.		
	PART – A		
Q.No	**Questions**	**BT Level**	**Competence**
1.	What is the thermal effect of IR lamp?	**BTL 1**	**Remembering**
2.	State the term fulguration.	**BTL 1**	**Remembering**
3.	Draw the cutting and coagulation waveforms generated by surgical diathermy machine.	**BTL 4**	**Analyzing**
4.	Cite the common conditions where TENS is used?	**BTL 1**	**Remembering**

5.	Choose some of the features of ultrasonic type diathermy.	**BTL 3**	**Applying**
6.	Define Lithotripsy.	**BTL 1**	**Remembering**
7.	Sketch the block diagram of an ultrasonic therapy unit.	**BTL 2**	**Understanding**
8.	List the advantages of diathermy.	**BTL 1**	**Remembering**
9.	Identify the risk associated with electro surgery.	**BTL 2**	**Understanding**
10.	Report the use of two main circuits used in short wave diathermy machine.	**BTL 2**	**Understanding**
11.	Interpret the methods involved in short wave diathermy.	**BTL 3**	**Applying**
12.	Categorize the different types of electro-surgery techniques commonly employed in practice.	**BTL 4**	**Analyzing**
13.	Apply the principle of heat distribution in the body tissues in a short wave andmicrowave Diathermy.	**BTL 3**	**Applying**
14.	Illustrate the safety precautions to be followed while preparing electrosurgical unit.	**BTL 3**	**Applying**
15.	Enumerate the advantages of short-wave diathermy.	**BTL 2**	**Understanding**
16.	Construct the block diagram of solid state electro-surgical unit.	**BTL 3**	**Applying**
17.	Apply the use of laser in therapy applications.	**BTL 3**	**Applying**
18.	Outline the different ways for applying ultrasonic to the body.	**BTL 2**	**Understanding**
19.	Summarize the importance of diapulse therapy technique used indiathermy.	**BTL 2**	**Understanding**
20.	How does a TENS machine open or close a gate?	**BTL 1**	**Remembering**
21	Sketch the schema of a surgical diathermy machine.	**BTL 4**	**Analyzing**
22	Draw the waveform to coagulate using spark gap generator and solid state diathermy system.	**BTL 4**	**Analyzing**
23	Plot the cut made using a conventional ESU	**BTL 4**	**Analyzing**
24	Differentiate between the waveform to cut a tissue using solid state diathermy machine and electron tube circuit.	**BTL 4**	**Analyzing**
	PART B		
1.	What is diathermy? Draw the circuit diagram of a short-wave diathermy and discuss its impact on therapy in detail. (13)	**BTL 1**	**Remembering**
2.	(i) Interpret the application techniques in short- wave diathermy machines. (8) (ii) Why the diapulse therapy is preferred? (5)	**BTL 2**	**Understanding**
3.	(i) Explain the principle of heating using microwaves. (5) (ii) Elaborate the working of microwave diathermy machine with the help of a simplified circuit diagram. (8)	**BTL 2**	**Understanding**
4.	(i) With a block diagram, examine the working function of ultrasonic therapy. (8) (ii) What are the advantages of using ultrasonic for therapeutic purposes? (5)	**BTL 3**	**Applying**
5.	Illustrate the following with respect to ultrasonic therapy unit (i) Dosage control. (6) (ii) Application technique. (7)	**BTL 2**	**Understanding**
6.	Summarize in detail the electrodes used in surgical diathermy (13)	**BTL 2**	**Understanding**
7.	Inspect the working principle of surgical diathermy machine with a block diagram. (13)	**BTL 4**	**Analyzing**
8.	Compare different diathermy techniques with neat waveforms. (13)	**BTL 4**	**Analyzing**
9.	Write short notes on the following. (i) Galvanic Current (4) (ii) Faradic current (3) (iii) Surging Current (3) (iv) Biphasic Stimulation (3)	**BTL 1**	**Remembering**
10.	(i) Label the current waveforms normally employed in electro diagnosisand electrotherapy. (7) (ii) Define the typical specifications of an electro-diagnostic therapy unit. (6)	**BTL 1**	**Remembering**

