SRM VALLIAMMAI ENGINEERING COLLEGE
(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF

ELECTRONICS AND COMMUNICATION ENGINEERING

QUESTION BANK

V SEMESTER

1906009 – MEDICAL ELECTRONICS

Regulation – 2019

Academic Year 2022 – 2023

Prepared by

Mr. C.Saravanakumar, Assistant Professor (Sl.G)/ECE

SRM VALLIAMMAI ENGINEERING COLLEGE
(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

QUESTION BANK

SUBJECT : 1906009 – MEDICAL ELECTRONICS

SEM / YEAR: V / III year B.E.

UNIT I - ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING				
Sources of bio medical signals, Bio-potentials, Biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, typical waveforms and signal characteristics.				
Q. No	**Questions**		**BT Level**	**Competence**
PART – A				
1.	What is meant by Resting Potential?		BTL 1	Remembering
2.	What is Action Potential.		BTL 2	Understanding
3.	Define Sodium pump.		BTL 1	Remembering
4.	Explain Bioelectric potential?		BTL 2	Understanding
5.	What is half cell potential?		BTL 1	Remembering
6.	Mention any 4 physiological signals.		BTL 4	Analyzing
7.	State All – or – Nothing Law.		BTL 1	Remembering
8.	Classify bio potential electrodes.		BTL 3	Applying
9.	Write the Nernst equation for electrode potential.		BTL 4	Analyzing
10.	How does Einthoven Triangle used in ECG Measurement?		BTL 4	Analyzing
11.	What are the important bands of frequencies in EEG and state their importance.		BTL 4	Analyzing
12.	Mention the factors to be considered while selecting a transducer?		BTL 2	Understanding
13.	Draw the Einthovan triangle.		BTL 1	Remembering
14.	State the importance of PCG signals.		BTL 2	Understanding
15.	List the lead systems used in ECG recordings.		BTL 2	Understanding
16.	What are the requirements of bioamplifiers?		BTL 1	Remembering
17.	Draw the electrical equivalent circuit of a surface electrode.		BTL 3	Applying
18.	State how a phonocardiogram and an electrocardiogram signals differ in their clinical information.		BTL 4	Analyzing
19.	Summarize the normal amplitude and frequency of EMG signal.		BTL 3	Applying
20.	Compare the electrodes used for ECG, EEG and EMG.		BTL 3	Applying
21.	Differentiate Intracellular fluid from Extracellular fluid.		BTL 3	Applying
22.	Draw the action potential waveform		BTL 2	Understanding
23.	Illustrate a typical ECG waveform with a diagram.		BTL 4	Analyzing
24.	What are the properties of gel which are used in the pregelled disposal electrodes?		BTL 3	Applying
PART – B				
1.	Discuss in detail about the resting and action potential.	(13)	BTL 1	Remembering
2.	(i) What is an Surface electrode?	(3)	BTL 3	Applying

	(ii) How it is used to measure bio electric potential? Discuss about its types.	(10)		
3.	How the needle electrode is used in recording bio potential?	(13)	BTL 2	Understanding
4.	What should be the characteristics of bio potential amplifiers? Explain with proper Justification.	(13)	BTL 4	Analyzing
5.	Explain the working of differential amplifier used in medical applications	(13)	BTL 1	Remembering
6.	Discuss the working of Chopper amplifiers	(13)	BTL 1	Remembering
7.	What are the methods to construct isolation amplifiers? Describe in detail.	(13)	BTL 3	Applying
8.	Draw and explain the ECG waveform in detail	(13)	BTL 2	Understanding
9.	Illustrate the three types of ECG Lead configurations with supporting diagrams.	(13)	BTL 2	Understanding
10.	With the neat diagram, analyse the ECG waveform with different block.	(13)	BTL 4	Analyzing
11.	Write the classification of brain waves along with its pattern.	(13)	BTL 4	Analyzing
12.	With the help of block diagram, explain the modern EEG unit.	(13)	BTL 2	Understanding
13.	(i) What is Electromyogrpahy(EMG)? (ii) Describe recording of the EMG signal with the block diagram.	(3) (10)	BTL 4	Analyzing
14.	Write short notes on Electromyogram.	(13)	BTL 3	Applying
15.	Draw the recording setup for Phonocardiography and describe about each blocks in detail.	(13)	BTL 1	Remembering
16.	Explain the four basic separate heart sounds that occur during the sequence of one complete cardiac cycle.	(13)	BTL 2	Understanding
17.	Classify the Heart Sounds based on the mechanism of its origin and explain each.	(13)	BTL 3	Applying
	PART – C			
1.	Describe the basic components of a bio medical system with a block diagram.	(15)	BTL 1	Remembering
2.	Describe the ECG Recording System with a block diagram.	(15)	BTL 1	Remembering
3.	Draw and explain the 10-20 electrode system used for EEG measurement.	(15)	BTL 3	Applying
4.	Explain the types of bio potential electrodes with the support of neat diagrams.	(15)	BTL 2	Understanding
5.	Compare the Signal characteristics of ECG and EMG	(15)	BTL 4	Analyzing

