SUBJECT CODE :- 81
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(Mech/Prod) Examination Nov/Dec 2015
Thermodynamics-II
(Revised)

[Time: Three Hours]   [Max. Marks: 80]

"Please check whether you have got the right question paper."

N.B
i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii)Solve any three questions from section A and any three questions from section B.
iii) Figures to the right indicate full marks.
iv) Use of non-programmable calculator and heat transfer data book is permitted in the examination.

SECTION-A

Q1.   Solve any five   10
a) What is boiler?

b) List the boiler mounting and accessories

c) What is boiler draught?

d) What is boiler efficiency?

e) What do mean by water tube boiler?

f) What is equivalent evaporation?

g) What are types of nozzle?

Q.2 a) What are the factors affecting selection of boiler?   05

b) Explain the construction and working of chochran boiler with the help of neat sketch.   05

c) Explain the working of supercharged boiler.   05

Q.3 a) A thermal power plant works on natural draught. The height of the chimney is restricted to 40m. The ambient   09
temperature of the air is 20^0C and the temperature of the flue gas passing through the chimney at its base is
300^0C. The air fuel ratio is 17:1. Calculate the diameter of the chimney at the base, if head lost due to friction is
25% of the ideal draught

b) Compare natural and artificial draught.   06

Q.4 a) A steam generator evaporators 18000kg/h of steam at 12.5 bar and the quality of 0.97 dry from feed water at   09
105^0C   When coal is fired at 2014 Kg/h. if the higher calorific value of coal is 27400 kj/kg, Find the

i)   heat rate of the boiler in kj/h,
ii)   equivalent evaporation and
iii)   Thermal efficiency

b) Establish the energy balance in a boiler, How can its performance be improved?   06

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Q.5 a) What are the types of nozzles?   04

     b) Derive an equation for discharge through the nozzle.   07

     c) Define supersaturated flow of steam   04

SECTION-B

Q.6   Solve any five   10

          a) Define rotary compressor
          b) What is blade efficiency
          c) What is impulse turbine
          d) What is surface condenser
          e) What is vaccum efficiency
          f) What is free air delivery
          g) Explain degree of reaction

Q.7 a) Differentiate between jet and surface condenser.   06

     b) A surface condenser is designed to handle 12000kg of steam per hour. The steam enters at 8kpa, 0.9dry. The   09
         condensate leaves the condenser at the corresponding saturation temperature. Calculate the rate of cooling
         water, if cooling water temperature rise is limited to 12^0C

Q.8 a) What are four basic components of a steam power plant? Write their function in brief.   05

     b) Why Carnot cycle is not practical for a stream power plant?   05

     c) Draw the schematic for an ideal Rankine cycle. Draw p-v, T-s and h-s diagrams for this cycle.   05

Q.9 a) What is regeneration? Draw schematic and T-s diagram for an ideal regenerative cycle.   06

     b) A steam power plant operates on an ideal Rankine cycle between a boiler pressure of 40 bar, 300^0 C and a   09
         condenser pressure of 0.035 bar. Calculate cycle efficiency, work ratio and specific steam consumption for

         i)Ideal Rankine cycle and

         ii)For Rankine cycle, when expansion process has an isentropic efficiency of 80%.

Q.10   a) Classify the air compressions   15
          b) Differentiate between single-acting and double –acting compressors.
          c) Explain the construction and working of a roots blower.

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