Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – May / June 2026

Date: 25-05-2026 **Time:** 01:00pm – 04:00pm

School: SOCSE	**Program:** B.Tech. (All Programs)	
Course Code: ECE3097	**Course Name:** Smart Electronics for Agriculture	
Semester: VI	**Max Marks:** 100	**Weightage:** 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**
Marks	**10**	**10**	**17**	**21**	**26**	**16**

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	State the basic operating principle of a soil pH sensor.	2 Marks	L1	CO3
2.	Briefly describe what is meant by an embedded system.	2 Marks	L1	CO4
3.	List any two key differences between UART and SPI communication protocols.	2 Marks	L1	CO4
4.	State the Nyquist sampling criterion in signal sampling.	2 Marks	L1	CO4
5.	Describe the concept of precision irrigation.	2 Marks	L1	CO5
6.	What is climate control system in agriculture?	2 Marks	L1	CO5
7.	Outline the concept of vertical farming.	2 Marks	L1	CO5
8.	State the meaning of scalability in agricultural systems.	2 Marks	L1	CO6
9.	Briefly explain prototyping in the context of design thinking.	2 Marks	L1	CO6
10.	Define sustainability metrics in the context of agriculture.	2 Marks	L1	CO6

Part B

Answer the Questions. **Total Marks 80M**

11.	a.	Explain the five pillars of the Green Revolution and discuss their role in improving agricultural productivity.	10 Marks	L2	CO1
		Or			
12.	a.	Explain the concepts of hydroponics and controlled environment agriculture (CEA), and discuss their advantages for agricultural production.	10 Marks	L2	CO1

13.	a.	Describe the architecture of an IoT-based agricultural system, clearly highlighting its different functional layers.	10 Marks	L2	CO2
		Or			
14.	a.	Explain the role of Artificial Intelligence (AI) and Machine Learning (ML) in agriculture, with suitable examples.	10 Marks	L2	CO2

15.	a.	Explain the stages of design thinking and show how they are applied in developing smart agricultural solutions.	10 Marks	L2	CO6
		Or			
16.	a.	Explain how data management frameworks support decision-making in smart agriculture.	10 Marks	L2	CO6

17.	a.	Select a suitable actuator (solenoid valve or motorized valve) for automating a drip irrigation system, and justify your choice based on operation, power requirements, and reliability.	5 Marks	L3	CO3
	b.	With neat diagrams, explain the construction and working of the SP-510 solar radiation sensor used for measuring radiation exposure.	10 Marks	L2	CO3
		Or			
18.	a.	Select a suitable gas sensor for monitoring air quality (CO_2/NH_3) and explain how it can be used to trigger a ventilation system.	5 Marks	L3	CO3
	b.	With neat diagrams, explain the construction and working of the AC Infinity Cloudline inline fan used for greenhouse ventilation.	10 Marks	L2	CO3

19.	a.	A pH sensor produces a non-linear output. Suggest a suitable linearization method (hardware or software) and explain how it improves measurement accuracy.	5 Marks	L3	CO4
	b.	Explain the basic architecture of a microcontroller with a neat diagram, and discuss the roles of CPU, memory, I/O ports, and communication interfaces.	10 Marks	L2	CO4
		Or			
20.	a.	Select a suitable communication technology for a large farm (5–10 km coverage), and justify your choice with reference to power consumption, range, and data rate.	5 Marks	L3	CO4

	b.	Explain the data acquisition workflow in smart agriculture, describing each stage from sensing to control action.	10 Marks	L2	CO4

21.	a.	Describe crop monitoring systems, including the key parameters monitored and the major technologies used.	20 Marks	L2	CO5
		Or			
22.	a.	Discuss livestock monitoring systems, including important monitored parameters and the benefits to farm management.	20 Marks	L2	CO5