

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2018

Subject Code:2140908

Date:05/12/2018

Subject Name:Electrical Power Generation

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

|     |                                                                                                                                                                                                                                                                                          | MARKS |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Q.1 | (a) For a steam power station, explain functions of: (i) Air Pre Heater (ii) Cooling Tower (iii) Economizer                                                                                                                                                                              | 03    |
|     | (b) Explain the essential factors which influence the choice of site for a nuclear power station.                                                                                                                                                                                        | 04    |
|     | (c) Draw and explain neat schematic arrangement of Hydro power station and discuss function of its constituents.                                                                                                                                                                         | 07    |
| Q.2 | (a) Write advantages and disadvantages of Steam power station.                                                                                                                                                                                                                           | 03    |
|     | (b) Differentiate between open cycle gas turbine and closed cycle gas turbine.                                                                                                                                                                                                           | 04    |
|     | (c) Draw and explain schematic arrangement of diesel power plant. Give advantages and disadvantages of diesel power plant.                                                                                                                                                               | 07    |
|     | <b>OR</b>                                                                                                                                                                                                                                                                                |       |
|     | (c) Determine load factor at which the cost of supplying a unit of electricity from a Diesel and from a Steam station is same if the annual fixed and running charges are as follows :<br>Diesel Fixed Rs. 300/kW Running Rs. 0.25/kWh<br>Steam Fixed Rs. 1200/kW Running Rs. 0.0625/kWh | 07    |
| Q.3 | (a) What are the sources and features of renewable energy sources?                                                                                                                                                                                                                       | 03    |
|     | (b) Explain the difference between fusion reaction and fission reaction.                                                                                                                                                                                                                 | 04    |
|     | (c) Define (i) Connected load (ii) Plant capacity factor (iii) Diversity factor (iv) Maximum load (v) Plant use factor (vi) Base load (vii) load curve.                                                                                                                                  | 07    |
|     | <b>OR</b>                                                                                                                                                                                                                                                                                |       |
| Q.3 | (a) What is tariff? Discuss three part tariff.                                                                                                                                                                                                                                           | 03    |
|     | (b) Differentiate between Horizontal and Vertical Axis Wind Turbine                                                                                                                                                                                                                      | 04    |
|     | (c) Explain the need of hybrid systems. Discuss solar-wind hybrid power system with suitable diagram and also state its advantages.                                                                                                                                                      | 07    |
| Q.4 | (a) Define: (i) solar constant (ii) beam radiation (iii) Diffuse radiation                                                                                                                                                                                                               | 03    |
|     | (b) Draw and explain the I-V and P-V characteristics of solar photovoltaic cell.                                                                                                                                                                                                         | 04    |
|     | (c) Derive equation for maximum power of wind turbine.                                                                                                                                                                                                                                   | 07    |
|     | <b>OR</b>                                                                                                                                                                                                                                                                                |       |
| Q.4 | (a) What is solar radiation spectrum?                                                                                                                                                                                                                                                    | 03    |
|     | (b) What are the major components of wind energy conversion systems?                                                                                                                                                                                                                     | 04    |
|     | (c) Explain pyranometer with diagram.                                                                                                                                                                                                                                                    | 07    |
| Q.5 | (a) Why is neutral earthing necessary in power system? How can it be classified?                                                                                                                                                                                                         | 03    |
|     | (b) What is resistance grounding? What are its advantages and disadvantages?                                                                                                                                                                                                             | 04    |
|     | (c) Write classification of substations.                                                                                                                                                                                                                                                 | 07    |
|     | <b>OR</b>                                                                                                                                                                                                                                                                                |       |
| Q.5 | (a) Enlist various equipment's used in substation                                                                                                                                                                                                                                        | 03    |
|     | (b) Compare indoor and outdoor substations.                                                                                                                                                                                                                                              | 04    |
|     | (c) Explain arc suppression coil earthing in detail.                                                                                                                                                                                                                                     | 07    |

\*\*\*\*\*