BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO2022)

CLASS: B.TECH/B.ARCH/IMSC **SEMESTER : V**
BRANCH: BT/CHEMICAL/CE/CS/IT/ECE/MECH/PIE/ARCH/IFT **SESSION : MO2022**

SUBJECT: EE365 INTRODUCTION TO SUSTAINABLE ENERGY

TIME: 03 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*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

Q.1(a)	What are different forms of energy?	[2]	CO1 (BL1-Knowledge)
Q.1(a)	Write down the adverse effects of conventional fuels utilized for energy generation.	[3]	CO1 (BL1-Knowledge)
Q.1(a)	Compare the various non-conventional energy resources.	[5]	CO2 (BL2-Understand)
Q.2(a)	State and explain the phenomenon of light energy conversion into electrical energy.	[2]	CO1 (BL1-Knowledge)
Q.2(a)	Design a mechanism for energy harvesting from solar PV system	[3]	CO5 (BL6- Create)
Q.2(a)	Discuss the decoupled control philosophy of grid connected solar PV system	[5]	CO3 (BL2- Understand)
Q.3(a)	Briefly describe the architecture of fixed speed wind turbine.	[2]	CO2 (BL3-Apply)
Q.3(a)	Draw the wind power curve and illustrate the key points on velocity scale.	[3]	CO3 (BL3-Apply)
Q.3(a)	Analyze the control structure of wind energy conversion system using complete block diagram.	[5]	CO4 (BL3-Apply)
Q.4(a)	Analyze the charging/discharging process of a battery and obtain expression for State of Charge (SOC).	[2]	CO4 (BL4-Analyze)
Q.4(b)	Compare Galvanic cell with Li-Ion cell and comment which one is more suitable for vehicular application with appropriate reasoning.	[3]	CO4 (BL4-Analyze)
Q.4(c)	Categorize different types of cell balancing. Present a critical analysis of each category in order to decide the most efficient method of cell balancing.	[5]	CO4 (BL4-Analyze)
Q.5(a)	Evaluate suitability of solar-energy integration with utility grid as compared to wind-energy integration with utility grid.	[2]	CO5 (BL5-Evaluate) (BL6- Create)
Q.5(b)	Compile list of critical issues during integration of renewable energy with grid. Discuss briefly.	[3]	CO5 (BL5-Evaluate) (BL6- Create)
Q.5(c)	Develop a closed loop control strategy for integrating solar-energy, wind-energy and battery storage system.	[5]	CO5 (BL5-Evaluate) (BL6- Create)

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