Registration No: **M.TECH**

Total Number of Pages : 2

M.TECH 1ST SEMESTER SUPPLE EXAMINATIONS, DECEMBER 2018
THERMAL AND NUCLEAR POWER PLANT
Branch: TE, Subject Code:MTEPE1052
(Regulations 2017)

Time: 3 Hours   Max Marks : 70   Question Code: SD18002088

PART-A (10 X 2=20 Marks)

1. Answer the following questions.

   a. Define Boiler blow down and what is % blow down?
   b. What is the basic difference between proximate analysis and Ultimate analysis?
   c. What is the function of Deaerator?
   d. Define load factor and capacity factor.
   e. What do you mean by radioactive decay?
   f. Explain neutron scattering.
   g. Write the two reason why not all the fission neutrons cause further fission
   h. Calculate the binding energy of 0.8 a.m.u. mass of nucleus.
   i. Calculate the decay constant of Thorium 233 if the half life is 22.1 min.
   j. Which reactor has been selected under India's nuclear power programme and why?

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

2. a) What are the different types of Circulation used in a thermal power plant? Explain one with   [5]

   neat diagram?

   b) A textile factory requires 10 ton/h of steam at 37 bar and 345^0C for process heating at 3 bar   [5]

   saturated and 1000 KW of power for which a back pressure turbine of 70% internal

   efficiency is to be used. Find the steam condition at the exit of the turbine. (The enthalpy of

   steam at 3 bar saturated condition is 2725.3 kj/kg and at 37bar 345^0C,

   the enthalpy is 3085.3 kj/kg).

3.a) Discuss the mechanism of fluidized bed combustion   .   [5]

   b) What are the different types of stokers used in steam power plant? Explain one with diagram.   [5]

4.a) Calculate the overall efficiency of Rankine- Rankine series cycles working with two different   [5]

   fluids mercury and steam.

   b) Describe briefly different types of furnaces used for burning pulverized coal.   [5]

5.a)Explain the working principle of an electrostatic precipitator.   [5]

   b) With neat sketch explain the working principle of air-preheater   [5]

6. a) Explain the working principle of neutron life cycle. [5]

  b) Calculate the microscopic absorption cross-section of natural Uranium, which consists of [5] 98% U-237 and 2% U-236. The microscopic cross sections for 0.025eV are: U-237: $\sigma c = 2.70$ barns, $\sigma f = 0.02$ barns and U-236: $\sigma c = 103$ barns, $\sigma f = 580$ barns.

7.a) what do you mean by co-generation system? Briefly explain pass-out and condensing [5] turbine?

  b) Explain the function of cladding? What are the factors suitable for selection of a cladding? [5]

8. Write short notes on
    a) CANDU reactor
                                                 [5]
    b) Indian Nuclear power programme
                                                   [5]

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