Reg. No. : | | | | | | | | | | |

Question Paper Code: 93B06

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Third Semester

Biomedical Engineering

19UBM306 - SENSORS AND MEASURING TECHNIQUES

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Define Transducer	CO1	U
2.	Differentiate transducer and inverse transducer	CO1	U
3.	Define strain	CO2	U
4.	What are the 2 types of temperature coefficients	CO2	U
5.	Photo multiplier –state the naming reason	CO3	U
6.	Define Dark Resistance of Photo transducer	CO3	U
7.	List the basic components of measuring Bridge circuit	CO4	U
8.	What is impedance, can we measure impedance using DC Bridge?	CO4	U
9.	What are the applications of CRO?	CO5	U
10.	Define Deflection sensitivity of CRO	CO5	U

PART – B (5 x 16= 80Marks)

11.	(a)	(i) With necessary diagram explain the basic functional blocks of a measuring system	CO1- U	(8)
		(ii) List the various types of Instruments	CO1- U	(8)
		Or		
	(b)	Explain Static and dynamic characteristics of a transducer	CO1- U	(16)
12.	(a)	(i) Explain in detail different types of Strain gauge with neat diagram	CO2- U	(8)
		(ii) With necessary diagram explain the principle and working of thermocouple	CO2- U	(8)
		Or		

	(b)	(i) Derive the equation for gauge factor	CO2- App	(8)
		(ii) Explain how LVDT is used for measuring displacement and direction with neat diagrams	CO2- U	(8)
13.	(a)	(i) With necessary diagrams Explain the following transducers (i) Phototube (ii) Photo multiplier (iii) Photovoltaic Cell	CO3- U	(8)
		(ii) What is scintillation counter, how it is used as a transducer for measurement	CO3- U	(8)
		Or		
	(b)	(i) With neat diagram explain Ultrasound transducer	CO3- U	(8)
		(ii) Write short notes on Nano sensors	CO3- U	(8)
14.	(a)	(i) Which bridge is used for measuring frequency, Explain	CO4- Ana	(8)
		(ii) A highly sensitive galvanometer can detect a current as low as 0.1nA. This galvanometer is used in a Wheatstone bridge as a detector. Each arm of the bridge has a resistance of 1KΩ. The input voltage applied to the bridge is 20V.Calculate the smallest change in resistance which can be detected. The resistance of the galvanometer can be neglected as compared with the internal resistance of bridge	CO4- App	(8)
		Or		
	(b)	Explain two different types of Schering Bridge for Inductance measurements and Derive their balancing equations	CO4- U	(16)
15.	(a)	With neat diagram explain dual beam and dual trace CRO	CO5- U	(16)
		Or		
	(b)	(i) With necessary diagrams explain the vertical and horizontal deflection system of a CRO	CO5- U	(8)
		(ii) Write short notes on Magnetic Tape Recorders	CO5- U	(8)