

B.Tech II Year II Semester (R15) Supplementary Examinations December 2018

**ELECTRICAL POWER GENERATING SYSTEMS**

(Electrical &amp; Electronics Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- What are the different types of energy sources?
  - What are the factors to be considered for selection of the site for a thermal power station?
  - What is mass curve?
  - How will you explain mechanism of energy release in a nuclear reactor?
  - Differentiate between the direct beam and diffuse solar radiation reacting the earth's surface.
  - What is meant by the capacity factor of a wind energy conversion system?
  - Write the principle of operation of wave power generation.
  - What are the factors effecting biogas generation?
  - Define plant capacity factor and plant use factor.
  - State what is meant by base load and peak load stations.

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 (a) What are the types of a steam turbine? Briefly discuss about their use and characteristics.  
 (b) Why pulverized fuel is preferred? What are the types of pulverized fuel business?

**OR**

- 3 (a) Explain the types of boilers and their characteristics used in thermal power stations.  
 (b) What are the types of fuels used in thermal power plants? Briefly discuss.

**UNIT – II**

- 4 (a) How the hydro plants are classified? Discuss briefly.  
 (b) A turbine in a hydro plant develops 2400 hp with a head of 400 ft. Determine the specific speed of the turbine if it has to run at a speed of 500 spm.

**OR**

- 5 (a) With necessary diagrams, explain about boiling water reactor and gas cooled reactors.  
 (b) Discuss the advantages and disadvantages of nuclear power station.

**UNIT – III**

- 6 (a) Enumerate the different types of concentrating type collectors.  
 (b) Explain the principle of conversion of solar energy into electric power.

**OR**

- 7 (a) Describe the electrical layout of a typical wind form by means of a single line diagram.  
 (b) Explain the terms: (i) Yaw control. (ii) Pitch control. (iii) Tethering control.

**UNIT – IV**

- 8 What are the main types of OTEC power plants? Describe their working in brief.

**OR**

- 9 (a) Describe the single basin arrangement in tidal power generation.  
 (b) Discuss how geothermal energy is utilized for electric power generation.

Contd. in page 2

## UNIT – V

- 10 (a) Name the elements that make up the operating expenditure of a power plant.  
(b) A power station has a maximum demand of 15 MW, a load factor of 0.7, a plant capacity factor of 0.525 and a plant use factor of 0.85. Find: (i) Daily energy produced. (ii) Reserve capacity of the plant.

OR

- 11 (a) Determine the annual cost of a feed water softener from the following data:  
Cost = Rs. 96,000  
Salvage value = 5%  
Life = 10 yrs  
Annual repair and maintenance cost = Rs. 3,000  
Annual cost of chemicals = Rs. 6,000  
Labour cost per month = Rs. 360  
Interest on sinking fund = 5%.
- (b) A base load power station and standby power station share a common load as follows:  
Base load station annual output =  $180 \times 10^6$  kWh  
Base load station capacity = 42 MW  
Maximum demand on base load station = 36 MW  
Standby station capacity = 22 MW  
Standby station annual output =  $17 \times 10^6$  kWh  
Peak demand on standby station = 18 MW.  
Determine the following for both power stations: (i) Load factor. (ii) Capacity (or plant) factor.

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 (Electrical & Electronics Engineering)

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**PART – A**  
 (Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

- What is the function of control rods?
- Define the function of economizer.
- What is meant by chain reaction?
- What is the function of surge tank?
- Explain solar constant.
- Write the equation for total power available in wind and draw a graph for it.
- Mention any two advantages of anaerobic digestion.
- What are the limitations of wave energy conversion?
- Define: (i) Maximum demand. (ii) Demand factor.
- Define load curve and load duration curve.

**PART – B**  
 (Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

2 Explain the function of boilers and super heaters in thermal power plants.

OR

3 What are the types of fuels used in thermal power plants? Briefly discuss.

**UNIT – II**

4 Explain the basic components of a nuclear reactor with a neat diagram.

OR

5 Draw a neat schematic diagram of a hydroelectric plant and write the functions of various components.

**UNIT – III**

6 What are the main components of flat plate solar collector, explain the function of each?

OR

7 (a) Explain the parameters 'tip speed ratio' and 'coefficient of performance' which characterize a wind mill rotor.

(b) What are the phenomena responsible for the creation of atmospheric winds?

**UNIT – IV**

8 Explain the closed cycle of OJEC system, with its advantages over open cycle system.

OR

9 (a) With neat schematic, explain the working of mini hydel power plant.

(b) How does ocean thermal energy conversion work?

**UNIT – V**

10 (a) Discuss the objectives and requirement of tariff methods.

(b) A factory has a maximum load of 240 kW at 0.8 pf lagging with an annual consumption of 50,000 units. The tariff is Rs.50 per kva of maximum demand plus 10 paise per unit. Calculate the flat rate of energy consumption. What will be annual saving of p.f raised to unity?

OR

11 Explain the terms load factor and diversity factor and discuss their effect on the cost of generation of electrical energy.

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 (Electrical & Electronics Engineering)

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 (Compulsory Question)

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- (a) What is the function of control rods?
- (b) Define the function of economizer.
- (c) What is meant by chain reaction?
- (d) What is the function of surge tank?
- (e) Explain solar constant.
- (f) Write the equation for total power available in wind and draw a graph for it.
- (g) Mention any two advantages of anaerobic digestion.
- (h) What are the limitations of wave energy conversion?
- (i) Define: (i) Maximum demand. (ii) Demand factor.
- (j) Define load curve and load duration curve.

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B.Tech II Year II Semester (R15) Regular Examinations May/June 2017  
**ELECTRICAL POWER GENERATING SYSTEMS**  
 (Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

**PART - A**  
 (Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Write a short note on super heater.
  - What is the use of condenser in thermal power station?
  - What are the main parts of nuclear reactor and their functions?
  - Briefly explain hydrograph.
  - Define altitude angle.
  - What are the main factors governing the selection of site for wind turbine generating systems?
  - Write the applications and advantages of biogas.
  - Write the major disadvantages of geothermal power generating stations.
  - What is meant by two part tariff?
  - Define load curve and load duration curve.

**PART - B**  
 (Answer all five units, 5 X 10 = 50 Marks)

**UNIT - I**

- 2 Explain the operation of thermal power station with a neat line diagram.

OR

- 3 What are the types of steam turbines and explain with neat diagram.

**UNIT - II**

- 4 Explain the procedure of nuclear waste disposal mechanism in a nuclear power plant.

OR

- 5 Explain the principle of operation of nuclear reactor with neat diagram.

**UNIT - III**

- 6 Explain about the point focusing collection of solar power generation.

OR

- 7 (a) Discuss the salient features of horizontal axis wind turbines and vertical axis wind turbines.  
 (b) Discuss about wind energy potential in India and its growth scenario.

**UNIT - IV**

- 8 With a neat sketch, explain biomass gasification.

OR

- 9 What is plate tectonic theory and how is it related to geothermal energy.

**UNIT - V**

- 10 A system has a straight line annual load duration curve with maximum and minimum demands of 150 MW and 500 MW respectively. The annual cost characteristics of base load and peak load stations are respectively given by  
 $C_1 = (\text{Rs } 10,00,000 + \text{Rs } 1000/\text{kW} + \text{Rs } 6/\text{kWh})$   
 $C_2 = (\text{Rs } 8,00,000 + \text{Rs } 600/\text{kW} + \text{Rs } 8/\text{kWh})$   
 Determine the operating schedule of peak load station for minimum annual cost. Also calculate the overall cost per kWh.

OR

- 11 Explain two part tariff and compare it with power factor tariff.

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