17352

14115

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory*.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any <u>FIVE</u> of the following : **20**

a) Define a thermodynamic system. Explain its different types.

b) How heat and work is defined ? Classify these quantities as path function or point function.

c) Differentiate between Adiabatic process and isothermal process with suitable diagrams.

d) Differentiate between impulse turbine and reaction turbine.

e) What are the methods of energy savings in air compressor ? Explain any one method.

f) Define the following terms related to IC Engines.

(i) Swept volume

(ii) Stroke

Marks

g) What are the three modes of heat transfer ? Give one example of each.

2. Attempt any TWO of the following : **16**

a) Define energy. What is stored energy and transit energy ? Discuss the types of stored energy.

b) Prove the difference between two specific heats (Cp and Cv) is equal to characteristics gas constant R.

c) Define wet, dry saturated and superheat steam. Explain the formation of steam at a constant pressure from water at O°C with T-S diagram.

3. Attempt any TWO of the following : **16**

a) Explain with neat sketch construction and working of surface condensers.

b) Explain vapour compression cycle with the help of P-H and T–S diagram.

c) In an otto cycle, the temperature at the beginning and end of the isentropic. Determine the air standard efficiency and the compression ratio. Take V = 1.4

4. Attempt any TWO of the following : **16**

a) Classify air compressors. Describe the working of a single stage reciprocating air compressor.

b) Differentiate between two stroke and four stroke engine.

c) Explain with neat sketch multiphase heat exchanger.

Marks

5. Attempt any TWO of the following : **16**

a) What role is played by cooling water ? What are the different types of cooling towers ? Explain any one with neat sketch.

b) Explain the I.C. Engine combustion stages is SI and CI engine.

c) A furnace wall is made up of refractory bricks of 300 mm thick. The inner and outer surfaces of the wall have temperature of 1000°C and 150°C. Find heat loss per square metre per hour.

If the outside temperature becomes 50°C, the furnace wall is covered with insulating bricks of 200 mm thickness, find the reduction in heat loss. Take thermal conductivity of refractory and in insulating bricks as 4.5 and 0.5 w/mk.

6. Attempt any TWO of the following : **16**

a) When is multistage compression used for air ? Explain the effect of intercooling in a multistage reciprocating compressor.

b) (i) State Stefan Boltzman law of radiation heat transfer.

(ii) Define –

(1) Absorptivity

(2) Transmissivity

(3) Reflectivity

(4) Emissivity.

c) (i) Differentiate between mountings and accessories of boilers.

(ii) Explain with neat sketch simple carburetor.

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