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Total Number of Pages : 02

M.TECH

M.TECH 2ND SEMESTER REGULAR EXAMINATIONS, MAY 2018

POWER PLANT AND PRACTICE

Branch: TE, Subject Code:MTEPE2053

Time: 3 Hours

Max Marks : 70

PART-A**(10 X 2=20 MARKS)****1. Answer the following questions.**

- a) What do you understand by drought? Classify it. (CO1)
- b) What is the effect of regeneration and reheating in gas turbine power plants? (CO1)
- c) Explain the effects of variable loads on power plant? (CO3)
- d) Define vacuum efficiency applied to a condenser. (CO1)
- e) What are the two different methods used to control NO_x and SO_x in flue gases? (CO4)
- f) Define Load factor and Capacity factor. (CO3)
- g) List out the major advantages of the combined power cycles. (CO1)
- h) Which reactor has been selected under India's nuclear power programme and why? (CO3)
- i) What is the purpose of governing in steam turbine? (CO1)
- j) What do you mean by environmental audits? (CO4)

PART-B**(5 X 10=50 MARKS)****Answer any five questions from the following.**

- 2 a) Explain the operation of an elastic precipitator with neat sketch. (CO1)[5]
b) Draw a neat diagram of cyclone burner and describe its working? (CO1) [5]
- 3 a) What are the different methods of governing the steam turbine?
Explain any one method with diagram? (CO1) [5]
b) Water at 30^oC flows into a cooling tower at a rate of 1.15kg per kg air. Air enters the tower at the DBT of 20^oC and a relative humidity of 60% and leaves it at a dry blub temperature of 28^oC and 90% relative humidity. Makeup water is supplied at 20^oC. Determine (a) the temperature of water leaving the tower, (b) the fraction of water evaporated and (c) the approach and the range of the cooling tower. (CO2) [5]
- 4 a) Explain with diagram the working of PWR and BWR. (CO2) [8]
b) Explain the advantages and disadvantages of PWR and BWR. (CO2) [2]
- 5 a) Write down the chemical methods to reduce emission. (CO4) [5]
b) Which undesirable emissions generated from combustion causes air pollution and write down the physics behind them. (CO4)[5]
- 6 a) A reactor is fuelled with 100 tonnes of natural uranium (atomic mass 238.05) in which the average thermal neutron (2200 m/sec) flux is 1013 neutrons/cm²s, the 2200 m/sec cross section of U-235(atomic mass 235.04) are; $\sigma_f = 579$ barns , $\sigma_a = 101$ barns, the energy release per fission is 200MeV and 0.715% of natural uranium is U-235. Calculate (a) the rating of the reactor in MW/tonne, (b) the rate of consumption of U-235 per day. (CO2)[8]
b) What do you mean by activity and half-life? (CO2)[2]

7. a) A forced draught fan supplies air at 10m/sec against a draught of 20 mm of water across the fuel bed. Estimate the power required to run the fan if 2500 kg/h of coal is consumed and 16 kg of air is supplied per kg of coal burned. The temperature of the flue gases and ambient air may be taken as 600 K and 300 K respectively. If the forced draught fan is replaced by an induced draught fan, what will be the power required to drive the fan?

(CO1)[8]

- b) What is the difference between FD and ID fans?

(CO1)[2]

8 Write short notes on following.

[5*2=10]

- a) Thermo electric power generation

(CO1)

- b) PFBC

(CO1)

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