A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 52B09

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Second Semester

Biomedical Engineering

15UBM209 - SENSORS AND MEASUREMENT TECHNIQUES

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A _____is a physical representation of a unit of measurement. CO1- R

   (a) Standard (b) Unit (c) System (d) Kilogram

2. The error due to _____ effects can be overcome by ensuring the impedance technique. CO1- R

   (a) Harmonic (b) Loading (c) Noise (d) Eddy current

3. _____ is the force applied to a material per unit area. CO2- R

   (a) Strain (b) Pressure (c) Stress (d) Acceleration

4. _____ has high sensitivity, accuracy and resolution for temperature measurement. CO2- R

   (a) Hygrometer (b) RTD (c) Thermocouple (d) Thermistor

5. _____ is the most stable piezoelectric material. CO3- R

   (a) Germanium (b) Silicon (c) Quartz (d) Titanium

6. _____ is a technology of miniaturized mechanical and electro-mechanical elements. Used for micro fabrication. CO3- R

   (a) MEMS (b) LASER (c) FPGA (d) PMMA

7. The non-electrical quantities are recorded indirectly by first converting them to equivalent voltages or current with the help of _____ CO4- R

(a) Amplifier (b) Machine (c) Sensors (d) Oscillator

8. The source of emission of electrons in a CRT is _____- CO4- R

(a) Post accelerating anode (b) Barium

(c) PN junction diode (d) Accelerating anode

9. Maxwell's inductance-capacitance bridge is used for measurement of inductance of _____. CO5- R

(a) Low Q coils (b) Medium Q coils (c) High Q coils (d) Low and medium Q coils

10. Frequency can be measured by using_____ CO5- R

(a) Maxwell's bridge (b) Schering bridge

(c) Heaviside Campbell bridge (d) Wien's bridge

PART – B (5 x 2= 10 Marks)

11. List the types of error. CO1- R

12. Define gauge factor. CO2- R

13. Name few smart sensors. CO3- R

14. Give the main blocks in the cathode ray oscilloscope. CO4- R

15. Write the merits of Kelvin's double bridge CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) Discuss the static and dynamic characteristics of measurement system. CO1- U (16)

Or

(b) Explain the different types of error in measurement system. CO1- U (16)

17. (a) Describe the capacitive transducer and explain its various types. CO2- U (16)

Or

(b) Explain in detail RTD and thermistor. CO2- U (16)

18.	(a)	Describe the magneto restrictive transducer.	CO3- Ana	(16)
		Or		
	(b)	Describe the smart and nano sensor (each one type).	CO3- Ana	(16)
19.	(a)	Explain the operation of XY recorder.	CO4- U	(16)
		Or		
	(b)	Explain the operation of sampling oscilloscope and dual storage oscilloscope.	CO4- U	(16)
20.	(a)	Describe the Kelvin's bridge and Wheatstone bridge.	CO5- U	(16)
		Or		
	(b)	Explain the Wein bridge and Hays bridge.	CO5- U	(16)