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**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR  
(GIET UNIVERSITY)**

Ph.D. (First Semester) Examinations, December – 2024

**23SPPEEE1021/SPPEEE1021– Distributed Generation and Microgrid  
(EEE)**



Time: 3 hrs

Maximum: 70 Marks

**The figures in the right hand margin indicate marks.**

**Answer ANY FIVE Questions.**

**(14 x 5 = 70 Marks)    Marks**

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|------|--|----|
| 1.a. | What are the fundamental requirements for grid integration technology and how it will impact the overall performance of the system?          | 8  |
| b.   | How active and reactive power play a major role in microgrid interfacing? Justify with examples.   | 6  |
| 2.   | What are the disadvantages of conventional power generation and how distributed generation can solve the issue of energy crisis?             | 14 |
| 3.a. | What is microgrid? Explain the architecture of microgrid with neat block diagram.  | 7  |
| b.   | Describe the power quality issues in microgrid.  | 7  |
| 4.   | What are the impacts of grid integration with non-conventional energy sources on existing power system? How the performance can be improved? | 14 |
| 5.a. | What are the key functions of microgrid and describe its benefits?   | 7  |
| b.   | Enumerate the limits on operational parameters in grid integration.  | 7  |
| 6.a. | Explain about communication infrastructure of microgrid interfacing.   | 7  |
| b.   | What is the difference between AC and DC microgrid?  | 7  |
| 7.   | What is the role of captive power plants in distributed generation technology and how it will impact the overall performance of the system?  | 14 |
| 8.a. | Write short notes on   | 7  |
|      | (i) Flywheels  |    |
|      | (ii) Ultra-Capacitors  |    |
| b.   | How electric charging station improves the performance of microgrid?   | 7  |

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