17413

14115

2 Hours / 50 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) Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. **Attempt any NINE of the following :**   **18**

    (a) State the classification of steam turbine based on direction of steam flow.

    (b) Write any two provisions under Boiler Act for remedial measure.

    (c) List the tests conducted for performance of I.C. engine.

    (d) Define compressor capacity and swept volume.

    (e) State the classification of pumps.

    (f) State the meaning of impulse and reaction turbine.

    (g) Enlist the different power losses in steam turbine.

    (h) Draw labelled sketch of single stage reciprocating compressor.

    (i) Write the formula to calculate the power required to drive the centrifugal pump with meaning of each term.

    (j) State the applications of compressed air in industry.

    (k) List the different types of impellers of centrifugal pump.

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

    (a) Explain the construction of Benson boiler with neat sketch.

    (b) Differentiate between two stroke engine and four stroke engine.

    (c) With neat sketch explain the working of vane type rotary compressor. Write two applications of it.

(d) What is priming ? Why it is necessary for centrifugal pump ?

(e) Steam at 6 bar pressure has enthalpy 2600 kJ/kg. Determine if the steam is wet or superheated and calculate the dryness fraction or the superheated temperature (Use steam properties given at the end of question paper)

(f) Explain with neat sketch the working of starting motor of I.C. engine.

3. Attempt any FOUR of the following : 16

(a) Differentiate between fire tube boiler and water tube boiler.

(b) During the test on single cylinder oil engine working on the four stroke cycle and be fitted with a rope brake, the following readings are taken : Effective diameter of brake wheel = 625 mm.

Dead load on brake = 200 N.

Spring balance reading = 30 N.

Speed = 450 rpm

Area of indicator diagram = 420 mm²

Length of indicator diagram = 60 mm

Spring scale = 1.1 bar per mm

Diameter of cylinder = 100 mm

Stroke = 150 mm

Quantity of oil used = 0.815 kg/hr

Calorific value of oil = 42000 kJ/kg

Calculate brake power and indicated power.

(c) State the methods of energy saving in air compressor and explain any one.

(d) Explain the construction and working of centrifugal pump with neat sketch.

(e) Compare reciprocating compressor with centrifugal compressor.

(f) State and draw different types of casings used in centrifugal pump.

Extract from Steam Table
(Saturated Water and Steam)

P (bar)	t_s °C	V_f m³/kg	V_g m³/kg	h_f kJ/kg	h_{fg} kJ/kg	h_g kJ/kg	S_f kJ/kg°K	S_g kJ/kg°K
6	158.85	0.001101	0.3157	670.56	2086.3	2756.8	1.9312	6.76
8	170.43	0.001115	0.2404	721.11	2048.0	2769.1	2.046	6.66

_____