SUBJECT CODE NO:- P-275
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(Mech./Prod) Examination May/June 2017
Thermodynamics-II
(Revised)

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

Please check whether you have got the right question paper.

N.B   i)Question no. 1 & 6 are compulsory from each section A & B.
ii)Solve any two questions from remaining questions in each section A & B.
iii)Steam table, mollier diagram is permitted.
iv) Assume suitable data, if required.

Section A

Q.1   Solve any five   10
i) Write major components of process Boiler.
ii) Differentiate between internally fired & external fired boiler.
iii) Define equivalent evaporation & factor of evaporation.
iv)What is Natural draught ?
v)List Applications of steam.
vi)Explain Induced draught.
vii)Define chimney efficiency.
viii)Define nozzle efficiency.

Q.2   a)A steam generator generates 300 kg of steam per hour at 12.5 bar & 0.97 dry from feed water at   08
105°C. The coal fired is 2040 kg/hr & its C.V = 27.4 MJ/kg. Find
i)equivalent evaporation
ii)Boiler efficiency
b)Explain Benson Boiler.   07

Q.3   a)Derive the equation for height & diameter of chimney.   07
b)A Chimney of 16m high is used for discharging maximum exhaust gases   08
i)Find the draught produced by chimney in mm of water
ii)if the maximum temp. of gases available is 350°C, find the mass of air supplied per kg of fuel if discharge
mass is maximum take atmospheric temperature = 20°C.

Q.4   a)What are types of draught. Explain Artificial draught.   07
b)The inlet condition to a steam nozzle are 10 bar & 250°C. The exit pressure is 2 bar. Assuming the   08
isentropic condition & negligible inlet velocity determine i)throat area ii)exit velocity iii)exit area

Q.5   Write short note on (Any three)   15
i)Effect of back pressure on nozzle characteristics
ii) isentropic flow through nozzle
iii)Artificial draught
iv)Heat losses in boiler.

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Section B

Q.6 Solve any five.   10
i)Explain jet condenser.
ii)List the method used to improve the performance of Rankine Cycle.
iii)What is compressor
iv)Define FAD
v)Define swept & clearance volume
vi)Define isothermal efficiency of compressor
vii)Explain need of multistage compressor
viii) What is intercooler?

Q.7 a)What are sources of air leakage & what is its effect on performance of condenser. Explain the method   08
used to reduce air leakage.
b)Derive the expression for the mass of circulating water required in condenser.   07

Q.8 a)Explain modified Rankine Cycle.   05
b)A simple Rankine works between pressure of 30 bar & 0.04 bar. The intial temp of steam is 400°C.   10
Calculate i)Turbine work   ii)pump work   iii)Cycle efficiency   iv)work ratio
v)Specific steam consumption.

Q.9 a)Derive the condition for minimum work required for two stage reciprocativa compressor with perfect   07
intercooling.
b)A single acting, two stage air compressor takes air at 1 bar & 300k delivers 10.5 kg/minute at 16 bar   08
when running at 440 rpm. Compression & expansion follows law $PV^{1.3}=c$.
Find   i)minimum power required
        ii)isothermal efficiency
        iii)Free air delivery (FAD)

Q.10 Write short note on . (Any three)   15
i)Vacuum pumps
ii)Rotary compressor
iii)Carnot cycle
iv)Effect of inlet & back pressure on performance of Rankine Cycle.

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