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Total Number of Pages:02

B .TECH
PEME5409

8th Semester Regular / Back Examination – 2016-17

POWER PLANT ENGINEERING

BRANCH: MECHANICAL

Time: 3 Hours

Max Marks: 70

Q.CODE:Z224

**Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)
- a) Draw pressure, velocity variation in simple impulse turbine and reaction turbines.
 - b) What do you understand by Boiler draught?
 - c) What do you mean by compounding of steam turbines
 - d) What are effects of regeneration and reheat on efficiency and work output of the power plant.
 - e) Enlist the various types of losses taking place in a steam turbine.
 - f) What is deaerator? Where is it exactly located?
 - g) State the advantage of pulverized fuel firing.
 - h) What is nuclear stability? Why are elements of higher mass number not stable?
 - i) Name four mountings used in boiler.
 - j) Mention the various types of tariff.
- Q2 a) Discuss the essential features of a steam power plant. (6)
- b) How can a capacity of a steam power plant be determined? Explain briefly. (4)
- Q3 a) What do you mean by super saturated flow? Explain with h-s diagram (5)
- b) Dry saturated steam is passed at 7 bar through a convergent-divergent nozzle. The throat area is 4.5 cm^2 . Find the mass of steam passing through the nozzle per minute. (5)
- Q4 a) With neat sketch, explain working of any one type of accessories used in boiler. (5)
- b) 5400 kg of steam is produced per hour at a pressure of 7.5 bar in a boiler with feed water at 41.5°C . The dryness fraction of steam at exit is 0.98. The amount of coal burnt per hour is 670 kg of calorific value 31000 kJ/kg . Determine the boiler efficiency and equivalent of evaporation. (5)
- Q5 a) Differentiate between surface and jet condenser (5)
- b) A surface condenser deals with 13625 kg of steam per hour at a pressure of 0.09 bar. The steam enters 0.85 dry and the temperature at the condensate and air extraction pipes is 36°C . The air leakage amounts to 7.26 kg/hour . (5)

Determine (i) the surface required if the average heat transmission rate is 4 kJ/cm^2 per second (ii) the cylinder diameter for the dry air pump, if it is to be single acting at 60 rpm with stroke to bore ratio 1.25 and volumetric efficiency of 0.85

- Q6 In a reaction turbine, the blade tips are inclined at 35° and 20° in the direction of motion. The guide blades are of the same shape as the moving blades, but reversed in direction. At a certain place in the turbine, the drum diameter is 1 meter and blades are 10 cm high. At this place the steam has a pressure of 1.75 bar and dryness fraction of 0.935. If the speed of this turbine is 250 r.p.m and the steam passes through the blades without shock, find the mass of the steam flow and power developed in the ring of moving blades. (10)
- Q7 a) What is a moderator? Name the common moderators and discuss their relative advantages and disadvantages. (5)
b) Give the functions and materials for the followings (5)
(i) reflector (ii) control rods (iii) biological shield
- Q8 Write short notes on (any two) (5+5)
a) Peak load, Demand factor and Load factor
b) BWR and PWR
c) Approach, Range and Cooling efficiency of a cooling tower