11.	Draw a block diagram electrosurgical diathermy and List the working in detail. (13)	**BTL 3**	**Applying**
12.	Express the detailed view on TENS. (13)	**BTL 3**	**Applying**
13.	Outline the working principle of extracorporeal lithotripsy with the help of a neat diagram. (13)	**BTL 4**	**Analyzing**
14.	Enlist the different therapeutic application of laser. (13)	**BTL 1**	**Remembering**
15	Analyze the various electrodes used with surgical diathermy system. (13)	**BTL 4**	**Analyzing**
16	Categorize the various circuit configurations for safety operation of the ESUs. (13)	**BTL 4**	**Analyzing**
17.	Examine the principle and operation of laser and discuss the importance of laser safety. (13)	**BTL 3**	**Applying**
	PART C		
1.	Write the different types of High frequency heat therapy with healing injured tissues. (15)	**BTL 1**	**Remembering**
2.	Explain the different methods of applying electrodes in shortwave diathermy treatment. (15)	**BTL 3**	**Applying**
3.	Elaborate in detail about the electrotherapy. (15)	**BTL 3**	**Applying**
4.	Infer the schematic diagram of a lithotripter system with biplane X-ray imaging and discuss in detail. (15)	**BTL 2**	**Understanding**
5.	Integrate a system to analyze the operational functioning of a surgical diathermy units. (15)	**BTL 4**	**Analyzing**

UNIT III – EXTRACORPOREAL DEVICES

Indication and principle of Haemodialysis, Dialysate, different types of Hemodialyzers, peritoneal dialyser monitoring systems, Need for heart lung machine, functioning of bubble, disc type and membrane type oxygenators, finger pump, roller pump, monitoring systems.

PART – A

Q.No	Questions	BT Level	Competence
1.	Summarize the components of heart lung machine.	**BTL 2**	**Understanding**
2.	When do you need heart lung machine?	**BTL 1**	**Remembering**
3.	List the important functions of kidneys.	**BTL 1**	**Remembering**
4.	Define the function of hemodialysis system.	**BTL 1**	**Remembering**
5.	Outline the two parts of the nephron.	**BTL 2**	**Understanding**
6.	Examine the risk associated with hemodialysis.	**BTL 4**	**Analyzing**
7.	Construct the block diagram of an artificial kidney.	**BTL 3**	**Applying**
8.	How is oxygenators used in heart lung machine?	**BTL 1**	**Remembering**
9.	What is dialysate? Mention its composition.	**BTL 1**	**Remembering**
10.	Classify dialyzer based on design considerations.	**BTL 2**	**Understanding**
11.	Write down the average value of systolic and diastolic pressure for the normal adult.	**BTL 4**	**Analyzing**
12.	Name the three main functional units of heart lung machine.	**BTL 1**	**Remembering**
13.	Mention the reason behind the centrifugal pump has replaced roller pump for routine CPB.	**BTL 2**	**Understanding**
14.	Choose the difference between a CPB and heart lung machine.	**BTL 3**	**Applying**
15.	Enlist the basic types of exchangers used in artificial kidney.	**BTL 2**	**Understanding**
16.	Outline the simplified block diagram of dialysis process.	**BTL 3**	**Applying**
17.	Distinguish between extracorporeal dialysis and intracorporeal dialysis.	**BTL 4**	**Analyzing**
18.	Identify the two different names used for heart lung machine.	**BTL 3**	**Applying**
19.	Infer the function of membrane in the dialysis process.	**BTL 2**	**Understanding**
20.	Determine UF Rate in L/hr for the given values take off liquid for treatment =1L, time = 4 hours	**BTL 3**	**Applying**
21.	Analyze the significance of ultrafiltration.	**BTL 4**	**Analyzing**
22.	Criticize the process of simple diffusion	**BTL 4**	**Analyzing**
23	Examine the importance of osmosis	**BTL 4**	**Analyzing**