UNIT - II: BIO-CHEMICAL AND NON-ELECTRICAL PARAMETER MEASUREMENT			
pH, PO2, PCO2, Colorimeter, Blood flow meter, Cardiac output, respiratory, blood pressure, temperature and pulse measurement, Blood Cell Counters.			
Q. No	**Questions**	**BT Level**	**Competence**
	PART – A		
1.	Write the equation for anode, cathode reaction in PO2 electrode.	BTL 1	Remembering
2.	What is meant by pH value of blood?	BTL 2	Understanding
3.	How does the pH value determine the alkalinity in blood fluid?	BTL 3	Applying
4.	What do you understand by electrophoresis?	BTL 2	Understanding
5.	What is korotkoff sound?	BTL 1	Remembering
6.	What are the typical values of blood pressure and pulse rate of an adult?	BTL 4	Analyzing
7.	Classify the types of blood pressure.	BTL 4	Analyzing
8.	What is calorimeter?	BTL 3	Applying
9.	Mention the applications of auto analyzer	BTL 4	Analyzing

10.	Name any four physical principles based on which blood flow meters are constructed.		BTL 1	Remembering
11.	What are the demerits of electromagnetic blood flow meter?		BTL 4	Analyzing
12.	What is Cardiac Output?		BTL 2	Understanding
13.	Mention the methods of measurement of cardiac output.		BTL 2	Understanding
14.	Find the cardiac output of a patient whose heart rate is 80BPM and a stroke volume of 80 millilitres per beat.		BTL 3	Applying
15.	Define residual volume		BTL 1	Remembering
16.	Name any two methods of respiration rate measurement.		BTL 1	Remembering
17.	How is the respiration rate measured?		BTL 4	Analyzing
18.	Write down the demerits of indirect method of blood pressure measurement.		BTL 4	Analyzing
19.	Which transducer is used for measuring temperature? Why?		BTL 3	Applying
20.	What is the principle used in pulse rate measurement?		BTL 3	Applying
21.	How is the pulse rate measured?		BTL 3	Applying
22.	State Beer and Lamberts Law.		BTL 2	Understanding
23.	What is meant by total lung capacity?		BTL 4	Analyzing
24.	What is residual volume		BTL 1	Remembering
PART – B				
1.	Describe a procedure for the measurement of pH in blood.	(13)	BTL 3	Applying
2.	Explain how PCO_2 can be measured.	(13)	BTL 4	Analyzing
3.	Construct the schematic of a simple colorimeter to measure the transmittance.	(13)	BTL 2	Understanding
4.	Describe the working of an electromagnetic flow meter with the help of a block diagram. Explain the working of each sub-system.	(13)	BTL 1	Remembering
5.	State and explain the principle behind the operation of Doppler blood flow meter	(13)	BTL 1	Remembering
6.	Write short notes on measurement of cardiac output using Dye Dilution method.	(13)	BTL 1	Remembering
7.	Describe the procedure to measure Total lung capacity using plethysmograph	(13)	BTL 3	Applying
8.	Describe the digital electronic thermometer with a circuit diagram.	(13)	BTL 2	Understanding
9.	Explain the methods to measure the changes in pulse due to blood flow.	(13)	BTL 2	Understanding
10.	Show the experimental setup for cardiac output measurement by impedance measurement and discuss on the measurement of cardiac output.	(13)	BTL 4	Analyzing
11.	Draw the block diagram of pulsed Doppler blood flow meter and explain the steps involved to measure the blood flow.	(13)	BTL 1	Remembering
12.	(i) What are the direct methods of measuring blood pressure? (ii) Draw a typical set up of a pressure measuring system by direct method.	(7) (6)	BTL 2	Understanding
13.	(i) What type of transducer is used for measuring direct blood pressure? (ii) Draw a simple circuit for calculating systolic and diastoylic blood pressure.	(7) (6)	BTL 4	Analyzing
14.	Explain the Korotkoff method for measurement of blood pressure.	(13)	BTL 3	Applying
15.	Assess the principle of coulter counter and with block diagram explain multi parameter coulter counter.	(13)	BTL 4	Analyzing
16.	Draw the block diagram of an automatic blood cell counter and explain its functioning.	(13)	BTL 2	Understanding
17.	Describe the principle of laser based blood cell counting using a schematic diagram.	(13)	BTL 3	Applying

