

Continuous Assessment Test (CAT) – I January 2026

Programme	:	B. Tech	Semester	:	Winter 2025-26
Course Code & Course Title	:	BACHY105	Class Number	:	CH2025260502982
Faculty	:	Prof. Sunit Kumar	Slot	:	F1+TF1
Duration	:	90 minutes	Max. Mark		50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks	CO	BT Level
1	a	How galvanic cells are different from electrolytic cells; explain with an example of each? Support your answer with a valid justification.	5	1	K1
	b	How conductivity of metals and semi-conductors varies with temperature? Explain.	5	1	K2
2	a	Explain the working principle of a photovoltaic (PV) cell and discuss the significance of bandgap of semiconductors on the efficiency of PV.	5	1	K2
	b	Explain the function of each component of a dye-sensitized solar cell and how oxidized dye will be regenerated.	5	1	K2
3	a	Write the anodic and cathodic reaction of a solid oxide fuel cell (SOFC) and also explain its advantages over proton exchange membrane fuel cell (PEMFC).	5	2	K3
	b	Define superconductors. Explain the Meissner effect phenomenon and its applications.	5	2	K3
4		Describe and compare paramagnetism, ferromagnetism, ferrimagnetism, and antiferromagnetism. Illustrate the spin alignments in the absence and presence of an external magnetic field.	10	2	K2
5	a	Discuss the hysteresis behaviour of ferromagnetic materials with a suitable plot between magnetic field vs. magnetization.	5	2	K3
	b	Define thermal conductivity.. What characteristics would you recommend for an effective coolant used in a high-performance laptop processor?	5	2	K3

***** All the best *****