17406

14115
3 Hours / 100 Marks

Seat No. ☐☐☐☐☐☐☐

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

(2) Answer each next main Question on a new page.

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

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

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

Marks

1. a) **Attempt any SIX of the following:** 12

(i) Classify internal combustion engines.

(ii) Enlist Non-conventional energy sources.

(iii) State limitations of first law of thermodynamics.

(iv) Write ideal gas equation and unit for universal gas constant.

(v) State the value of characteristics gas constant for air. Also states its unit.

(vi) State uses of compressed air.

(vii) Give classification of compressor.

(viii) Give the classification of air conditioning system.

Marks

b) **Attempt any <u>TWO</u> of the following:** 08

(i) Explain the working or four stroke petrol engine with theoretical and actual valve timing diagram for same engine.

(ii) With sketch, describe working of Geothermal power plant.

(iii) Define extensive and intensive properties of the system with two examples.

2. **Attempt any <u>FOUR</u> of the following:** 16

a) Define :

(i) Pure substance

(ii) Working substance give examples

b) State assumption made for ideal gas.

c) Differentiate between petrol and diesel engine.

d) State Boyle's and Avagadro's law.

e) Explain two stage reciprocating compressor.

f) Differentiate between an Isothermal and Adiabatic process.

3. **Attempt any <u>FOUR</u> of the following:** 16

a) State second law of thermodynamics and enthalpy.

b) Describe with neat sketch the working of four stroke diesel engine.

c) What do you understand by Bio-diesel? How it is useful in future?

d) Sketch and explain working of screw compressor.

e) What is Isobaric process? Sketch on PV and TS diagram.

f) Give the classification of steam turbines.

Marks

4. **Attempt any <u>TWO</u> of the following:** **16**

a) State the classification of air conditioning systems with their application.

b) Explain Otto cycle with P.V. and T-S diagram and derives the expression for air standard efficiency.

c) Explain the working principle of central fugal compressor with neat sketch.

5. **Attempt any <u>TWO</u> of the following:** **16**

a) If one kg of gas is neated at constant pressure from 30°C to 250°C estimate the heat added 1 work done and change in internal energy.

b) Draw and explain working of Cochran Boiler.

c) Draw a neat sketch of window air-conditioner and label the parts.

6. **Attempt any <u>FOUR</u> of the following:** **16**

a) State statement of first law of thermodynamic.

b) Differentiate between fire tube boilers and water tube boilers.

c) What is Adiabatic and sketch on PV and TS diagram.

d) Define :

(i) Entropy state its unit

(ii) Define heat and work

e) Sketch solar water heater and explain its working.

f) What is the components of vapour compression cycle and gives the applications of vapour compression cycle.

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