



17554

11718

3 Hours / 100 Marks

Seat No.

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- 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. A) Attempt **any six** :

12

- a) Name any two applications based on solar energy.
- b) Define Renewable and non renewable source of energy.
- c) State Zeroth law of thermodynamics.
- d) Define :
 - i) Internal energy
 - ii) Entropy
- e) Define – Boiler draught.
- f) Define :
 - i) Dryness fraction of steam
 - ii) Degree of superheat
- g) State the importance of steam table.
- h) State Dalton's law of partial pressure.
- i) Draw T-S diagram of Carnot cycle and name all the processes involved in it.

B) Attempt **any two** :

8

- a) Draw layout of hydroelectric power plant mention the function of each component in brief.
- b) Define path function and point function with their examples.
- c) What is heat exchanger ? State different types of heat exchangers.

2. Attempt **any four** :

16

- a) Explain the working of wind energy power plant with neat sketch.
- b) Define the term thermodynamic system. Give its classification and two examples of each.
- c) State the difference between heat and work.
- d) Draw PV and T-S diagram of Rankine cycle and label it.
- e) Give the classification of boiler.
- f) Draw P.V and T-S diagram of diesel cycle and label it.

P.T.O.

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

- a) Define the term :
 - i) Thermodynamic state
 - ii) Thermodynamic process
 - iii) Thermodynamic cycle
 - iv) Thermodynamic property
- b) Define Nozzle. Give its types and draw their neat sketches.
- c) State the various sources of air leakage in condenser.
- d) State the factors responsible for preignition. What are the effects of preignition.
- e) Draw actual valve timing diagram of 4-stroke diesel engine.
- f) Explain with neat sketch shell and tube type heat exchanger.

4. Attempt any four :**16**

- a) State two statements of second law of thermodynamics.
- b) Write steady flow energy equation and apply it to boiler.
- c) Differentiate between heat engine and heat pump (any four points).
- d) Explain how dryness fraction is measured with separating calorimeter with neat sketch.
- e) Explain induced draught cooling tower with neat sketch.
- f) Give any four applications of heat exchanger.

5. Attempt any two :**16**

- a) Explain generation of steam at constant pressure with T-H diagram.
- b) Explain the construction and working of two pass surface condenser with neat sketch.
- c) In an ideal otto cycle, the air at the beginning of isentropic compression is at 1 bar and 18°C. The compression ratio is 8. If the heat added during constant volume process is 250 KJ/Kg. Determine :
 - i) Maximum temperature in the cycle.
 - ii) Air standard efficiency.
 - iii) Work done per cycle.
 - iv) Heat rejected during the cycle.

6. Attempt any two :**16**

- a) Explain the construction and working of cochran boiler with neat sketch.
 - b) Explain the construction and working of simple impulse turbine with neat sketch.
 - c) Explain the working of 4-stroke petrol engine with neat sketch.
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