PART – C				
1.	Summarize the different types of ultrasonic blood flow meter? Explain each in detail.	(15)	BTL 1	Remembering
2.	What is meant by the term "Cardiac output"? How is Cardiac output measured by Fick's method? Explain in detail.	(15)	BTL 3	Applying
3.	Describe the procedure to measure patients air flow rate during respiration using Pneumotachograph	(15)	BTL 1	Remembering
4.	Discuss on any one direct and indirect method of measurement of blood pressure.	(15)	BTL 2	Understanding
5.	In the body plethysmograph, the volume of the chamber is 0.20m3. The maximum thorax pressure is $2 * 10^5$ pascal and its minimum is $0.35 * 10^5$ pascal when the patient goes through breathing motions after the mouthpiece valve is closed. Meanwhile the chamber pressure goes from $0.97 * 10^5$ pascal to $1.03 * 10^5$ pascal. Calculate the total lung capacity.	(15)	BTL 4	Analyzing

UNIT - III: ASSIST DEVICES			
Cardiac pacemakers, DC Defibrillator, Dialyser, Ventilators, Magnetic Resonance Imaging Systems, Ultrasonic Imaging Systems.			
Q. No	**Questions**	**BT Level**	**Competence**
PART – A			
1.	Write the two important factors that demand internal pace maker's usage.	BTL 4	Analyzing
2.	What is the cardiac pacemaker and why it is used?	BTL 2	Understanding
3.	Classify Pacing modes.	BTL 1	Remembering
4.	What are the types of Pacemakers?	BTL 2	Understanding
5.	What are the batteries used for implantable pacemaker?	BTL 1	Remembering
6.	What types of electrodes are used in defibrillator?	BTL 4	Analyzing
7.	What is meant by Fibrillation?	BTL 1	Remembering
8.	Distinguish between internal pacemaker and external pacemaker.	BTL 3	Applying
9.	What is defibrillator?	BTL 4	Analyzing
10.	Which fibrillation is more dangerous and why?	BTL 1	Remembering
11.	Differentiate between internal defibrillator and external defibrillator.	BTL 4	Analyzing
12.	Mention the advantages of rectangular wave defibrillator.	BTL 2	Understanding
13.	Calculate energy stored in a 16μF capacitor of a defibrillator that is charged to a potential of 5000V DC.	BTL 4	Analyzing
14.	Classify the defibrillator based on applied voltage.	BTL 2	Understanding
15.	Draw the defibrillator output waveform and indicate the output energy level.	BTL 2	Understanding
16.	What are the batteries used for implantable pacemaker?	BTL 1	Remembering
17.	Which type of electrode is applied in the case of internal stimulation and what is the current range?	BTL 3	Applying
18.	Which type of electrode is applied in the case of external stimulation and what is the current range?	BTL 3	Applying
19.	State the disadvantages of AC defibrillator.	BTL 3	Applying
20.	Draw the circuit of DC defibrillator and give its output specifications.	BTL 3	Applying
21.	Mention any one disadvantage of DC defibrillator.	BTL 3	Applying
22.	What is the need for Dialysis?	BTL 2	Understanding
23.	State the advantages of Magnetic Resonance imaging.	BTL 4	Analyzing
24.	What are the three modes of display in ultrasonic imaging system?	BTL 1	Remembering

