**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE (PILANI), HYDERABAD CAMPUS**

**COMPREHENSIVE EXAMINATION, 1ST SEMESTER, 2022-23**

**BITS F418; BIOMEDICAL ENGINEERING**

**CLOSED AND OPEN BOOK, *TOTAL MARKS (25 +15 = 40)***

**DATE: 28.12.22 TIME: 2:00-5:00 P.M.(AN) CB + OB = 180MIN**

**SECTION-A CLOSED BOOK – 25%**

1. Justify why saccades are said to be ballistic. 4M
2. Justify two major reasons why graphene is now a preferred choice for the fabrication of various biosensor devices over carbon nanotubes. 6M
3. Draw an equivalent electric circuit diagram representing the electrode-gel-skin interface. Mention one difference between polarized and non-polarized electrodes. Which one is more suitable for ECG recording and why? (4 + 4+ 2 = 10M)
4. How bioelectric potentials are generated in our bodies? Explain in detail. Mention 2 important characteristics of biopotential electrodes. (6 +4 = 10M)
5. How does genetic engineering influence biomedical engineering? 10M
6. Write a short note on biosensor applications in the medical field. 10M

**Please submit your answer sheet for close book before writing open book**

**SECTION- B- OPEN BOOK – 15%**

**Q1.** On a bright winter day, you were called to play cricket by your friends for 10 overs match. For the first 3 overs, you were asked to be the wicketkeeper. After 3 overs, you were asked to ball and you took two wickets. Next 4 overs, you were requested to be the fielder near the boundary and here in this case also you were lucky in catching the ball and taking the last wicket of the opponent**. Describe in detail and list out the different saccades** that were initiated while you played cricket with your friends in all three conditions and **describe in detail which higher neural pathways were involved in the above 3 cases.** 30M