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. Use of steam tables, logarithmic, Mollier’s chart is permitted.

Marks

1. Attempt any SEVEN of the following:

   (a) How boiler efficiency is differ from seasonal efficiency?
   (b) State different power losses in turbine.
   (c) What is purpose of Morse test? Name other methods.
   (d) State different industrial use of air compressor.
   (e) Define FAD (free air delivered) of air compressor.
   (f) Write different uses of rotodynamic pump.
   (g) Classify turbine according to direction of steam flow.
   (h) Write function of foot valve.
   (i) Write the equation of power required to drive reciprocating pump.
   (j) What is principle of operation of steam turbine?
   (k) Enlist the sources of heat losses in boiler.

   7 × 2 = 14

2. Attempt any FOUR of the following:

   (a) Sketch and explain Benson critical boiler.
   (b) Define cylinder bore and piston displacement of IC engine.
   (c) Explain working of single stage air compressor with P-V diagram.

   4 × 3 = 12

P.T.O.
(d) What does staging mean? What are the advantages of multistage compression?

(e) Write advantages and disadvantages of double acting pump.

(f) How you can select proper piping system of centrifugal pump?

3. Attempt any FOUR of the following:  

(a) Differentiate between subcritical and supercritical boiler.

(b) How combustion takes place in C.I. engine? Also write its application.

(c) Name three types of reciprocating air compressor that are commonly used in industry with its one application.

(d) What is purpose of hydraulic pump in fluid power system?

(e) Explain the power torque characteristics with graph of an spark ignition engine.

(f) Write the possible causes and remedies for following in case of IC engine:
   (i) Excessive vibration
   (ii) Suction problem
   (iii) Bearing wear
   (iv) Irregular discharge

4. Attempt any FOUR of the following:  

(a) Explain superheater and preheater in super critical boilers.

(b) Explain clearly why priming is essential before starting of centrifugal pump.

(c) Define the term specific speed of centrifugal pump and state an expression for it in terms of head, discharge and speed and rpm.

(d) Explain working of impulse turbine with neat sketch.

(e) List the four stages of compressed air preparation.

(f) State the faults and remedies for following causes in IC engine:
   (i) Incorrect gap between radiator and fan
   (ii) Piston seizure
   (iii) No spark at spark plug
   (iv) Engine turns over