

Enroll No

K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar
 (An Empowered Autonomous Institute, affiliated to SUK)

Q.P. Code
UT 3105

Unit Test -II (2025-26)

S.Y. B.Tech.- Robotics & Automation

Course Code:RA205

Course Name: Sensors & Instrumentation

Day & Date: Thursday 18/09/2025

Time: 3:45 To 4:45

Max Marks- 25

- Instructions:**
- 1) All questions are compulsory.
 - 2) Figures in rounded () brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
 - 3) CO is the index number of the Course Outcome statement.
 - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.
 - 5) Assume suitable data if necessary.
 - 6) Use of non-programmable calculators is allowed

			Marks	BT Level	COs
Q.1	A	Design a compass sensor using the magnetic field generated by a current-carrying coil, a suspended ferromagnetic needle, and an optical encoder frame. Explain with a neat labeled diagram how the system detects heading direction and converts it into an electrical signal. what is the taxonomy of this question (diagram 2, limitation 1, designing 2, working principal justification 2)	7	6	3
	B	Differentiate between Anisotropic Magneto-Resistive (AMR), Giant Magneto-Resistive (GMR), and Tunneling Magneto-Resistive (TMR) magnetic sensors in terms of their working principle, sensitivity, and specific applications. (6 pointer each one mark which includes diagram)	6	4	3
		OR			
	C	Compare the operation of a Hall Effect magnetic sensor and a Hall Effect current sensor. Highlight their differences in terms of working principle, limitation and applications. (Both diagrams 1-mark each)	6	4	3
Q.2	A	Compare the working principles (1), characteristics (1), and specific applications (1) of photo-conductive cells, photo-voltaic cells, and photo-resistive sensors. (diagram 1) (2 for difference between them)	6	3	4
	B	Select three different real-world applications analyze and justify which temperature sensor (Thermistor, RTD, or Thermocouple) should be used.	6	3	4

