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SEAT No. :

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BE/INSEM/APR-518

B.E. (Mechanical/ Mechanical S/W)

402047 : ENERGY ENGINEERING

(2015 Pattern) (Semester - II)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

- 1) Answer three questions from following.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use steam table, logarithmic tables, slide rules, Mollier charts, electronic pocket calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) a)

What is FBC? Explain its stages with neat sketches. [4]

- b) In a Reheat Rankine cycle the steam is supplied at 50 bar and 400°C to high pressure turbine and after expansion upto 12 bar pressure, the steam is reheated at constant pressure upto 380°C in a reheater before further expanding in low pressure turbine upto pressure of 0.1 bar. Find Rankine Cycle efficiency of the plant. Draw T-s diagram. Do not neglect the pump work. [6]

OR

Q2) a)

Explain present status of power generation in India. [4]

- b) In a co-generation steam power plant, the boiler generates steam at 50 bar & 400°C which is supplied to turbine for expansion. Steam at 5 bar is extracted from turbine for process heating and remainder continues to expand up to condenser pressure of 0.05 bar. The mass flow rate of steam from boiler is 15 kg/sec. If the amount of steam extracted for process heating is 5kg/sec. which is condensed at 5 bar from process heater. Neglect Pump Work [6]

Find :

- i) Power output from turbine in kW
- ii) Heat utilization in kW
- iii) Thermal efficiency of plant
- iv) Effectiveness of co-generation.

Draw T-s diagram.

P.T.O.

Q3) a) Explain :

- i) condenser efficiency;
- ii) vacuum efficiency

b) Following data were recorded during the testing of condenser :

Vacuum = 71 cm of Hg; Barometer reading = 75.5 cm of Hg

Condensate temperature = 25°C;

Determine the partial pressure of air and steam in the condenser and the mass of air per kg of steam. Also, determine the vacuum efficiency. [6]

OR

Q4) a) Write short note on methods to control pollutants for thermal power plants. [5]

b) Explain in detail about thermal pollution. [5]

Q5) a) Explain the important factors to be considered for site selection for a hydroelectric power plant. [5]

b) Draw a neat diagram of CANDU reactor. Explain its advantages and disadvantages over the other type of reactors. [5]

OR

Q6) a) Explain the problems and solutions associated with nuclear waste disposal. [5]

b) Write a note on selection of hydraulic turbine. [5]

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