

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Summer 2018 - 19 Examination**

**Semester: 5**  
**Subject Code: 03111302**  
**Subject Name: Biomedical Instrumentation**

**Date: 18/05/2019**  
**Time: 10:30am To 01:00pm**  
**Total Marks: 60**

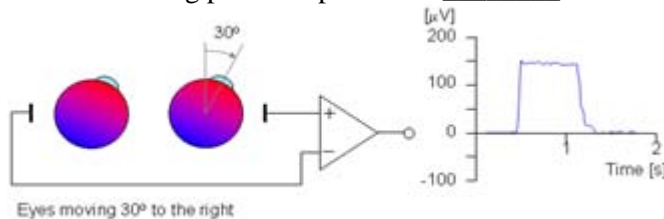
**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1 Objective Type Questions - (All are compulsory) (Each of one mark)****(15)**

1. Biomagnetic signals are produced from \_\_\_\_\_
  - a) Brain, heart, lungs
  - b) Lungs, liver, kidney
  - c) Brain, heart, stomach
  - d) Heart, lungs, liver
2. Which of the following measures instantaneous pulsatile flow of blood:
  - a) Electromagnetic blood flow meter
  - b) Ultrasonic blood flow meters
  - c) NMR blood flow meter
  - d) Laser Doppler blood flow meter
3. In ECG, the chest electrode V3 is placed at
  - a) 4<sup>th</sup> intercostal space left sternal edge
  - b) over the apex
  - c) 4<sup>th</sup> intercostal space right sternal edge
  - d) halfway between V2 and V4

4. The following picture represents a \_\_\_\_\_



- a) ERG b) ENG c) EOG d) EGG

5. The following ECG pattern represents:



- a) Tachycardia b) Normal ECG c) Hyperkalemia d) Bradycardia

6. Half cell potential is defined as \_\_\_\_\_
7. Einthoven Triangle is \_\_\_\_\_
8. Holter cardiography in ECG is \_\_\_\_\_
9. Hemodynamics is defined as \_\_\_\_\_
10. EOG is useful for \_\_\_\_\_
11. Offset voltage means \_\_\_\_\_
12. Valvular events are \_\_\_\_\_
13. Blood velocity in aorta is \_\_\_\_\_ cm/s
14. Plasma display is \_\_\_\_\_
15. One advantage of digital oscilloscope is \_\_\_\_\_

- Q.2 Answer the following questions. (Attempt any three) (15)**
- A) Draw and explain the equivalent circuit of a biopotential electrode interface
  - B) What are the characteristics of different types of brain waves?
  - C) Why do we use microelectrodes? What are different types of microelectrodes?
  - D) Draw block diagram of oscilloscope.
- Q.3 A) Explain the origin of different heart sounds. What is phonocardiography? (07)**
- B) Explain how the various Physiological parameters listed below could be measured: (08)**
- i) To measure the B.P ( any technique)
  - ii) To measure the blood flow by electromagnetic blood flow meter.
- OR**
- B) What are various methods for measurement of blood flow? Explain them in detail. (08)**
- Q.4 A) Describe origin of bioelectric signals. Draw a typical cell potential waveform, label it properly and explain phenomenon of depolarization and repolarization. (07)**
- OR**
- A) Describe cardiac output and different methods to its determination. (07)**
- B) Explain the working principle of a ECG machine with a neat block diagram. (08)**