
 Mansoura University	 Faculty of Engineering	Biomedical Engineering (BME) Department
		Time allowed: 1 Hour
		Exam is two page (front and back), Full mark=30
		Assume any missing data; solve in same paper
		Include and name all steps
الفصل:	الاسم:	

A circuit diagram for a circuit that is used to acquire the electrocardiogram (EEG) signal from the body is shown in Fig. 1.

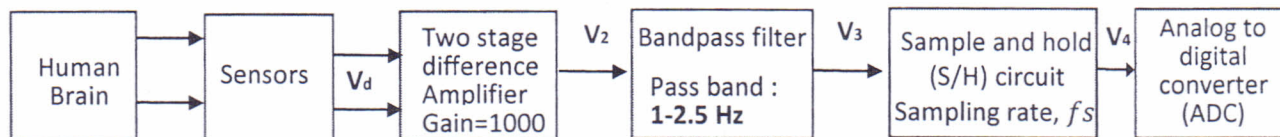


Fig. 1 A block diagram for a circuit used to acquire EEG signal from the body

Answer the following, showing details if possible [30 points, each is 5 points]

1. Sketch an action potential curve, showing details. What is its job for brain cells?	2. Sketch the characteristic curve of a temperature sensor with sensitivity $20\text{mV}/2^{\circ}\text{C}$, and full-scale linear output range of $\pm 100\text{ mV}$.

5. Design a digital to analog converter (a block diagram inside the successive approximation ADC), using **reference voltage, $V_{ref}=5V$** , with a minimum resolution of **1.5V**

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6. Design a two-stage amplifier. First stage is a difference amplifier, **gain of 25**. Second stage is a noninverting amplifier, **gain of 400**. Noninverting amplifier should produce **no more than 5V**.

Difference amplifier design (gain=25)	Noninverting amplifier design (gain=400) Max=5V