17406

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

(7) 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) State different types of ideal gas processes. (any four)

   ii) Define dryness fraction and degree of superheat.

   iii) Define volumetric and isothermal efficiency of air compressor.

   iv) Define coefficient of performance of refrigeration and give its unit.

   v) State four applications of compressed air

   vi) Define Non-Renewable source of energy. Give their examples.

    vii) Give the classification of I.C. Engines (any four).

    viii) Define two stroke and four stroke cycle.

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

    i)   Represent isobaric and isochoric, isothermal and adiabatic process on P.V. and T.S. diagram.

    ii)   Differentiate between SI and CI Engines.

    iii) Describe different phases of steam formation.

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

  a) Represent otto cycle on P-C and T-S diagram and write equation for air standard efficiency.

  b) Draw neat labelled sketch of Coachran boiler and show the flue gas path.

  c) Define -

    i)   Free air delivered

    ii)   Compressor capacity

    iii) Piston displacement

    iv) Indicated power

  d) Differentiate between Heat and Work (any four).

  e) Give the classification of Boiler.

  f) Define Extensive and Intensive properties of the system with examples.

Marks

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

a) Give the classification of Air compressor.

b) What do you understand by Non-conventional power generation system? Explain their importance in the situation of power shortage through out the world.

c) Explain with sketch flat plate collector and its applications.

d) Explain with sketch working of two stroke petrol engine.

e) What are the advantages of two stage compression of air.

f) Define heat and work and explain why work is known as 'high grade energy'?

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

a) Explain with neat sketch working of four stroke petrol engine with actual and theoretical indicator diagram.

b) Suggest the following components for 'Cold storage room' and justify your answer.

   i) Compressor

   ii) Condenser

   iii) Expansion device

   iv) Evaporator

   v) Refrigerant

c) Explain construction and working of window air conditioner.

Marks

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

   a) Draw a neat labelled sketch of Babcock and Wilcox boiler. Show the path of water, steam and flue gases. Explain in short.

   b) Explain construction and working of centrifugal compressor. What are its uses?

   c) Explain vapour compression cycle, its components and applications.

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

   a) Draw a neat line diagram of Thermal power plant and explain working.

   b) Explain with sketch working of Tidal power plant.

   c) Explain working of Two stage air compressor and represent it on P-V diagram.

   d) State first and second law of thermodynamic. (Two statements of each)

   e) Differentiate between two stroke and four stroke engine.

   f) Only sketch winter air conditioning system and show air circulation by arrows.

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3 Hours / 100 Marks