PART – B				
1.	Differentiate the internal pacemakers from external pacemakers.	(13)	BTL 4	Analyzing
2.	It is desired to deliver pacemaker pulses with period 0.857 second and energy per pulse 10.286μJ. The amp-hour rating of lithium cell is equal to 0.1 A-H and its terminal voltage is equal to 2.8 volts. (i)Calculate the energy in joules stored in the lithium cell (ii) Calculate the life time of that lithium cell.	 (7) (6)	BTL 4	Analyzing
3.	(i) How pacemakers are classified based on the modes of operation? (ii) Explain the working of Atrial synchronous pacemaker.	(7) (6)	BTL 2	Understanding
4.	Draw a circuit diagram of a fixed rate pacemaker and explain its working details	(13)	BTL 1	Remembering
5.	Explain the working of stand by pacemaker with its merits and demerits	(13)	BTL 1	Remembering
6.	With the help of the neat block diagram, discuss the operation of demand pacemaker	(13)	BTL 1	Remembering
7.	Construct the circuit diagram for a D.C. Defibrillator and explain the working of D.C. Defibrillator.	(13)	BTL 3	Applying
8.	(i) What is a defibrillator and classify the types of defibrillator based on the electrode placement. (ii) Explain the working principle of A.C. defibrillator.	(7) (6)	BTL 3	Applying
9.	Write short notes on (i) Synchronised D.C. defibrillator (ii)Square wave defibrillator	 (7) (6)	BTL 2	Understanding
10.	(i) Compute the energy per pulse when the pacemaker pulse width is 0.5 millisecond and pulse voltage is 3 volts, the circuit current drain is 0.5μA, the heart electrode resistance is 500 ohms and the heart rate is 70bpm. (ii) What are the difference between hemodialysis and Peritoneal Dialysis	(7) (6)	BTL 4	Analyzing
11.	Describe the procedure of hemodialysis with a suitable block diagram.	(13)	BTL 1	Remembering
12.	(i)What is a ventilator? Give its importance in respiratory failures? (ii)Describe the operation of pressure limited, volume limited and servo controlled ventilators.	(6) (7)	BTL 2	Understanding
13.	Elaborate the working of spirometer with a neat diagram.	(13)	BTL 4	Analyzing
14.	List any 6 recording devices for ultrasonic imaging system and explain about each of them.	(13)	BTL 3	Applying
15.	Discuss the working of Digital real time ultrasonic scanner.	(13)	BTL 1	Remembering
16.	State the Bio effects due to diagnostic ultrasound.	(13)	BTL 2	Understanding
17.	What are the advantages of NMR imaging system over other imaging system? List out the biological effects of this imaging modality.	(13)	BTL 3	Applying
PART – C				
1.	A defibrillator delivers a square pulse of 4000V with a duration of 4 millisceonds. The internal resistance of the defibrillator is about 15 ohms. The skin-electrode resistance is 50 ohms and the thorax resistance is 30 ohms. Compute (i) the energy delivered to the patient's thorax. (ii) the total energy available from the defibrillator. (iii) calculate the percentage of loss of energy.	 (5) (5) (5)	BTL 4	Analyzing
2.	Evaluate the principle of dialysis in the artificial kidney. What are the different types of dialyzers? Explain their construction and principle of operation.	(15)	BTL 3	Applying

3.	Draw a block diagram of a ventilator along with its accessories and explain its function.	(15)	BTL 2	Understanding
4.	Elaborate the computer controlled ultrasonic image forming system with a block diagram.	(15)	BTL 1	Remembering
5.	Describe the MRI instrumentation with a neat diagram	(15)	BTL 1	Remembering

