C20-EE-303

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BOARD DIPLOMA EXAMINATION, (C-20)

NOVEMBER/DECEMBER—2022

DEEE – THIRD SEMESTER EXAMINATION

POWER SYSTEMS—I (GENERATION)

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. List any six basic components of wind power mill.

2. Define solar cell.

3. Classify the steam turbines based on the direction of steam flow.

4. State any one reason for heating the feed water in boilers.

5. List the types of cooling towers.

6. A hydel power plant operates under an effective head of 50 meters and a discharge of 94 m^3/sec. Determine the power developed.

7. Define hydrograph.

8. List any three merits of nuclear energy.

9. What is meant by nuclear fusion?

10. A 15 MW power station generates 50×10^6 units of energy per annum. Determine its load factor and calculate the electrical energy generated by the power station, if the load factor is improved to 60%.

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Explain the causes and effects of air pollution in a steam power plant.

(OR)

(b) Discuss the advantages of coal pulverization in improving the efficiency of a thermal power station.

12. *(a)* Classify hydel power station depending upon the type of location and explain.

(OR)

(b) Discuss the limitations in selection of site for locating a hydel power plant.

13. *(a)* Discuss the functions of any six basic components of a nuclear reactor.

(OR)

(b) Explain with a block diagram, the working of a gas power plant.

14. *(a)* Explain any four types of tariffs that are commonly used in calculation of electrical energy consumed.

(OR)

(b) A steam power station of capacity 150 MW costs ₹15 crore in capital investment. The various costs are as follows :

1. Insurance and taxes = ₹ 2 lacs/annum.
2. Fuel and lubricants = ₹ 4 lacs/annum.
3. Transportation and storage = ₹ 2 lacs/annum.
4. Salaries and wages = ₹ 3 lacs/annum.
5. Miscellaneous costs = ₹ 2 lacs/annum.

Reckoning interest and depreciation at 15% per annum of capital cost, calculate the cost of energy generated per unit if the total generation in the year is 400 million units.

15. *(a)* Mention any six advantages of integrated system over isolated operation.

(OR)

(b) A three-phase synchronous motor having a mechanical load of 100 kW is connected in parallel with a load of 500 kW of 0·8 p.f. lagging. The excitation of the motor is adjusted, so that the kVA input to the motor becomes 120 kVA. Determine the new power factor of the whole system.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. Coal handling, steam generating and cooling arrangement comprises the major components in a condensing type of thermal power station. Support your answer with a line diagram.

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