

**M.Sc.(Instrumentation) Examination 2017**  
**2<sup>nd</sup> year 2<sup>nd</sup> semester**

**Subject: Biomedical Instrumentation**  
**Full marks:100**

**Paper: VIII(T-203)**  
**Time: 4 hours**

**Group-A**

**Question No1 is compulsory and answer any five from the rest;**

- 1. Utilize the following Biomedical techniques/Instrumentation to diagnose and treat a patient of your choice:  
Angiography, CT Scan, Embolisation and Ultrasonograph.  
You may use one or more techniques beside the above. 10**
- 2. Explain with diagram the functioning of 'Man-Instrument system'. What is Black Box in this respect ? mention the precautions the operator should take. 8**
- 3. Give a brief account of the role of Electrodes in medical Instrumentation. Exemplify with at least two different kinds of electrodes. 8**
- 4. Discuss various types of Bio-sensors. Explain with a neat sketch the process of Bio-sensing. Give illustrations. 8**
- 5. What is Biotelemetry? What are its advantages? Explain with diagram the functional blocks of Biotelemetry systems. 8**
- 6. Explain the terms 'Psycho neuro immunology' and 'Psychoneuro Physiology'. Give a brief view of psychosomatic disorders and polygraph test. 8**
- 7. What is Infrared thermometer? Explain its functioning and advantages over other kinds of thermometer. Also explain Thermogram and Thermo vision. 8**
- 8. Give a brief view of 'Flame Photometer' and colorimeter'. What is chemical profile and what are its utilities? 8**
- 9. Explain the application of 'Nuclear medicine' with at least 3 examples. What are PET and stereo radiography? 8**

**GROUP - B**

**Answer any three of the following questions**

**Two marks have been allotted for general proficiency.**

1. **What are the common uses of CT imaging? Mention the phases of CT imaging. What are Ray, Ray sum, View and Attenuation Profile?** [3 + 5 + 8]
2. **How does the CT procedure work? Explain the data acquisition phase of CT with a figure. Describe the limitations of conventional radiography.** [6 + 6 + 4]
3. **How the MR signal is created? What are T1 and T2 weighted scans. What are the types of magnet used in MRI? Mention the contraindications for MRI.** [6+2 + 4 + 4]
4. (a) **Describe the role of blood group antigens & serum antibodies of both fetus & mother in developing hemolytic disease of a newborn.** [8]
- (b) **Briefly, describe different types of hemoglobinopathies due to structural variation of globin chains.** [8]
5. **What properties of cells can be measured by a flow cytometer? Explain the hydrodynamic focusing in FACS. What is the role of fluorescent marker and how cells are sorted on the basis of surface protein? Briefly explain the role of optical filters in FACS. Give some applications of flow cytometry.** [3+3+4+3+3]