PRACTICE SET
End Semester Examination, May 2026

Program: BMLT
Semester: IV
Subject: Bio-signal Acquisition System
Subject Code: 42ABMT409
Course Outcome:
On the completion of the Course, the students will be able to:

Course Outcomes	Description
CO1	Understand the working with the biomedical equipment.
CO2	Explain the fundamentals of the types of biomedical sensors and transducers for biomedical data acquisition.
CO3	Understand Fundamentals of bio-signals and their pattern analysis.
CO4	Understand the fundamentals of the concept and design of biomedical equipment.
CO5	Understand the operation and maintenance of bio-recorders and medical display systems.

UNIT I

Section A (10 marks)

1. Define the term "Resting Potential" in a single sentence. **[CO3, Remember, LOT]**
2. Explain the process of depolarization in a cell. **[CO3, Understand, LOT]**
3. Show how to calculate the equilibrium potential of an ion using the Nernst equation. **[CO3, Apply, LOT]**
4. Name two primary differences between periodic and non-periodic bio-signals. **[CO3, Understand, LOT]**
5. Analyze the specific effect of 50Hz power line noise on an ECG recording. **[CO3, Analyze, HOT]**
6. Evaluate why cardiac rhythmicity is essential for a stable heart rate. **[CO3, Evaluate, HOT]**

Section B (20 marks)

7. Evaluate the impact of external electrical noise on the quality of EEG signals. **[CO1, Evaluate,HOT]**
8. Create a labeled diagram of an action potential showing all the phases. [**CO3, Create, HOT**]

UNIT II

Section A (10 marks)

9. State the basic function of a biomedical sensor. [**CO2, Remember, LOT**]
10. Describe the materials used to make a standard Ag/AgCl electrode. [**CO2, Understand, LOT**]
11. Apply the use of electrode gel to improve signal quality on dry skin. [**CO2, Apply, LOT**]
12. List two common recording problems found in biomedical transducers. [**CO2, Remember, LOT**]
13. Analyze the cause of motion artifacts when a patient moves during a test. [**CO2, Analyze, HOT**]
14. Evaluate the benefits of using disposable surface electrodes over needle electrodes. [**CO2, Evaluate, HOT**]

Section B (20 marks)

15. Analyze the different types of transducers used for biomedical applications. [**CO2, Analyze, HOT**]
16. Create a step-by-step remedy for fixing common electrode recording problems. [**CO2, Create, HOT**]

UNIT III

Section A (10 marks)

17. Name the main device used to amplify small bio-signals. [**CO4, Remember, LOT**]
18. Explain why filters are needed in a bio-signal acquisition system. [**CO4, Understand, LOT**]
19. Compute the gain of an amplifier if the output voltage is 200mV and input is 2mV. [**CO4, Apply, LOT**]
20. Describe the role of a Notch filter in removing interference. [**CO4, Understand, LOT**]
21. Analyze why high input impedance is critical for biomedical amplifiers. [**CO4, Analyze, HOT**]
22. Evaluate the safety purpose of using isolation amplifiers for patients. [**CO4, Evaluate, HOT**]

Section B (20 marks)

23. Evaluate the performance of low-pass versus high-pass filters in ECG processing. [**CO4, Evaluate, HOT**]
24. Create a block diagram for a basic signal conditioning unit for an EMG machine. [**CO4, Create, HOT**]

UNIT IV

Section A (10 marks)

25. Define the term "Radio Telemetry" for medical monitoring. [**CO4, Remember, LOT**]
26. Identify the core parts of a portable telemetry transmitter. [**CO4, Remember, LOT**]
27. Explain the advantage of using land-line telemetry for long-term monitoring. [**CO4, Understand, LOT**]
28. Show how FM modulation is used to transmit physiological data. [**CO4, Apply, LOT**]
29. Analyze the challenges of signal interference in a wireless hospital ward. [**CO4, Analyze, HOT**]

30. Evaluate the limitations of signal range in portable telemetry units. [**CO4, Evaluate, HOT**]

Section B (20 marks)

31. Analyze the workflow of a wireless ECG telemetry system from patient to monitor. [**CO4, Analyze, HOT**]
32. Create a design for a multi-channel telemetry system using multiplexing. [**CO4, Create, HOT**]

UNIT V

Section A (10 marks)

33. List two types of XY chart recorders used in clinical settings. [**CO5, Remember, LOT**]
34. Describe the function of a central monitoring console in an ICU. [**CO5, Understand, LOT**]
35. Show how to change the stylus or paper in a thermal recorder. [**CO5, Apply, LOT**]
36. State the difference between a numerical display and a waveform display. [**CO5, Remember, LOT**]
37. Analyze the benefits of digital LCD screens over old analog displays. [**CO5, Analyze, HOT**]
38. Evaluate the importance of visual and audio alarms on a patient monitor. [**CO5, Evaluate, HOT**]

Section B (20 marks)

39. Analyze the mechanical principle of operation of a PMMC chart recorder. [**CO5, Analyze, HOT**]
40. Evaluate the role of medical cameras in recording surgical procedures. [**CO5, Evaluate, HOT**]

Summary Sheet

CO Wise

CO	Q. No	Marks
CO1	7	20
CO2	9,10,11,12,13,14,15,16	100
CO3	1,2,3,4,5,6,8	80
CO4	17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32	200
CO5	33,34,35,36,37,38,39,40	100
Total		**500**

Unit Wise

Unit	Q. No	Marks
Unit 1	1,2,3,4,5,6,7,8	100
Unit 2	9,10,11,12,13,14,15,16	100
Unit 3	17,18,19,2021,22,23,24	100
Unit 4	25,26,27,28,29,3031,32,33	100
Unit 5	33,34,35,36,37,38,39,40	100
Total		**500**

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No	Marks
LOT	1, 2, 3,4,9,10,11,12,17,18,19,20,25,26,27,28,33,34,35,36	200
HOT	5,6,7,8,13,14,15,16,21,22,23,24,29,30,31,32,37,38,39,40	300
Total		**500**

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Disclaimer: -This is a Practice set. The Question in End term examination will differ from the Practice set. This Practice set is meant for practice only.