

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT
(An Autonomous College U/s UGC Act 1956)

B.Tech. SEMESTER-I, SEMESTER END EXAMINATION - WINTER 2024

Subject Code: 1EL102

Date: 21-12-2024

Subject Name: ELECTRICAL POWER GENERATION

Time: 11:00 AM to 01:30 PM

Total Marks: 70

Instructions

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Write answers of **Section A** and **Section B** in **separate answer books**.
3. Attempt all questions from both **Section A** and **Section B**.
4. Each section carries **35 marks**, with a total of **70 marks** for the examination.
5. The figures to the right of each question indicate full marks, make suitable assumptions with justification.
6. BL - Bloom's Taxonomy Levels (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

SECTION A

	Marks BL CO		
Q.1 Objective-Type Questions	[05]		
(a) Which component in a steam power station converts heat energy into mechanical energy?	1	R	1
(i) Boiler			(ii) Condenser
(iii) Turbine			(iv) Generator
(b) In a nuclear power station, which material is commonly used as a coolant?	1	R	3
(i) Uranium			(ii) Water
(iii) Graphite			(iv) Carbon dioxide
(c) In a steam power station, what is the purpose of an economizer?	1	R	1
(i) To convert steam into water			(ii) To preheat the air before entering the boiler
(iii) To improve efficiency by preheating feed water			(iv) To remove impurities from water
(d) What is one of the main environmental concerns of placing a steam power station near a populated area?	1	R	1
(i) Noise pollution			(ii) Air pollution due to emissions
(iii) Excessive water use			(iv) Availability of fuel

- (e) What is the primary fuel used in diesel power plants? 1 R 3
- (i) Natural Gas (ii) Diesel
- (iii) Coal (iv) Uranium

Q.2 Attempt Any Two [10]

- (a) With the help of schematic diagram explain the operation of Steam power plant. 5 U 1
- (b) For a steam power plant, explain function of: (i) Air pre heater (ii) Cooling tower (iii) ESP (iv) ID fan (v) Super heater (vi) Condenser (vii) Boiler feed pump 5 U 1
- (c) Give advantage and disadvantage of steam power station. 5 R 3

Q.3 Attempt Any Two [10]

- (a) Describe important points for site selection of nuclear power station. 5 U 1
- (b) Explain functions of the following in relation to nuclear power station: 5 U 1
 (i) Control rod (ii) Moderator (iii) Coolant (iv) Heat exchanger
- (c) Explain (i) Fusion Reaction (ii) Fission Reaction 5 U 3

Q.4 Attempt Any Two [10]

- (a) Explain the working of gas turbine power plant with a schematic diagram. 5 R 1
- (b) Describe important points for site selection of gas turbine power plant. 5 U 1
- (c) What are the classification of gas turbine power plant? 5 U 3

SECTION B

	Marks	BL	CO
Q.5 Objective-Type Questions	[05]		
(a) Which type of plant has minimum running cost? (i) Diesel Power Plant (ii) Nuclear Power Plant (iii) Hydro Power Plant (iv) Thermal Power Plant	1	A	4
(b) Installed capacity of a power station is ____ then the maximum demand. (i) less (ii) more (iii) equal (iv) zero	1	U	5
(c) The hydroelectric power plants are_____ (i) Operating cost is high and initial cost is high (ii) Operating cost is low and initial cost is high (iii) Operating cost is low and initial cost is low (iv) Operating cost is high and initial cost is low	1	A	4
(d) The location of surge tank is close to _____ (i) Tail race (ii) Dam (iii) Turbine gate (iv) Spillway	1	R	4
(e) What does the highest point on the daily load curve represents? (i) Peak load. (ii) Maximum demand. (iii) Both (i) & (ii). (iv) None of these.	1	U	5
Q.6 Attempt Any Two	[10]		
(a) Explain the essential factors which influence the choice of site for a hydro power plant.	5	A	4
(b) Describe the benefits and drawbacks of wind energy and its application.	5	R	4
(c) Briefly describe the solar pond and binary cycle solar thermal power plant.	5	U	4
Q.7 Attempt Any Two	[10]		
(a) Define: (i) Load Curves (ii) Average Load (iii) Connected Load (iv) Maximum Demand (v) Demand Factor.	5	R	5
(b) What do you understand by (i) Base Load and (ii) Peak Load of a power generation?	5	U	5

- (c) A power plant supplies the following loads to various consumers: 5 E 5
 Industrial consumer = 1500kW; Commercial consumers = 750kW, Domestic consumer = 100 kW; annual load factor = 450 kW
 If the maximum demand on the station is 2500 kW and the number of kWh generated per year is 45×10^5 . Determine (i) average demand (ii) the diversity factor (iii) annual load factor.

Q.8 Attempt Any Two [10]

- (a) A generating station has a connected load of 43 MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum. Calculate (i) average demand, (ii) the demand factor and (iii) the load factor 5 E 5
- (b) Explain the terms load factor and diversity factor and how do these factors influence the cost of generation? 5 R 5
- (c) What do you understand by Tariff? Discuss the objective of Tariff. 5 U 5
