17554

16117

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.

(7) Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. Attempt any FIVE of the following : **20**

(a) Explain in brief working of hydraulic power plant with neat sketch.

(b) Explain Zeroth law of thermodynamics & give example.

(c) Differentiate between fire tube boiler & water tube boilers.

(d) Describe the construction of impulse turbine with neat sketch.

(e) Explain Brayton cycle with P-V & T-S diagram.

(f) Classify heat exchangers & give any four applications of heat exchangers.

(g) Differentiate between point function & path function.

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

(a) Explain working of solar water heating system with a neat sketch.

(b) Write a steady flow energy equation & apply it to boiler & condenser.

(c) Draw a neat & labelled sketch of Cochran boiler.

(d) Give classification of steam condensers & state primary & secondary functions of condenser.

(e) Differentiate between two stroke & four stroke engine.

(f) Explain working of shell & tube type heat exchanger with neat sketch.

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

(a) Explain closed system & open system. Give two examples of each.

(b) Describe the working of combined separating & throttling calorimeter with neat sketch.

(c) Give sources of air leakages in steam condensers.

(d) Explain supercharging of I.C. engine & its necessity.

(e) Determine the state of steam if

(i) pressure is 10 bar & specific volume is 0.185 m^3/kg.

(ii) pressure is 12 bar & temperature is 200 °C.

(f) What is vacuum efficiency & condenser efficiency ?

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

(a) Differentiate between heat pump & refrigerator. (minimum four points)

(b) Differentiate between natural draught & forced draught cooling tower.

(c) A 5 ton of steam is compressed adiabatically in a compressor from state 1 (P_1 = 0.5 bar & x_1 = 0.85) to state 2 (P_2 = 12 bar).

Determine the work input using Mollier diagram. Represent the process on the enthalpy – entropy diagram.

(d) Define pre-ignition & scavenging.

(e) What is Biogas & Biomass & state its applications.

(f) Draw & explain parallel flow heat exchanger.

5. Attempt any FOUR of the following : 16

(a) Explain the steam generation process for 1 kg water at 0 °C under constant pressure with T-H diagram.

(b) Differentiate between jet condensers & surface condensers with respect to construction, performance & applications.

(c) List fuels, lubricant additives & their advantages used in IC engine.

(d) Explain concept of PMM-I & PMM-II.

(e) Differentiate between Boiler mountings & accessories.

(f) Explain otto cycle with P-V & T-S diagram.

6. Attempt any FOUR of the following : 16

(a) Explain the statements of second law of thermodynamics.

(b) What is boiler & how steam boilers are classified.

(c) What is nozzle. Give four applications of nozzle.

(d) Explain process of detonation in I.C. engine.

(e) State & explain Dalton's law of partial pressure.

(f) Define :

(i) Enthalpy & Entropy

(ii) Extensive & Intensive properties
