BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : VI**
BRANCH: BIOTECHNOLOGY **SESSION : SP/2025**

SUBJECT: BE319 BIOELECTRONICS CONCEPT AND INSTRUMENTATION

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Describe the signal conduction mechanism in nervous system with the help of a neat labeled diagram	[5]	1	2
Q.1(b)	Compare and contrast the cardiac action potential with muscle action potential	[5]	1	4
Q.2(a)	Illustrate the different lead configurations for ECG	[5]	2	3
Q.2(b)	Explain the working of a mechanical spirometer using a suitable labeled diagram	[5]	2	2
Q.3(a)	Calculate the energy delivered to a patient through a defibrillator if a 8 uF (micro Farad) capacitor is charged to a potential of 2000 V. Draw defibrillator circuit and briefly explain its working.	[5]	2	3
Q.3(b)	Categorize pacemakers and describe their features.	[5]	2	4
Q.4(a)	Discuss how interdisciplinary knowledge is required for design of any biomedical equipment taking example of any device that you have studied	[5]	5	2
Q.4(b)	Assess the frequency shift in a Doppler instrument if blood flow velocity is 20 com/sec., frequency of the transducer is 5 MHz, and the angle that the sound beam makes with respect to vessel lumen be 60^o ($\cos 60^o = 0.5$)	[5]	2	5
Q.5(a)	Assess the electrical hazards associated with medical equipments and recommend basic steps for troubleshooting	[5]	4	5
Q.5(b)	Summarize the biotelemetry systems describing their advantages and disadvantages	[5]	3	2

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