



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Third Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EET3004: MEASUREMENTS AND INSTRUMENTATION

COURSE OUTCOMES

- CO1: Choose appropriate instruments for measuring electrical quantities**
CO2: Calculate the circuit parameters R,L,C using bridges
CO3: Illustrate the concept of digital measurement system
CO4: Describe the function and working of various transducers for measuring physical quantities
CO5: Describe the role of intelligent sensor and data acquisition system for effective measurement and data storage

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

- | | | |
|--|-----|-------------------|
| 1. Differentiate Moving coil and Moving iron instruments. | CO1 | [K ₂] |
| 2. What is a volt-ratio box? | CO1 | [K ₁] |
| 3. Write the condition for an AC bridge to be balanced. | CO2 | [K ₁] |
| 4. Mention the limitations of Wheatstone bridge. | CO2 | [K ₁] |
| 5. How will you prevent creeping in energy meter? | CO3 | [K ₂] |
| 6. List the types of tools used in digital systems. | CO3 | [K ₁] |
| 7. Draw the typical temperature control circuit of thermistor. | CO4 | [K ₁] |
| 8. Compare transducer and inverse transducer. | CO4 | [K ₂] |
| 9. State the principle of A/D conversion. | CO5 | [K ₂] |
| 10. What is the purpose of nano sensors? | CO5 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

- | | | | |
|---|---|-----|-------------------|
| 11. a) A PMMC instrument has a coil of dimensions 10 mm x 8 mm. The flux density in the air gap is 0.15 Wb/m ² . If the coil is wound for 100 turns, carrying a current of 5 mA then calculate the deflecting torque and angle of deflection if the spring constant is 0.2 x 10 ⁻⁶ Nm/degree. | 8 | CO1 | [K ₃] |
|---|---|-----|-------------------|

	b)	Derive an expression for torque developed in moving iron instrument.	8	CO1	[K ₂]
12.	a)	Derive the balance equation for the measurement of unknown capacitance using suitable AC bridge.	8	CO2	[K ₃]
	b)	Illustrate the working of Kelvin's double bridge with neat sketch.	8	CO2	[K ₂]
13.	a)	Explain the construction and working principle of a Weston type frequency meter.	8	CO3	[K ₂]
	b)	Explain briefly about power quality analyzer.	8	CO3	[K ₂]
14.	a)	With a neat diagram, explain the working of resistance temperature detectors.	8	CO4	[K ₂]
	b)	Write in detail about the construction and working principle of LVDT.	8	CO4	[K ₂]
15.	a)	Explain the working principle of MEMS sensor with an example.	8	CO5	[K ₂]
	b)	With the help of block diagram, explain the operation of a single channel DAS.	8	CO5	[K ₂]
16.	a)	Discuss various static characteristics of a measurement system.	8	CO1	[K ₂]
	b)	Explain the operation of successive approximation type A/D converter with its diagram.	8	CO5	[K ₂]
