

Code No: 07A3EC21

R07**Set No. 2****II B.Tech I Semester Examinations, November 2010****THERMAL SCIENCE****Common to Mechatronics, Production Engineering****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. (a) Draw the diagram of A/F ratio versus throttle opening for different operating conditions of simple carburetor and explain salient features.
(b) What are the limitations of simple carburetor and how to rectify them. [8+8]
2. (a) What are the different forms of energy? Define potential energy and kinetic energy?
(b) A gas undergoes a reversible non flow process according to the relation $p = (-2v + 14)$ where v is the volume in m^3 and p is the pressure in bar. Determine the work done when the volume changes from 3 to 6 m^3 . [6+10]
3. (a) Draw the flow diagram of vapour compression refrigeration system and analyze the thermodynamic cycle applied for it?
(b) Explain the difference between the Bell Coleman and Joule cycle of refrigeration. [8+8]
4. (a) Prove that violation of the clausius statement leads to violation of the Kelvin Planck statement of the second law of thermodynamics.
(b) How is entropy defined?
(c) What is available energy and unavailable energy? [10+2+4]
5. (a) What are different modes of fuel admission to engine cylinder?
(b) Sketch a typical induction system of a petrol engine? [8+8]
6. (a) State and explain the four processes of the diesel cycle.
(b) A diesel engine has compression ratio of 14 and cut-off takes place at 6% of the stroke. Find the air standard efficiency. [8+8]
7. (a) What are different operating variables affect the thermal efficiency of gas turbine power plant? Explain.
(b) The minimum and maximum temperature limits in a gas turbine plant are 288 K and 1100 K. The pressure limits are 1 bar and 8 bar. Determine the thermal efficiency and work ratio. [8+8]
8. (a) Define enthalpy and how is it related to internal energy.
(b) A closed system consists of water contained in a cylinder and being stirred by a paddle wheel. During the process 35 kJ/hr of work was imparted to the system, and the internal energy increased to 145 kJ from its initial value of 120 KJ during one hour of stirring. Determine the heat transfer. [6+10]

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(b) What are the limitations of simple carburetor and how to rectify them. [8+8]

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R07**Set No. 3**

II B.Tech I Semester Examinations, November 2010

THERMAL SCIENCE

Common to Mechatronics, Production Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions

All Questions carry equal marks

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(b) Sketch a typical induction system of a petrol engine?

[8+8]

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