

22441

23242

3 Hours / 70 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.

Marks

- 1. Attempt any FIVE of the following: **10****
- a) Draw P-v and T-s diagram for isochoric process.
 - b) Define property of system. List different types of property of system.
 - c) Define calorific value of fuel.
 - d) State classification of gas turbines.
 - e) Define free air delivered and piston displacement related air compressor.
 - f) Define conventional and non conventional energy sources.
 - g) State the advantages of Biomass power.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Describe the different phases of formation of steam.
 - b) Write equation for:
 - i) Work done
 - ii) Change in internal energy
 - iii) Change in enthalpy for Isobaric process.
 - c) Draw a neat labelled sketch and explain three pass packaged type boiler.
 - d) Explain the construction and working of single stage reciprocating air compressor with P-v Diagram.
- 3. Attempt any THREE of the following:** **12**
- a) Represent the Diesel cycle on P-v and T-s diagram and write equation for air standard efficiency of the same.
 - b) A sample of coal has the following composition on the mass basis:
Carbon 82%, Hydrogen 8%, Sulphur 2%, Oxygen 4% and Ash 4% Calculate using Dulong's formula higher and lower calorific value of fuel.
 - c) Write factors used for governing the selection of cogeneration system and state advantages of cogeneration.
 - d) Explain different types of modes of heat transfer.
- 4. Attempt any THREE of the following:** **12**
- a) Represent the Carnot and Dual combustion cycle on P-v and T-s diagram also state the advantages.
 - b) Describe with neat sketch construction and working of Bomb calorimeter.
 - c) Write the importance and impact of energy conservation on environment and economy.
 - d) Explain the technical selection parameters of cogeneration system.
 - e) Explain the use of inter cooling in compressor.

- 5. Attempt any TWO of the following: 12**
- a) Explain combustion chemistry of Carbon, Methane and Hydrogen.
 - b) Draw and explain Babcock and Wilcox Boiler. Write advantages of Boiler.
 - c) Explain with neat sketch Geo-thermal power plant.
- 6. Attempt any TWO of the following: 12**
- a) Compare reciprocating and rotary compressor on the basis of:
 - i) Working principal
 - ii) Capacity
 - iii) Nature of flow
 - iv) Application
 - v) Maintenance
 - vi) Delivery - pressure range
 - b) What are the various sources of air leakage into a steam condenser? How does it affect the performance of the condensing plant.
 - c) Explain Solar lighting system with sketch.
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