

**B.Tech DEGREE EXAMINATION, NOVEMBER 2023**

Seventh Semester

**18EEE404T - DISTRIBUTED GENERATION AND MICRO GRID***(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)***Note:**

- i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40<sup>th</sup> minute.
- ii. **Part - B** and **Part - C** should be answered in answer booklet.

**Time: 3 Hours****Max. Marks: 100****PART - A (20 × 1 = 20 Marks)****Marks BL CO**

Answer all Questions

- |  |   |   |   |   |
|--|---|---|---|---|
| 1. The predominant source of energy on earth is<br>(A) Electricity<br>(C) The Sun  | (B) Natural Gas<br>(D) Plants   | 1 | 1 | 1 |
| 2. The electrical output of a solar cell depends on the _____<br>(A) Ultraviolet radiation<br>(C) Heat component of solar radiation  | (B) Intensity of solar radiation<br>(D) Infrared radiation  | 1 | 1 | 1 |
| 3. Solar radiation that is received after it changes its direction due to reflection and scattering in the atmosphere is called _____.<br>(A) Diffused radiation<br>(C) Beam radiation | (B) Scattered radiation<br>(D) Radiation  | 1 | 1 | 1 |
| 4. Solar radiation that has not been absorbed or scattered and reaches the earth surface directly is called _____.<br>(A) Beam radiation<br>(C) Diffused radiation                     | (B) Scattered radiation<br>(D) Radiation  | 1 | 1 | 1 |
| 5. A Battery is an _____.<br>(A) Electrochemical device<br>(C) Internal combustion device  | (B) Energy storage device<br>(D) Energy conversion device   | 1 | 1 | 2 |
| 6. IEEE Stands for _____.<br>(A) Institute of Electrical and Electronics Engineers<br>(C) Indian Electrical and Electronics Engineers  | (B) Indian Institute of Electrical and Electronics Engineers<br>(D) Indian Energy and Environmental Engineers | 1 | 1 | 2 |
| 7. IEEE1547 standard mandates that islanding condition should be detected in _____ secs.<br>(A) 1<br>(C) 3   | (B) 2<br>(D) 4  | 1 | 1 | 2 |
| 8. IEEE1547 standard is written considering that the Distributed Resources is having a _____.<br>(A) 40 Hz source<br>(C) 30 Hz source  | (B) 50 Hz source<br>(D) 60 Hz source  | 1 | 1 | 2 |
| 9. Which one of the following doesn't fall under the broad categories of micro grid drivers?<br>(A) energy security<br>(C) clean energy integration                                    | (B) economic benefits,<br>(D) Feeder control  | 1 | 1 | 3 |

