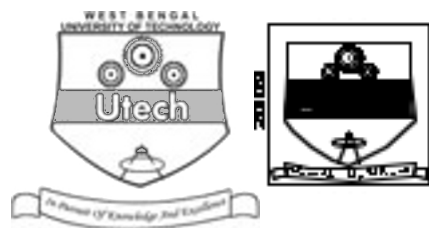


MEDICAL ELECTRONICS (SEMESTER - 8)

CS/B.TECH(ECE-NEW)/SEM-8/EC-804B/09



1.
Signature of Invigilator

2.
Signature of the Officer-in-Charge

Reg. No.

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Roll No. of the
Candidate

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CS/B.TECH(ECE-NEW)/SEM-8/EC-804B/09
ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL – 2009
MEDICAL ELECTRONICS (SEMESTER - 8)

Time : 3 Hours]

[Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
b) For **Groups – B & C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

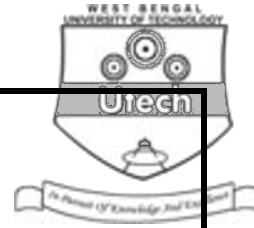
FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B					Group – C					Total Marks	Examiner's Signature
Question Number																						
Marks Obtained																						

.....
Head-Examiner/Co-Ordinator/Scrutineer

8878-B/E (27/04)



DO NOT WRITE ON THIS PAGE



ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL - 2009
MEDICAL ELECTRONICS
SEMESTER - 8



Time : 3 Hours]

[Full Marks : 70

GROUP – A**(Multiple Choice Type Questions)**

1. Choose the correct answer for the following : 10 × 1 = 10
- i) LVDT is a transducer meant for
- | | | |
|----------------|-------------------|----------------------|
| a) pressure | b) flow | |
| c) temperature | d) none of these. | <input type="text"/> |
- ii) $E_{NS} = 61.6 \log \frac{u - v}{u + v}$. This equation is called
- | | | |
|--------------------|-------------------------|----------------------|
| a) NERNST equation | b) Cell action equation | |
| c) EMG equation | d) none of these. | <input type="text"/> |
- iii) Spirogram is the recording of
- | | | |
|---------------------------------|----------------------|----------------------|
| a) lung volume change | b) blood flow change | |
| c) flexibility of spinal chords | d) none of these. | <input type="text"/> |
- iv) To measure ECG potentials the electrode type chosen is
- | | | |
|----------------------|----------------------------|----------------------|
| a) Microelectrodes | b) Skin surface electrodes | |
| c) Needle electrodes | d) all of these. | <input type="text"/> |
- v) Positron Emission Tomography Scan is a imaging technique which produces images of the body by detecting radiation or are emitted from the body after the patient is injected which is a radioactive tracker.
- | | | |
|-------------------|--------------------------------------|----------------------|
| a) α -rays | b) β -rays | |
| c) γ -rays | d) α -rays and β -rays. | <input type="text"/> |



vi) Oximetry refers the determination of in the circulating arterial blood.

- a) % of oxygen saturation
- b) percentage of carbon dioxide saturation
- c) none of these.

vii) The maximum level of current that may pass through a human body safely is

- a) 5 μ A
- b) 5 mA
- c) 50 mA
- d) 5 A.

viii) Bradycardia refers to

- a) a fast heart rate
- b) slow heart rate
- c) normal heart rate
- d) no connection with heart rate.

ix) The volume of gas remaining after a normal expiration less the volume remaining after a forced expiration is called as

- a) expiratory reserve volume
- b) tidal volume
- c) vital capacity
- d) total lung capacity.

x) Typical image acquisition time in MRI system are the order of

- a) 60 - 120 ms
- b) 50 - 100 ms
- c) 30 - 60 ms
- d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.

3 \times 5 = 15

2. Classify the biomedical instruments. What do you mean by interfering and modifying inputs ?

2 + 3

3. Explain the principle of computerized axial topography and compare its method of visualization with conventional X-Ray methods.

5



4. Write briefly the different shock hazards from electrical equipment and methods to prevent these accidents. $2 \frac{1}{2} + 2 \frac{1}{2}$
5. What are the different types of blood flowmeters ? Explain any one of them. $1 + 4$
6. Distinguish between Electromyography, Electromyograph and Electromyogram. Why does the EMG equipment use the oscilloscope readout instead of pen recorder ? How may the EMG equipment be used for nerve conduction velocity ? $2 + 2 + 1$

GROUP – C
(Long Answer Type Questions)

Answer any *three* questions.

$3 \times 15 = 45$

7. Derive the equation of chemical activity of a cell membrane. What are the difference between Central nervous system and Peripheral nervous system ? What is membrane potential graph ? What are the uses of biomagnetic signal ? $5 + 3 + 3 + 4$
8. a) What is the function of a biomedical transducer ? Draw and explain the equivalent circuit of an electrode.
- b) What are the basic problems of electrodes and how can they be minimized ?
- c) Name the different types of electrodes and mention the respective application fields.
- d) With a neat diagram, explain the operation of a floating type skin surface electrode. $4 + 4 + 3 + 4$
9. What are the advantages and disadvantages and limitations of MRI system ? Explain with a neat diagram the working principle of MRI system. What is free induction decay ? $6 + 6 + 3$
10. a) Draw the block diagram of EEG and describe the functions of each block.
- b) What EEG electrodes do ? What is a 10 - 20 electrode placement system ?
- c) How is the biopotential for EEG generated ?
- d) What do you mean by evoked potential ?
- e) Discuss the different frequency ranges in EEG. $4 + 3 + 3 + 2 + 3$
11. Explain spirometry. Explain with a neat diagram, the working principle of a spirometer. Define Lung Compliance. Explain nitrogen wash technique. $2 + 7 + 2 + 4$

END