17554

16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Questions on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

(8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

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

a) What do you mean by CNG and LPG?

b) Define the term 'Property' of a system.

c) State the second law of thermodynamics as per Kelvin-Plank Statement.

d) Define the term 'Point function' and 'path function'.

e) State advantages of superheated steam.

f) Define the term 'dryness fraction'. State the dryness fraction for dry saturated steam.

Marks

g) Represent constant volume process on P-V an T-S diagram.

h) What are the functions of steam nozzle?

i) State different types of cooling towers.

j) State Dalton's law of partial pressure.

k) How detonation is controlled in I.C. engine?

l) Show otto cycle on P-V and T-S diagram.

m) What are the reasons of pre-ignition in I.C. Engine?

n) State applications of heat exchangers.

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

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

b) What do you mean by heat pump? Give equation for COP of refrigerator and state relation between COP of refrigerator and COP of heat pump.

c) Wet steam at 10 bar pressure is having total volume of 0.125 m^3 and enthalpy content is 1800 KJ. Calculate mass dryness fraction of steam.

d) What are the effects of air leakage in condenser?

e) How I.C. engines are classified?

f) How heat exchangers are classified? Give materials used for heat exchangers.

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

a) Write down the general steady flow energy equation and derive the simplified forms when used for the following.

(i) Boiler

(ii) Nozzles

b) Explain "Zeroth law thermodynamics".

c) Explain with neat sketch working of LaMount Boiler.

Marks

d) State the functions of cooling towers and explain with sketch induced-draught cooling tower.

e) What is turbo charging? Give its advantages as related to I.C. engine.

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

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

a) Define entropy and explain how it is useful in thermodynamics?

b) What is the purpose behind Boiler mountings and accessories.

c) How boilers are classified.

d) Define following for steam condenser

(i) Vacuum efficiency

(ii) Condenser efficiency

e) Give the list of any four lubricants additives used in I.C. engine and state their advantages.

f) Explain with neat sketch working of counter flow heat exchanger.

5. Attempt any TWO of the following: **16**

a) Explain with neat sketch construction and working of Babcock and Wilcox boiler.

b) How steam turbines are classified? Explain construction and working of reaction turbine.

c) Define scavenging, state the types of scavenging methods and describe how scavenging is reduce in each method with neat sketch.

Marks

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

a) Explain with neat sketch working of Bio-gas plant.

b) What do you mean by Intensive and Extensive property of a system. Give two examples of each property.

c) Give application of steady flow energy equation to condenser and turbine.

d) State the function of following for Boiler.

(i) Fusible plug

(ii) Blow off cock

(iii) Economiser

(iv) Superheater

e) What are the sources of air leakage in condenser.

f) Differentiate between two stroke cycle and four spoke cycle I.C. engine.