UNIT IV - PHYSICAL MEDICINE AND BIOTELEMETRY				
Diathermies - Shortwave, ultrasonic and microwave type and their applications, Surgical Diathermy, Biotelemetry				
Q. No	**Questions**		**BT Level**	**Competence**
PART – A				
1.	What is Diathermy?		BTL 1	Remembering
2.	List the types of Diathermy.		BTL 2	Understanding
3.	State the need for the usage of high-frequency current in diathermy?		BTL 3	Applying
4.	What is the frequency of currents used in surgical diathermy units? Why?		BTL 4	Analyzing
5.	What is Dia-pulse shortwave diathermy?		BTL 1	Remembering
6.	What is the frequency of operation of ultrasound diathermy? What is the reason for this frequency selection?		BTL 4	Analyzing
7.	Mention any two diseases that can be cured by ultrasound diathermy.		BTL 1	Remembering
8.	What is the use of ultrasonic diathermy?		BTL 3	Applying
9.	What is microwave diathermy?		BTL 4	Analyzing
10.	Give the types and frequencies of operation of diathermy units.		BTL 1	Remembering
11.	Define Biotelemetry.		BTL 4	Analyzing
12.	Name the instruments needed for a bio-telemetry system.		BTL 2	Understanding
13.	Draw the block diagram of the Bio-telemetry system.		BTL 1	Remembering
14.	List the applications of Bio-telemetry.		BTL 2	Understanding
15.	Mention the advantages of a Bio-telemetry system.		BTL 2	Understanding
16.	Mention the scheme of modulation techniques used for Bio-telemetry.		BTL 1	Remembering
17.	Suggest a modulation technique to be used in Bio-telemetry when more than one signal is transmitted and recorded.		BTL 4	Analyzing
18.	Write down the advantage of double modulation in a wireless telemetry system.		BTL 2	Understanding
19.	What is the need for wireless telemetry?		BTL 3	Applying
20.	State about the modulation system used in the wireless telemetry?		BTL 3	Applying
21.	What are the various forms of multiplexing wireless telemetry systems?		BTL 3	Applying
22.	What are the various forms of multichannel wireless telemetry systems?		BTL 3	Applying
23.	Point out the problems associated with the implant telemetry circuits?		BTL 4	Analyzing
24.	Specify the frequencies used for Bio-telemetry.		BTL 1	Remembering
PART – B				
1.	Discuss the various electrosurgery techniques using the diathermy unit.	(13)	BTL 4	Analyzing
2.	With a neat diagram, explain the electrosurgical diathermy unit.	(13)	BTL 4	Analyzing
3.	(i) Explain the principle of heating using microwaves. (ii) Describe the working of the microwave diathermy machine with the help of a block diagram.	(3) (10)	BTL 2	Understanding
4.	With a simplified circuit diagram, explain the shortwave diathermy	(13)	BTL 1	Remembering

	unit.			
5.	Describe the pulsed shortwave diathermy and justify how it is more advantageous than traditional shortwave diathermy.	(13)	BTL 4	Analyzing
6.	Explain the ultrasonic diathermy unit with a neat block diagram.	(13)	BTL 1	Remembering
7.	(i) Explain the application technique of ultrasound therapy. (ii) How do we control the dosage in ultrasonic therapy units?	(7) (6)	BTL 3	Applying
8.	Explain the concept of automatic tuning in shortwave diathermy	(13)	BTL 2	Understanding
9.	Discuss the different methods of applying shortwave diathermy to the patients.	(13)	BTL 2	Understanding
10.	Explain the biotelemetry application on WIMAX networks.	(13)	BTL 4	Analyzing
11.	Describe the Single Channel Temperature Telemetry system with necessary diagram.	(13)	BTL 1	Remembering
12.	What are the components used to construct Single Channel ECG Transmitter?	(13)	BTL 2	Understanding
13.	(i) What are the common methods used for modulation in bio-telemetry system? (ii) Explain the pulse width modulator system with the help of a diagram.	(3) (10)	BTL 3	Applying
14.	Explain the working of a generalized FM telemetry transmitter.	(13)	BTL 2	Understanding
15.	Explain with the help of a diagram the working of a single channel ECG telemetry system.	(13)	BTL 1	Remembering
16.	(i) Which type of modulation system is used in a multichannel bio-telemetry system? (ii) Explain the multiplexing methods commonly used in multi-channel biotelemetry systems.	(3) (10)	BTL 3	Applying
17.	Describe the Multi-channel Patient Monitoring Telephone Telemetry System with necessary diagram.	(13)	BTL 3	Applying
	PART – C			
1.	Draw the block diagram of a surgical diathermy machine. Why do we use an isolated circuit in the output circuit?	(15)	BTL 3	Applying
2.	Describe in detail about the range and area of irritation of different diathermy techniques.	(15)	BTL 2	Understanding
3.	Justify the possibilities of sports physiology studies through telemetry with necessary diagrams.	(15)	BTL 4	Analyzing
4.	Describe with the help of a block diagram the telemetry system for ECG.	(15)	BTL 1	Remembering
5.	How to transmit bio-signals over telephone lines? Explain with the help of a diagram a single channel telephone telemetry system.	(15)	BTL 1	Remembering

UNIT V - RECENT TRENDS IN MEDICAL INSTRUMENTATION			
Telemedicine, Insulin Pumps, Radio pill, Endomicroscopy, Brain machine interface, Lab on a chip.			
Q. No	**Questions**	**BT Level**	**Competence**
	PART – A		
1.	Define BMI.	BTL 1	Remembering
2.	Write the principle behind the BMI method and list its applications.	BTL 2	Understanding
3.	Give the advantages of Insulin pumps.	BTL 1	Remembering
4.	State the feature of lab on chip.	BTL 2	Understanding
5.	Mention a few applications of BMI based system.	BTL 2	Understanding
6.	Draw the diagram of an endomicroscopy.	BTL 2	Understanding
7.	Summarize the necessary Parameters of cell signaling in the CNS.	BTL 4	Analyzing

