BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MSc/IMSc **SEMESTER: IV/X**
BRANCH: PHYSICS **SESSION: SP/2025**

SUBJECT: PH517 NONCONVENTIONAL ENERGY MATERIALS

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Describe the environmental impact of conventional energy sources. Explain the need for sustainable energy sources	[5]	1	2
Q.1(b)	Discuss the challenges associated with renewable energy sources. Write the current status of renewable energy sources.	[5]	1	3
Q.2(a)	Explain the formation of the space charge region in a PN Junction. Derive an expression for built-in potential.	[5]	2	2
Q.2(b)	Draw an energy band diagram of a PN Junction under illumination and explain the generation of photovoltage.	[5]	2	3
Q.3(a)	Discuss fundamental and technological losses in solar cells.	[5]	3	2
Q.3(b)	Define Internal quantum efficiency. Explain how the spectral response of a solar cell can provide information about the quality of material, solar cell fabrications and junction.	[5]	3	2
Q.4(a)	Explain the formation of PN junction in commercial wafer-based Si Solar Cells.	[5]	4	2
Q.4(b)	Write the generic advantages of thin film technologies over conventional wafer-based technology.	[5]	4	3
Q.5(a)	Explain the construction and working of horizontal and vertical windmills.	[5]	5	2
Q.5(b)	Discuss briefly about the tidal power plant and mention the advantages and disadvantages of the tidal power plant.	[5]	5	2

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