

- (c) Distinguish between obstructive and restrictive lung disease. How are these two identified using spirometer. (6)
6. (a) What are pacemakers? Explain one in detail with the help of a suitable example. (6)
- (b) Explain conventional X-ray machines and its properties. (6)
- (c) Explain in detail with neat diagram differential auscultatory technique of blood pressure measurement. (6)
7. (a) What are the difficulties faced in measuring a living system? (6)
- (b) Discuss the different modes of operation of cardiac pacemaker (6)
- (c) What is impedance pneumography? Explain the principle of its measurement. Why is this technique not suitable for measuring lung volume even it is properly calibrated? (6)

(1500)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4063

H

Unique Paper Code : 2512042401

Name of the Paper : Biomedical Instrumentation

Name of the Course : B.Sc. (H) Instrumentation

Semester : IV

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
 2. Attempt **any five** questions in all.
 3. **Question No. 1** is compulsory.
 4. **All** questions carry equal marks.
 5. Use of non-programmable scientific calculator is allowed.
-
1. (a) Explain the three-letter code format used for identification of pacemakers. (3)

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- (b) How the lead of ECG different from electrode of ECG? (3)
 - (c) What is a miniature effect in electrodes used for biomedical purpose? (3)
 - (d) Draw the waveforms of the action potential. (3)
 - (e) Define the term residual volume and identify the technique used for the measurement of residual volume.
 - (f) Explain electrode-electrolyte interface. (3)
2. (a) Explain with the help of a diagram, the international standard of electrode placement used in EEG machine. (6)
- (b) Describe the importance of Einthoven triangle. Draw a standard ECG waveform and label it with standard notation. (6)
- (c) Draw and explain working of standard 12 lead system for ECG recording. (6)
3. (a) Describe different types of electrodes used in Biomedical applications. (6)

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- (b) Explain different types of respiratory volumes with the help of diagrams. (6)
 - (c) A patient is diagnosed with prolonged R-R interval frequently. problem and suggest the type of pacemaker required for correcting this condition. Also explain its principle of operation. (6)
4. (a) Name and explain the detailed working principle of any two active transducers used in biomedical applications. (6)
- (b) Explain the principle and working of fleisch type pneumotachometer. (6)
- (c) List different types of recorders and display devices used in an ECG machine. How Holter recording machine is different from normal ECG recorder. (6)
5. (a) What is the basis of a thermal imaging system? What type of detectors are used in thermal imaging? (6)
- (b) Explain components of man instruments system with suitable diagrams. (6)

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