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

Question Paper Code:U3B05

B.E./B.Tech. DEGREE EXAMINATION,NOV.2024

Third Semester

Biomedical Engineering

21UBM305– SENSORS AND MEASURING TECHNIQUES

(Regulations 2021)

Duration:3.00hours Maximum:100Marks

Answer ALL Questions

PARTA-(10 x2=20 Marks)

1.	What is active transducer?	CO1-U
2.	What are primary and secondary standards?	CO1-U
3.	What are the different principles used in capacitive transducer?	CO1-U
4.	Compare thermistor and RTD.	CO3-Ana
5.	Compare the characteristics of photo diode and photo transistor.	CO3-Ana
6.	Mention the spectro photometric applications of photo electric transducer.	CO1-U
7.	What is the need of bridges in measurement system?	CO1-U
8.	List the advantages of AC Bridge.	CO1-U
9.	Name two types of analog to digital converters used in DVM design.	CO1-U
10.	Differentiate between CRO & DSO.	CO3-An

PART– B(5X 16= 80Marks)

11. (a)	Discuss the static and dynamic characteristics of transducers.	CO1-U	(16)
	Or		
(b)	Explain the different type of errors in measurement systems.	CO1-U	(16)

12.	(a)	Explain the construction, working, characteristics and biomedical applications of Strain gauges.	CO1-U	(16)
		Or		
	(b)	Describe the working principle and characteristics of thermocouple. Also explain the cold junction compensation in thermocouple.	CO1-U	(16)
13.	(a)	(i) Describe the construction and working of photomultiplier tube.	CO1-U	(8)
		(ii) Compare the differenttypes of photoelectric transducers.	CO3-Ana	(8)
		Or		
	(b)	(i) Explain the construction, characteristics and biomedical application of Photovoltaic cell.	CO1-U	(8)
		(ii) Briefly analyze the spectro-photometric applications of photo electric transducers.	CO3-Ana	(8)
14.	(a)	(i) What are the different problems associated with the measurement of low resistance? With necessary illustrations explain the working principle of Kelvin's double bridge.	CO1-U	(8)
		(ii) The arms of an a.c. Maxwell bridge are arranged as follows: AB is a non-inductive resistance of 1,000Ω in parallel with a capacitor of capacitance 0.5μF, BC is a non-inductive resistance of 600Ω CD is an inductive impedance (unknown) and DA is a non-inductive resistance of 400Ω. If balance is obtained under these conditions, find the value of the resistance and the inductance of the branch CD.	CO2-App	(8)
		Or		
	(b)	(i) Describe the working of Function generator.	CO1-U	(8)
		(ii) An AC bridge was made up as follows: arm AB, a capacitor of 0.8μF in parallel with 1kΩ resistance, BC a resistance of 3kΩ, arm CD an unknown capacitor Cx and Rx in series, arm DA a capacitance of 0.4μF. The supply at 1kHz is connected across BD and a detector across AC. Determine the value of unknown capacitance Cx, unknown series resistance Rx and dissipation factor.	CO2-App	(8)

15. (a)	(i)	Explain the block diagram of dual slope type DVM.	CO1-U	(8)
	(ii)	Draw the block diagram of CRO and explain the function of each block.	CO1-U	(8)
		Or		
(b)	(i)	Briefly discuss the working of X-Y recorder.	CO1-U	(8)
	(ii)	Draw the complete block diagram of DSO and explain in detail how it is used for measuring bio-signal.	CO1-U	(8)