

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: B.TECH
BRANCH: EEE**

**SEMESTER : III
SESSION : MO/19**

SUBJECT: EE203 ELECTRIC ENERGY GENERATION AND CONTROL

TIME: 3 HOURS

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Give the comparison of steam power plant, hydro-electric power plant, diesel power plant and nuclear power plant on the basis of operating cost, initial cost, efficiency, maintenance cost and availability of source of power. [5]
- Q.1(b) A power supply is having the following loads : [5]
- | Type of load | Max. demand (k W) | Diversity of group | Demand factor |
|--------------|-------------------|--------------------|---------------|
| Domestic | 1500 | 1.2 | 0.8 |
| Commercial | 2000 | 1.1 | 0.9 |
| Industrial | 10,000 | 1.25 | 1 |
- If the overall system diversity factor is 1.35, the plant capacity factor is 40% and the annual load factor is 50%. Determine (i) the maximum demand on the supply system, (ii) the average demand on the supply system (iii) connected load of each type, and (iv) reserve capacity of the plant. Select appropriate data if missing.
- Q.2(a) Define Draught. Discuss Natural and Induced Draught with neat diagram and list out their merits and demerits. [5]
- Q.2(b) Explain with a neat diagram the construction and working principle of Lancashire Boiler. [5]
- Q.3(a) A factory is located near a water fall where the usable head for power generation is 25 m. The factory requires continuous power of 400 kW throughout the year. The river flow in a year is (a) 10 m³ /sec for 4 months, (b) 6 m³ /sec for 2 months and (c) 1.5 m³ /sec for 6 months. [5]
- (i) If the site is developed as a run-of-river type of plant, without storage, determine the standby capacity to be provided. Assume that overall efficiency of the plant is 80%.
- (ii) If a reservoir is arranged upstream, will any standby unit be necessary? What will be the excess power available?
- Q.3(b) Discuss the Tangential flow hydro turbine with neat diagram and explain its different components. Also, explain the functions of the following with neat sketch: (i) dam (ii) spillways (iii) surge tank (iv) headworks (v) draft tube. [5]
- Q.4(a) Explain the principle of operation of breeder reactor used in nuclear power generation with a neat sketch. [5]
- Q.4(b) Draw the schematic diagram of a nuclear power station and discuss its operation. [5]
- Q.5(a) Explain the working of four stroke diesel engine with neat diagram. [5]
- Q.5(b) Explain the operating principle of solar plant. Draw the PV and IV characteristics of solar cell and explain the maximum power point tracking algorithm with a neat flow chart. [5]

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