

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

CLASS: B. Tech
BRANCH: EEE

SEMESTER : 7TH
SESSION : MO/2025

SUBJECT: EE605R1 MICROGRID OPERATION AND CONTROL

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 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
-

		CO	BL
Q.1(a)	Contrast the typical microgrid structure and conventional power system structure.	[2]	1 1
Q.1(b)	Draw a typical microgrid layout such as proposed by CERTS and explain its components and working.	[3]	1 2
Q.2(a)	What are the main functions of micro-source controllers and central controllers in microgrid operation?	[2]	2 2
Q.2(b)	Mention the requirements of energy storage system in a microgrid. What are the various technical advantages and challenges of microgrid development?	[3]	2 3
Q.3(a)	What is MPPT tracking? Explain Perturb and Observe method of MPPT with the help of a flowchart.	[2]	2 2
Q.3(b)	Discuss the implementation of Boost converter for realizing MPPT using load line concept. Use proper circuit diagrams and related equations.	[3]	2 3
Q.4(a)	What are the technical challenges in integrating microgrids with the main power grid, specifically concerning voltage and frequency stability?	[2]	3 2
Q.4(b)	Draw the electrical model of a PV cell and derive its governing equations. How does I_{sc} and V_{oc} depends on i_p ? Justify. Draw the I-V and P-V characteristics of photovoltaic cells	[3]	3 3
Q.5(a)	What is average modelling of a converter? Discuss it for a buck converter.	[2]	4 2
Q.5(b)	Discuss the average modelling of a Grid connected PV based active generator with ESS. Draw complete model and explain the governing equations of each subsystems.	[3]	4 3

:::::18/09/2025:::::M