24	Interpret the principle of reverse osmosis (RO)	**BTL 3**	**Applying**
	PART B		
1.	Describe in detail the principle of heart lung machine with diagram. (13)	**BTL 1**	**Remembering**
2.	Illustrate the following with neat diagrams. (i) Bubble oxygenators (7) (ii) Peritoneal dialysis. (6)	**BTL 3**	**Applying**
3.	Demonstrate the principle used in the pump oxygenators in detail with the help of neat diagram. (13)	**BTL 3**	**Applying**
4.	List important points about the different types of oxygenators. (13)	**BTL 1**	**Remembering**
5.	Explain ultrafiltration rate monitor with the help of neat block diagram. (13)	**BTL 3**	**Applying**
6.	Give a detailed account on classification of dialyzer according to three basic design consideration. (13)	**BTL 1**	**Remembering**
7.	Examine the simplified circuit diagram of conductivity of dialysate and explain in detail. (13)	**BTL 3**	**Applying**
8.	Point out in detail about the performance analysis of dialyzer. (13)	**BTL 4**	**Analyzing**
9.	Analyze in detail any one of the techniques to remove waste products from the blood. (13)	**BTL 4**	**Analyzing**
10.	(i) Compare hemodialysis and peritoneal dialysis. (4) (ii) Examine any one of the above in a detailed manner along with its merits and demerits. (9)	**BTL 4**	**Analyzing**
11.	Write brief notes on the following oxygenators (i) Disc type (7) (ii) Membrane type (6)	**BTL 1**	**Remembering**
12.	Elucidate the application of heart lung machine during open heart surgery. (13)	**BTL 2**	**Understanding**
13.	Summarize in detail about the artificial kidney and its functions. (13)	**BTL 2**	**Understanding**
14.	Draw a block diagram of blood leak detector using LED as a light source and analyze the importance of each block. (13)	**BTL 4**	**Analyzing**
15	Enumerate important functions of kidneys with a neat diagram of the human renal system. (13)	**BTL 2**	**Understanding**
16	Report the changes in the body fluids that occurs during renal disease. (13)	**BTL 2**	**Understanding**
17	Analyze the principle of dialysis used in artificial kidneys. (13)	**BTL 4**	**Analyzing**
	PART C		
1.	Review the cardiovascular circulation and heart lung machine model used during surgeries. (15)	**BTL 2**	**Understanding**
2.	Identify the principle of dialysis in the artificial kidney. What are the different types of dialyzers? Explain their construction and principle of operation. (15)	**BTL 4**	**Analyzing**
3.	Write the natural process of filtration to that process used in portable kidney machine. (15)	**BTL 1**	**Remembering**
4.	Examine the circuit diagram for dialysate temperature control and measurement. (15)	**BTL 3**	**Applying**
5	Analyze the functioning of dialyzers with various different performance measures. (15)	**BTL 4**	**Analyzing**

UNIT IV – RESPIRATORY AIDS			
Ventilator- Need, Types, Intermittent positive pressure, breathing apparatus operating sequence, electronic IPPB unit with monitoring for all respiratory parameters, Humidifier, Nebulizer, Aspirator, Infant incubators.			
PART – A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Classify ventilator based on the method of initiating inspiratory phase.	**BTL 2**	**Understanding**
2.	When does a ventilator offer the best chance of survival?	**BTL 1**	**Remembering**
3.	Outline the contradiction for IPPB.	**BTL 2**	**Understanding**
4.	How is IPPB different from intermittent positive pressure ventilation?	**BTL 1**	**Remembering**
5.	What is a nebulizer?	**BTL 1**	**Remembering**
6.	Illustrate the risk associated with a ventilator.	**BTL 3**	**Applying**
7.	Draw the functional diagram of a positive pressure ventilator.	**BTL 3**	**Applying**
8.	List the parameters need to be monitored while using ventilator.	**BTL 1**	**Remembering**
9.	Who needs the nebulizer?	**BTL 1**	**Remembering**
10.	Summarize the benefits of IPPB.	**BTL 2**	**Understanding**
11.	Differentiate hypo ventilation and hyper ventilation.	**BTL 4**	**Analyzing**
12.	Define lung compliance.	**BTL 1**	**Remembering**
13.	Review the side effects caused by using ventilators for a long time.	**BTL 2**	**Understanding**
14.	Identify the other names for ventilators	**BTL 3**	**Applying**
15.	Predict the main functions of ventilator.	**BTL 4**	**Analyzing**
16.	Give the reason for using the medical incubator.	**BTL 3**	**Applying**
17.	Asses the importance of using aspirator that are often included as part of a ventilator.	**BTL 4**	**Analyzing**
18.	Choose the difference between aspirator and a pump.	**BTL 3**	**Applying**
19.	Give the advantages of nebulizer.	**BTL 2**	**Understanding**
20.	Illustrate the factors that affect the performance of humidifier.	**BTL 3**	**Applying**
21	Examine the conducting section of the human respiratory system	**BTL 4**	**Analyzing**
22	Sort and arrange different divisions in the respiratory section.	**BTL 4**	**Analyzing**
23	Draw the schematic diagram of alveolar gas exchange.	**BTL 4**	**Analyzing**
24	Mention the importance of the process of respiration	**BTL 2**	**Understanding**
PART B			
1.	Describe in detail the different mechanical modes of operation of ventilator. (13)	**BTL 1**	**Remembering**
2.	Explain in detail about the artificial ventilation. (13)	**BTL 2**	**Understanding**
3.	Demonstrate the principle and operations of continuous positive airway pressure apparatus with the help of neat diagram. (13)	**BTL 3**	**Applying**
4.	Elaborate in detail about the infant incubators. (13)	**BTL 3**	**Applying**
5.	Express the detailed view on high frequency ventilators. (13)	**BTL 3**	**Applying**
6.	Define the principle of humidifier functions. State its advantages and disadvantages. (13)	**BTL 1**	**Remembering**
7.	Integrate a medical equipment for a person with asthma or another respiratory condition to administer medication directly and quickly t o the lungs. (13)	**BTL 4**	**Analyzing**
8.	Draw a block diagram of microprocessor-controlled ventilator and analyze the importance of each block. (13)	**BTL 4**	**Analyzing**
9.	Identify the different methods of classification of ventilator. (13)	**BTL 2**	**Understanding**
10.	Categorize the two basic types of ventilators based on clinical usage in detail. (13)	**BTL 4**	**Analyzing**

