Registration No :

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M.Tech.
HTPE211

2nd Semester Back Examination 2017-18
POWER PLANT PRACTICE AND CONTROL
BRANCH : HEAT POWER & THERMAL ENGG,
HEAT POWER ENGG, THERMAL ENGG, THERMAL POWER ENGG
Time : 3 Hours
Max Marks : 70
Q.CODE : C952
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1   **Answer the following questions:**   **(2 x 10)**
 a) With PV and TS diagram explain the effect of reheating and regeneration in a
        gas turbine plant.
 b) Write the function of draft tube in turbine outlet?
 c) What are effects of regeneration and reheat on efficiency and work output of
        the power plant.
 d) What is the function of economizer and air preheater?
 e) Define the term "Breeding".
 f) What are the micro hydel plants? Why are they important now days?
 g) What are the major factors that decide the economics of power plants?
 h) What is the use of load curves in power plants?
 i) What are the advantages of super critical boiler over critical boilers?
 j) List out the inherent advantages of the combined power cycles.

Q2 a) How are nuclear reactor classified? Discuss fast breeder reactor.   **(6)**
  b) What are the desirable properties of a good moderator?   **(4)**

Q3 a) What are the auxiliaries of a hydro-power plant and what methods of drives   **(5)**
         are employed for these? Discuss merits and demerits of each method.
  b) Draw the neat diagram of hyperbolic cooling tower and discuss its merit and   **(5)**
         demerits.

Q4 a) Explain with a neat sketch the principle of turbine speed regulation.   **(5)**
  b) Enumerate various modern ash-handling systems.   **(5)**

Q5   A regenerarive steam power plant generates 27000 kW energy from the   **(10)**
         electric generator directly coupled to steam turbine. The steam at 60 bar and
         450C is supplied to the steam turbine. The condenser vacuum is 730 mm of
         Hg. The steam is bled from the steam turbine at 3 bar. The heating of the feed
         water is done in the direct contact heater. Assuming the turbine efficiency of
         each portion of expansion is 90%, find a) the steam bled per kg of steam
         supplied to the turbine. b) the steam generated per hour if the boiler efficiency
         is 90% and alternator efficiency is 95% and mechanical efficiency is 98%.
         Neglect pump work.

Q6 **a)** Find the cost of generation per kW-hr from the following data. **(6)**

Capacity of the plant	- 120MW
Capital cost	- Rs.1,200 per kW installed
Interest and depreciation	- 10 %on capital
Fuel consumption	- 1.2 kg / kW-hr.
Fuel cost	- Rs. 40 tone
Salaries, wages, repairs and maintenance	- 6, 00,000 / year

The maximum demand is 80 MW and load factor is 40 %.

b) A power station has two 60MW units each running for 1500hours a year. The energy produced per year is 700×10^6 kW-hr. Calculate the plant load factor and plant use factor. **(4)**

Q7 **a)** How waste is disposed off in nuclear power station? What are the main difficulties in handling radioactive waste? **(5)**

b) Explain the principle involved in design of chimney. **(5)**

Q8 **Write short notes on (any TWO)** **(5 x 2)**
a) Water treatment systems
b) Future energy Systems
c) Environmental impacts of thermal power plant