17352

11819

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**

a) State first law of thermodynamics and its limitations.

b) Define heat and work. State sign conventions used for work and heat transfer with suitable examples.

c) State (i) Boyler's law (ii) Charle's law.

d) Differentiate between impulse and reaction steam turbine (any four).

e) Explain the working of roots blower with neat sketch.

f) Give the classification of I.C. engine (any four).

g) Define : i) Absorptivity ii) Transmissivity iii) Reflectivity iv) Emissivity.

2. Attempt **any four** : **16**

a) State two statements of second law of thermodynamics.

b) State the general steady flow energy equation. State the meaning of each term with SI unit.

c) Draw P-V and T-S diagram for Isobaric and Isochoric gas process.

d) 1 m^3 of air at a pressure of 8 bar absolute and temperature 70˚C is expanded isothermally until the volume becomes six times the initial volume. Calculate i) Final pressure ii) Work done.

e) Explain the process of steam formation with the help of T-H diagram.

f) Explain with neat sketch, forced draught cooling tower.

P.T.O.

Marks

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

a) Classify boiler.

b) Draw a neat sketch of surface condenser. Label all components.

c) Explain multistaging in compressor. State advantages of multistaging.

d) Explain superheating of suction vapour in a vapour compression refrigeration cycle.

e) Draw P-V and T-S diagram of Carnot cycle and label all the processes in it.

f) One face of copper plate 10 mm thick is maintained at 250˚C and other at 40˚C. Calculate amount of heat transferred through the plate. Take K = 384 W/mts for copper.

4. Attempt **any four** : **16**

a) Draw a neat labelled sketch of centrifugal compressor.

b) Explain with neat sketch multiphase heat exchangers.

c) Explain the working of simple carburettor with neat sketch.

d) Draw actual valve timing diagram of 4 stroke petrol engine and label it.

e) Explain shell and tube type heat exchanger with neat sketch.

f) State the three modes of heat transfer and give one example of each.

5. Attempt **any four** : **16**

a) Explain the percentage increase in efficiency, if compression ratio of otto cycle changes from 6 to 7.

b) Differentiate between boiler mountings and accessories. State any two boiler accessories with their functions.

c) Explain the working of reaction steam turbine with neat sketch.

d) Explain the three modes of heat transfer.

e) State applications of heat exchanger (any four).

f) Explain the phenomena of scavenging in I.C. engine and explain any one method.

6. a) Attempt **any one** : **8**

i) Explain the working of 2 stroke petrol engine with neat sketch.

ii) Draw a neat layout of VCR system and explain working of VCR cycle. State the function of each component in cycle.

b) Attempt **any two** : **8**

i) State Stefan Boltzman law. State Fourier's law of heat conduction and its equation.

ii) Draw a layout of steam power plant and label it.

iii) Explain with neat sketches different types of thermodynamic systems and write equations in terms of W and Q.