11.	Write short notes on (i) Aspirator (4) (ii) Humidifier (5) (iii) Nebulizer (4)	**BTL 1**	**Remembering**
12.	Summarize the different terms associated with ventilator in detail. (13)	**BTL 2**	**Understanding**
13.	Illustrate the different types of nebulizers. (13)	**BTL 3**	**Applying**
14.	Analyze the IPPB unit for monitoring all respiratory parameters. (13)	**BTL 4**	**Analyzing**
15.	Indicate the different lung volumes used for diagnosis (13)	**BTL 2**	**Understanding**
16	Infer in detail the lung capacities used for diagnosis (13)	**BTL 2**	**Understanding**
17	Identify the performance of ventilators using its pressure-volume diagrams. (13)	**BTL 2**	**Understanding**
	PART C		
1.	Explain in detail about the mechanics of respiration. (15)	**BTL 2**	**Understanding**
2.	Write the appropriate pressure flow and volume diagram with its pause time. (15)	**BTL 1**	**Remembering**
3.	Integrate a suitable device that can assist in respiration and discuss in detail. (15)	**BTL 4**	**Analyzing**
4.	Elaborate in detail about the modern ventilators. (15)	**BTL 3**	**Applying**
5	Illustrate the importance of the following (i) Mandatory Minutes Volume Ventilation. (3) (ii) Controlled Mandatory Ventilation. (3) (iii) Assisted Spontaneous Breathing. (3) (iv) Positive End Expiratory Pressure. (3) (v) Continuous Positive Airway Pressure. (3)	**BTL 3**	**Applying**

UNIT V – RADIATION THERAPY AND RADIATION SAFETY

Effects of 8onizing radiation, Radiation therapy – Cobalt, Cesium therapy, linear accelerator, betatron, cyclotron, brachytherapy. Radiation safety-Hazardous Effects of Radiation, Radiation measuringunits, Allowed Levels, Radiation protection in medicine- radiation protection principles, ICRP regulation, Protection methods.

