

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY

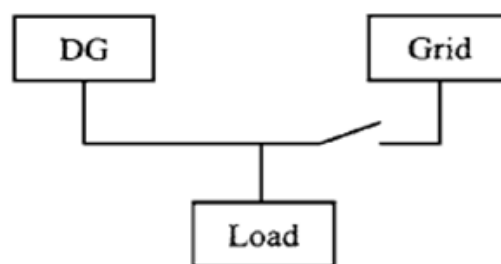
B.Tech. Summer 2018 - 19 Examination

Semester: 5**Subject Code: 03106331****Subject Name: Distributed Generation****Date: 21/05/2019****Time: 10:30am to 01:00pm****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions (All are compulsory) (Each of one mark) (15)

1. Force of sea waves as they break against the coastline is known as
 - a) Solar Energy
 - b) Wind Energy
 - c) Tidal Energy
 - d) Hydro Energy
2. In a fuel cell Anode is of
 - a) Oxygen
 - b) Ammonia
 - c) Hydrogen
 - d) Carbon monoxide
3. Which type of Generator is employed in wind power plant?
 - a) Synchronous generator
 - b) Induction generator
 - c) Self excited DC generator
 - d) Separately excited DC generator
4. Which type of inverter is used in isolated systems where the inverter draws its DC energy from batteries charged by photovoltaic arrays?
 - a) Stand alone inverter
 - b) Grid tie inverter
 - c) Battery backup inverter
 - d) Square wave inverter
5. The nature of the current developed in MHD generator is
 - a) ac
 - b) dc
 - c) Both a and b
 - d) None of these
6. Figure mentioned below is _____ type of DG connection with electrical system.



7. _____ is a small-scale power grid that can operate independently or collaboratively with other small power grids.
8. In _____ mode, the converter connects the power source in parallel with other sources to supply local loads and possibly feed power into the main grid.
9. _____ in a solar panel refers to series and parallel arrangement of solar cells.
10. The condition in which a distributed generator (DG) continues to power a location even though electrical grid power is no longer present is known as _____.
11. Electric generation facilities connected to an Area EPS through a Point of Common Coupling is known as _____.
12. The wind speed is measured using an instrument called as _____.
13. _____ Islanding Detection method is based on monitoring of grid variables.

14. The wind speed at which a wind turbine is designed to be shut down to prevent damage from high wind is _____ speed.
15. Equation of maximum efficiency for solar cell is _____.

Q.2 Answer the following questions. (Attempt any three) **(15)**

- A) List out the reasons which limit solar cell efficiency.
- B) Explain in detail about pitch control used in wind turbine.
- C) Write a short note on Flywheel used as energy storage element in distribution system.
- D) A solar cell (0.85 cm^2) receives solar radiation with photons of 1.6 eV energy having an intensity of 0.9 mW/cm^2 . Measurements show open circuit voltage of 0.5 V/cm^2 , short circuit current of 9 mA/cm^2 and the maximum current is 50% of the short circuit current. The efficiency of cell is 20%. Calculate the maximum voltage that the cell can give and find the 'Fill Factor'.

Q.3 A) What are the advantages and disadvantages of renewable energy generation sources? **(07)**

- B) A propeller type, horizontal shaft wind turbine having following wind characteristics: (1) Speed of wind 10 m/s at 1 atm and 15°C (2) The turbine has diameter of 120 m and its operating speed is 40 rpm at maximum efficiency. Calculate: **(08)**
- The total power density in the wind stream
 - The maximum obtainable power density assuming $\eta = 40\%$
 - Total power produced in kW
 - The torque and axial thrust

OR

- B) Draw simplified diagram of microgrid and explain about security issues related to it. **(08)**

Q.4 A) Explain with diagram working of geothermal power generation system. **(07)**

OR

- A) What are the types of microgrid? Explain each in detail along with figure. **(07)**
- B) What is the function of Dynamic Voltage Restorer (DVR)? Draw block diagram of DVR and explain in detail about components used in DVR. **(08)**