8.	Examine the framework of Brain machine interface.		BTL 3	Applying
9.	Mention the advantages of performance of lab on chip module.		BTL 1	Remembering
10.	Write about any one of the implantable infusion systems.		BTL 1	Remembering
11.	List down the uses of components employed in an implantable insulin pump.		BTL 1	Remembering
12.	Explain the principle of telemedicine?		BTL 2	Understanding
13.	What is a radio pill?		BTL 2	Understanding
14.	What are the essential parameters of telemedicine?		BTL 2	Understanding
15.	Discuss the applications of passive pumping device in LOC.		BTL 4	Analyzing
16.	Compare the merits and demerits of various feature of BMI.		BTL 3	Applying
17.	Outline the simplified block diagram of insulin pump equipment.		BTL 3	Applying
18.	Point out the applications of Endomicroscopy method.		BTL 1	Remembering
19.	State the applications of telemedicine in health care.		BTL 3	Applying
20.	Justify the term Telemedicine for remote diagnosis and treatment in hospitals.		BTL 3	Applying
21.	What are the two concepts in telemedicine..		BTL 4	Analyzing
22.	How the data are recorded using a radio pill?		BTL 4	Analyzing
23.	What did you infer from the term endomicroscopy?		BTL 4	Analyzing
24.	Is endoscopy and endomicroscopy are same? Justify your answer.		BTL 3	Applying
	PART – B			
1.	Explain the telemedicine based communication method with a suitable block diagram.	(13)	BTL 1	Remembering
2.	Describe the working principle of the implantable type infusion system.	(13)	BTL 4	Analyzing
3.	Summarize the need for each of the essential components in endomicroscopy & its applications.	(13)	BTL 2	Understanding
4.	Examine the design procedure involved in the BMI with a neat diagram.	(13)	BTL 1	Remembering
5.	Describe in detail about infusion pumps system.	(13)	BTL 1	Remembering
6.	(i) Demonstrate about radio pills explain with necessary diagram. (ii) Give some applications radio pills in the recent trend medicine field.	(10) (3)	BTL 3	Applying
7.	Illustrate the different operations performed using endomicroscopy.	(13)	BTL 3	Applying
8.	Draw the various component used in an implantable insulin pump and explain in detail about the necessity of each component.	(13)	BTL 3	Applying
9.	(i) Define the nonlinear mixture of competitive linear models in BMI. (ii) Examine the Reaching task neuronal sensitivities sorted from minimum to maximum for a movement in Sensitivity-Based Pruning.	(7) (6)	BTL 4	Analyzing
10.	(i) List out the LOC applications. (ii) What are the salient features of Insulin pumps.	(7) (6)	BTL 4	Analyzing
11.	Write brief notes on the working principle of a Programmable volumetric infusion pump.	(13)	BTL 1	Remembering
12.	With necessary diagrams, discuss the working of an endomiroscopic unit.	(13)	BTL 2	Understanding
13.	Analyze the design procedure for testing the HIV using Lab on a chip in detail.	(13)	BTL 4	Analyzing
14.	Write notes on BMI with necessary illustrations	(13)	BTL 2	Understanding
15.	Explain how telemedicine helps the patients and medical	(13)	BTL 1	Remembering

	practitioners			
16.	Describe the working of the Drop rate counter-type infusion system?	(13)	BTL 2	Understanding
17.	Draw the block diagram of LOC and explain about the each blocks.	(13)	BTL 3	Applying
	PART – C			
1.	(i) Explain the various type of insulin pumps system in recent trend medicine. (ii) Conclude the specific advantages of insulin pumps.	(10) (5)	BTL 1	Remembering
2.	(i) Summarize the benefits and limitations of telemedicine. (ii) Assess the importance of LOC in recent trend in medicine.	(7) (8)	BTL 4	Analyzing
3.	Elaborate the principle of operation and application of Radio pill.	(15)	BTL 2	Understanding
4.	Discuss the basic application of BMI to implement different motor function interconnection between brains to hand and leg.	(15)	BTL 3	Applying
5.	Describe the artificial pancreas and its components in detail with a neat diagram.	(15)	BTL 1	Remembering