- |   |   |   |   |
|---|---|---|---|
| 10. According to _____, Distributed Energy Resources (DERs) must be able to detect and shut down unintentional islands.             | 1 | 1 | 3 |
| (A) IEEE 1547-2003  |   |   |   |
| (B) IEEE 1547-2010  |   |   |   |
| (C) IEEE 1547-2015  |   |   |   |
| (D) IEEE 1547-2020  |   |   |   |
| 11. Which method from the following don't belong to Passive Islanding Detection methods?  | 1 | 1 | 3 |
| (A) Under/Over Voltage Protection   |   |   |   |
| (B) Frequency Shift   |   |   |   |
| (C) Voltage phase Jump Detection  |   |   |   |
| (D) Sliding Mode Frequency Shift  |   |   |   |
| 12. Which method detects islanding by changing the amplitude of the output inverter current?  | 1 | 1 | 3 |
| (A) Impedance measurement   |   |   |   |
| (B) Frequency Shift   |   |   |   |
| (C) Voltage phase Jump Detection  |   |   |   |
| (D) Negative-Sequence Current Injection   |   |   |   |
| 13. _____ controller takes the responsibility of independent control of power flow in operation and management of micro grid.       | 1 | 1 | 4 |
| (A) Micro- source   |   |   |   |
| (B) Central   |   |   |   |
| (C) Harmonics   |   |   |   |
| (D) Integral  |   |   |   |
| 14. The capacity of feeder area micro grid ranges from _____.   | 1 | 1 | 4 |
| (A) 5 – 20 MW   |   |   |   |
| (B) 1 – 4 MW  |   |   |   |
| (C) 25 – 40 MW  |   |   |   |
| (D) 50 - 100MW  |   |   |   |
| 15. In AC micro grid, distribution network is connected to the AC bus via _____.  | 1 | 1 | 4 |
| (A) Circuit breaker   |   |   |   |
| (B) Fuse  |   |   |   |
| (C) Relay   |   |   |   |
| (D) Feeder  |   |   |   |
| 16. Which one of the following doesn't belong to main issues of micro grid economics?   | 1 | 1 | 4 |
| (A) Optimal technology investment   |   |   |   |
| (B) Utilization of unique aspects   |   |   |   |
| (C) Distribution system relationship  |   |   |   |
| (D) Transmission line losses  |   |   |   |
| 17. Which of the following don't belong to connection charges for connecting distributed generations (DGs) to distribution systems? | 1 | 1 | 5 |
| (A) Deep connection charge  |   |   |   |
| (B) Shallow connection charge   |   |   |   |
| (C) Shallowish connection charge  |   |   |   |
| (D) Controller connection charge  |   |   |   |
| 18. What is the full form of SCADA?   | 1 | 1 | 5 |
| (A) Supervisory Center and Document Account   |   |   |   |
| (B) Supervisory Control and Data Acquisition  |   |   |   |
| (C) Supervisory Column and Data Assessment  |   |   |   |
| (D) Supervisory Control and Data Assessment   |   |   |   |
| 19. The standard form of RTU is _____   | 1 | 1 | 5 |
| (A) Remote Terminal Unit  |   |   |   |
| (B) Reverse Terminal Unit   |   |   |   |
| (C) Rotatory Terminal Unit  |   |   |   |
| (D) Remote Technical Unit   |   |   |   |
| 20. What is the standard form of DCS?   | 1 | 1 | 5 |
| (A) Digital Control System  |   |   |   |
| (B) Distributed Communication System  |   |   |   |
| (C) Distributed Control System  |   |   |   |
| (D) Distributed Code System   |   |   |   |

**PART - B (5 × 4 = 20 Marks)**

Answer **any 5** Questions

- |  |   |   |   |
|--|---|---|---|
| 21. What are the advantages and disadvantages of Conventional Sources of Energy?                     | 4 | 2 | 1 |
| 22. List out four differences between conventional and non-conventional energy sources.              | 4 | 2 | 1 |
| 23. Define Distributed Generation (DG) and List out the benefits of them while used in power system. | 4 | 2 | 2 |

24. Simply explain how Distributed Generation (DG) works and mention its advantages while used in power system?	4	2	2
25. Briefly explain what are the broad categories that a micro grid drivers fall?	4	2	3
26. What are the objectives of micro source controller (MC) in operation and management of microgrid?	4	2	4
27. List out some important economic issues that arises while using DG in power system.	4	2	5

**PART - C (5 × 12 = 60 Marks)**

Answer **all** Questions

**Marks BL CO**

28. (a) Mention the causes of the World Energy Crises? Explain them in detail. (OR) (b) Discuss in detail about the components of WECS.	12	2	1
29. (a) List out any three types of Distributed Generation (DG) that are available in recent trends and explain them briefly? Mention also about the Impacts of Distributed Generation on the Environment. (OR) (b) Discuss in detail about scope, purpose and limitations of IEEE1547.1 and IEEE1547.4 standards while using DG in power system.	12	2	2
30. (a) Discuss in detail about Passive islanding detection method and its types? (OR) (b) Explain the process of how Unit - output Power Control (UPC) is implemented in controlling the active power when the DGs are introduced in power system.	12	3	3
31. (a) Discuss in detail about the typical structure and configurations of a microgrid. (OR) (b) Outline on AC microgrid structure in detail with a neat sketch.	12	3	4
32. (a) Discuss in detail about Potential benefits and Future developments of Microgrid economics in power system. (OR) (b) What are the two cases that has to be followed under the process of Fast separation from a faulted feeder during protection of micro grid? Explain them.	12	2	5

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