Code No: 127GP

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, September - 2021
POWER PLANT ENGINEERING
(Mechanical Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks

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1.a) How the energy resources are utilized in India for power generation and discuss the technological developments for power generation?
b) Explain the method of separation of ash from the combustion chamber and discuss the ash handling system. [7+8]

2.a) What are different components required for the fuel burning system to use pulverized coal? Explain.
b) Explain the significance of supercharging of diesel engine power generation units along with a suitable diagram. [8+7]

3.a) Draw the layout of combined cycle power generation unit and derive the equation for the thermal efficiency of the plant.
b) Differentiate among closed, open and semi closed gas turbine power plants based on constructional and loading conditions. [7+8]

4.a) How does the fuel cell work? Explain with a suitable diagram and also discuss how to make use of solar energy for the operation of fuel cells.
b) Explain the principle of operation of Magneto Hydrodynamic system for direct energy power generation with a suitable diagram. [8+7]

5.a) Explain the significance of hydrological cycle of a hydro electric power station along with their characteristics.
b) Explain the principle of operation of pumped storage hydro power station with a suitable line diagram. [7+8]

6.a) Describe the principle of operation of horizontal axis wind turbine power generation unit along with their merits and demerits.
b) What are different tidal energy resources available in India? Discuss the capacity of these power generation plants. [8+7]

7.a) Explain the principle of operation of fast breeder reactor used in Nuclear power generating units.
b) What are different breeding and fertile materials used for power generation in Nuclear reactors? Discuss them. [7+8]

8.a) A steam power plant has installed capacity of 120 MW and a maximum demand of 100 MW. The coal consumption is 0.4 kg per kWh and the cost of the coal is Rs 80 per ton. The annual expenses of salaries and other overhead expenses excluding coal are Rs 50×10^5. The plant works on load factor 0.5 and the capital cost of the power station is Rs 4×10^5. If the rate of interest and depreciation is 10%, then calculate the cost of power generation for kWh.
b) What are different pollution standards to be maintained in India to control the pollution from power plants? Explain. [8+7]

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