ARYA COLLEGE OF ENGINEERING

GUESS PAPER

B.Tech. III Semester 2025- 2026

3EE3-04_ POWER GENERATION PROCESS

Unit 1

Short Answers: (2 Marks Each)

Q. 1 Why overall efficiency of thermal power plant is very low?

Q. 2 Compare between (1) 'Fissile and Fertile' materials (2) Nucleal Fusion and Nuclear fission

Q. 3 Explain necessity of superheated steam and pulverized coal in thermal power plant.

Q. 4 Why nuclear power plant becoming very popular?

Q. 5 Explain the classification of hydro power plant.

Descriptive Answers: (5 to 20 Marks)

Q.1 Explain the difference between open cycle and close cycle gas turbine plant with suitable diagram.

Q. 2 Draw the schematic diagram of a thermal power station and explain its operation with its important components.

Q. 3 Distinguish between a fast breeder reactor and a heavy water reactor.

Q. 4 Explain the pumped storage hydro power plant. Explain its advantages.

Q. 5 Give the schematic view of nuclear power plant. What are the materials used for fuel, coolant and moderator in nuclear power plant?

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Unit 2

Short Answers: (2 Marks Each)

Q. 1 Explain greenhouse effect. What are its causes and effects on environment?

Q. 2 Explain environmental impact of thermal and gas power plant.

Q. 3 Explain environmental impact of nuclear power plant.

Q. 4 Write short note on Indian energy scenario about coal, oil and gas.

Q. 5 Define Hot, cold and spinning reserve.

Q. 6 Compare renewable and non- renewable energy sources.

Descriptive Answers: (5 to 20 Marks)

Q. 1 What is the difference between single basin and double basin arrangement of a tidal power plant?

Q. 2 Explain the conversion of solar energy into electrical energy in a solar power plant.

Q. 3 Describe the natural resources and sustainable energy resources.

Q. 4 Explain the different parts of wind energy system of a wind power plant.

Q. 5 Give a brief classification of various energy resources.

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Unit 3

Short Answers: (2 Marks Each)

Q.1 Explain different types of electrical load.?

Q. 2 What is energy load curve? Explain it.

Q.3 How power factor can be improves using synchronous condensers?

Q. 4 Explain the (1) demand factor (2) Plant capacity factor

Q. 5 What are the causes and effects of low power factor in industries?

Q.6 What are the advantages of power factor improvement? How can power factor be improved?

Descriptive Answers 5 to 20 Marks)

Q. 1 Define the following terms for a power station.

i. Diversity factor
ii. Utilization factor
iii. Load factor
iv. Annual plant capacity factor

Q. 2 A generating station has connected load of 23MW and a maximum demand of 20 MW, the units generated being 61.5×10^6 per annum. Calculate

i. Demand factor
ii. Average demand
iii. Load factor

Q. 3 The daily demands of three consumers are given below:

Time	Consumer-1	Consumer-2	Consumer-3
12 midnight to 6 AM	200W	200W	NO LOAD
6 AM TO 10 AM	500W	NO LOAD	400W
10 AM TO 3 PM	300W	800W	1200W
3 PM TO 8 PM	600W	200W	400W
8 PM TO MIDNIGHT	200W	NO LOAD	200W

Plot the load curve and find:

i. Maximum demand of individual consumer
ii. Load factor of individual consumer
iii. Diversity factor
iv. Load factor of the station

Q.4 A generating station has the following daily load cycle.

Time (Hrs)	0-4	4-8	8-10	10-12	12-18	18-24
Load (MW)	30	50	40	60	70	50

Draw the load curve and find the following:

i. Maximum demand
ii. Units generated per day
iii. Average load
iv. Load factor

Q. 5 A 400V, 50Hz, 3- Phase line delivers 200 KW at 0.8 pf lagging. It is desired to raise the line power factor to unity by installing shunt capacitors. Calculate the capacitance of each unit if they are connected in (i) star (ii) Delta

Q. 6 What is the difference between chronological load curve and load duration curve.

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Unit 4

Short Answers:(2 Marks Each)

Q. 1 What do you mean by Co-generation.

Q. 2 Discuss the load of load diversity in power system economics.

Q. 3 Discuss the effect of load factor on unit energy cost.

Q. 4 What is depreciation reserve? Why it is necessary to maintain it?

Q. 5 Differentiate between fixed and operating cost of power plants.

Q. 6 A transformer originally costing Rs. 1,00,000 has a useful life of 16 years. If the scrap value of the equipment is Rs.20,000, Find the annual depreciation by straight line method.

Descriptive Answers: (5 to 20 Marks)

Q. 1 Calculate most economic power factor when kVA demand is constant.

Q. 2 How can we calculate generation cost and depreciation of power plants?

Q. 3 Calculate most economic power factor when kW demand is constant.

Q. 4 Determine the generation cost per unit of energy from the following plant data:

Installed capacity=120 MW

Capital cost= Rs. 10000 per kw

Interest and depreciation= 15%

Fuel consumption= Rs. 500 per 1000 kg

Salaries, wages, repairs and other operating costs per annum= Rs. 10,00,000/-

Peak load= 100 MW

Load factor= 60%

Q. 5 Define the term diversity factor and prove that load factor of supply system is improved by an increase in diversity of load.

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Unit 5

Short Answers: (2 Marks Each)

Q. 1 Illustrate general tariff form. Also throw light on objectives of tariffs.

Q. 2 Differentiate between peak load and base load plants.

Q. 3 Explain selection and location of thermal power plant.

Q. 4 Explain spot pricing.

Q. 5 Give a comprehensive comparison of thermal, hydro and nuclear power sources

Q.6 Write short notes on power factor improvement tariff.

Descriptive Answers: (5 to 20 Marks)

Q. 1 Explain flat demand & straight meter rate tariffs.

Q. 2 Discuss different types of tariffs used for charging the consumers of electrical energy.

Q. 3 Discuss various types of reserves.

Q. 4 An industrial consumer has an annual energy consumption of 201500 kWh at a load factor of 0.35. The tariff is Rs. 9000+ Rs. 1200 per kw of maximum demand + Rs. 2.20 per kWh. (i) find his annual bill (ii) what is the bill if total energy consumption is the same but load factor improved to 0.55. (iii) what is the bill if energy consumption is reduced by 25% and load factor is 0.33. (iv) Find average energy cost in each case.

Q. 5 Discuss the various methods to conserve the energy and sustain the energy.