

B.E. Instrumentation Engineering (Model Curriculum) Semester - VI  
**IN602M - Bio-Medical Instrumentation**

P. Pages : 2

Time : Three Hours



**GUG/S/23/14029**

Max. Marks : 80

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- Notes :
1. All questions carry marks as indicated
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Diagrams and Chemical equation should be given wherever necessary.
  5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Elaborate the term intelligent Medical-Instrument system? 8
- b) Define following static characteristics-Accuracy, Precision, Hysteresis, Linearity, Drift. 8  
Define following dynamic characteristic-Lag, Speed of response.

**OR**

2. a) Define following static characteristics-Precision, Hysteresis, Sensitivity, Linearity, Resolution. 8
- b) Define Man-Instrument system? Explain in detail components of Man-Instrument system with suitable block diagram? 8
3. a) Discuss in detail various types of electrodes used for EEG measurement? 8
- b) Define Nernst equation? Describe polarization and depolarization in relation with resting and action potential. 8

**OR**

4. a) Explain following types of electrodes in detail. 8  
a) Surface electrodes.  
b) Microelectrodes.
- b) Explain the following. 8  
a) PH electrode.  
b) AG-AG/CL electrode.
5. a) Explain in details methods of Non-invasive BP measurement technique. 8  
a) Ultrasonic doppler method.  
b) Oscillometric method with suitable graphical representation.
- b) Explain basic principle of Electromagnetic blood flow meter with neat sketches? 8

**OR**

6. a) Explain electrical and mechanical relation of heart with illustrations? 8
- b) What is need for cardiac Defibrillators? With neat diagram explain DC defibrillator? 8

7. a) How spirometer can be used for respiratory volume measurement? Discuss in detail. 8
- b) Illustrate how electromyogram is recorded from human body with neat block diagram. 8

**OR**

8. a) State graphical representation of volume and capacities of lungs? 8
- b) What is Plethysmograph? Explain full body plethysmograph with illustrations and schematic diagram. 8
9. a) Write short note on: 8
- a) Leakage current.
- b) Physiological effect of electricity of human body.
- b) Explain functional block diagram of MRI machine with its instrumentation? 8

**OR**

10. a) What is Computer Tomography? Explain its scanning procedure with complete diagram. 8
- b) What is principle of Ultrasonic imaging? Differentiate between Haemo-dialysis and Peritoneal dialysis? 8

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