17554

15162

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** :   **20**

   1) Give the classification of energy sources.

   2) What is system ? Explain types of system.

   3) Differentiate between heat and work.

   4) Define : (1) Wet steam (2) Dry steam (3) Dryness fraction (4) Superheated steam.

   5) i) State Dalton's law of partial pressure.

      ii) What is the function of condenser ?

   6) What is scavenging ? What are different methods of scavenging ?

   7) Explain parallel flow heat exchanger.

2. Attempt **any two** :   **16**

   a) Explain with neat sketch throttling calorimeter.

   b) Explain the equivalence of Kelvin Planck and Clausius statement.

   c) Explain with neat sketch evaporative type of surface condenser.

3. Attempt **any four** :   **16**

   a) Differentiate between point function and path function.

   b) Draw a neat sketch of cochran boilers.

   c) What is nozzle ? What are its types ?

Marks

   d) Explain valve timing diagram for 4-stroke cycle petrol engine.

   e) What is the function of lubricant additives ? What are its advantages ?

   f) Draw a neat sketch of shell and tube type of condenser.

4. Attempt **any four** :   16

   a) Differentiate between renewable and non-renewable energy sources.

   b) Calculate the enthalpy of 1kg of steam at a pressure of 8 bar and dryness fraction 0.8. How much heat would be required to raise 2kg of this steam from water at 20°C ?

      For 8 bar hf = 720.9 kJ/Kg hfg = 2046.5 kJ/Kg.

   c) What are the sources of air leakage in condenser ? State its effects.

   d) Explain supercharging and turbocharging in IC engine.

   e) Explain construction and working of two stroke cycle petrol engine.

   f) Explain with neat sketch cross flow heat exchanger.

5. Attempt **any two** :   16

   a) Write steady flow energy eq^n. Derive it for (i) Boiler (ii) Nozzle (iii) Turbine.

   b) Explain with neat sketch Lamount Boiler.

   c) What is the function of cooling tower ? Explain induced draught cooling tower.

6. Attempt **any four** :   16

   a) Explain solar distillation.

   b) Explain PMM I and PMM II.

   c) Explain with T-S and H-S diagram Rankine cycle.

   d) What is turbine ? Give its classification.

   e) In an otto cycle, the temperature at the beginning and end of the isentropic compression are 316°K and 596°K respectively. Determine air standard efficiency and the compression ratio. Take γ = 1.4.

   f) Explain preignition and detonation.

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