PART – A

Q.No	Questions	BT Level	Competence
1.	How does ionizing radiation affect humans?	**BTL 1**	**Remembering**
2.	Compare ionizing and nonionizing radiation.	**BTL 4**	**Analyzing**
3.	Summarize the benefits of using cobalt-60.	**BTL 2**	**Understanding**
4.	What is ionization effect?	**BTL 1**	**Remembering**
5.	Choose the different devices used to protect external radiation exposure.	**BTL 3**	**Applying**
6.	Name few blocks in the subsystem of linear accelerator machine.	**BTL 1**	**Remembering**
7.	Differentiate cyclotron and betatron.	**BTL 2**	**Understanding**
8.	Identify the few sources of ionizing radiation.	**BTL 3**	**Applying**
9.	Point out the three major components of linear accelerator machine.	**BTL 4**	**Analyzing**
10.	Define brachytherapy.	**BTL 1**	**Remembering**
11.	Classify the major subsystems of cobalt machine.	**BTL 2**	**Understanding**
12.	Find the three important factors which influence radiation exposure.	**BTL 1**	**Remembering**
13.	When do ionizing radiations become safe?	**BTL 1**	**Remembering**
14.	Interpret the term ALARA.	**BTL 3**	**Applying**
15.	Illustrate the principle behind the inverse square law.	**BTL 3**	**Applying**

16.	Indicate the use of radioactive and non-radioactive cesium.	**BTL 2**	**Understanding**
17.	Give some examples of brachytherapy.	**BTL 2**	**Understanding**
18.	List out the advantages of linear accelerator.	**BTL 4**	**Analyzing**
19.	Enlist the difference between deterministic and stochastic effects.	**BTL 2**	**Understanding**
20.	Compare and contrast the three principles used for radiation protection.	**BTL 4**	**Analyzing**
21	Categorize the methods used to manage cancer.	**BTL 4**	**Analyzing**
22	Inspect the significance of high voltage X-ray machines.	**BTL 4**	**Analyzing**
23	Interpret the major subsystems in a cobalt machine.	**BTL 3**	**Applying**
24	Apply the significance of ICRP guidelines for radiation safety	**BTL 3**	**Applying**
	PART B		
1.	Describe in detail about the effects of ionizing radiation. (13)	**BTL 1**	**Remembering**
2.	Illustrate the operation of betatron with neat diagram. (13)	**BTL 2**	**Understanding**
3.	Demonstrate the principle of operation of cyclotron. (13)	**BTL 3**	**Applying**
4.	Explain about the constructional detail of cobalt machine. (13)	**BTL 2**	**Understanding**
5.	Express the detailed view on radiation measuring units. (13)	**BTL 3**	**Applying**
6.	Write short notes on cobalt and cesium therapy. (13)	**BTL 1**	**Remembering**
7.	Elaborate in detail about the radiation safety principles. (13)	**BTL 4**	**Analyzing**
8.	Draw the schematic diagram of accelerator and collimator subsystems in detail. (13)	**BTL 4**	**Analyzing**
9.	Categorize the different principles of radiation protection and discuss in detail. (13)	**BTL 4**	**Analyzing**
10.	Explain the operation and working principle of medical linear accelerator machine. (13)	**BTL 3**	**Applying**
11.	What is radiation therapy? What are the different radiotherapy techniques available? Explain any one of them. (13)	**BTL 1**	**Remembering**
12.	Classify the different methods of mounting the accelerator and explain in detail. (13)	**BTL 2**	**Understanding**
13.	Summarize about the radiation protection in medicine. (13)	**BTL 2**	**Understanding**
14.	Examine the different blocks present in medical linear accelerator and explain in detail with the help of neat block diagram. (13)	**BTL 4**	**Analyzing**
15	Elaborate the functional principle of brachytherapy with a neat diagram. (13)	**BTL 3**	**Applying**
16	Define and elaborate the methods of radiation protection in medicine. (13)	**BTL 1**	**Remembering**
17	Analyze the schematic of on-off transition mechanism in the cobalt machine. (13)	**BTL 4**	**Analyzing**
	PART C		
1.	Interpret about the hazardous effect of radiation. (15)	**BTL 3**	**Applying**
2.	Explain in detail about linac device with the help of neat block diagram. (15)	**BTL 2**	**Understanding**
3.	Employ the layout of the accelerator with respect to the patient. (15)	**BTL 3**	**Applying**
4.	Write the following to radiation safety in detail (i) ICRP regulation. (8) (ii) Optimization of radiation protection. (7)	**BTL 1**	**Remembering**
5.	Infer different radiation measuring units and emphasis on the significance of allowed level of radiation. (15)	**BTL 2**	**Understanding**