17407

21314

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

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

(2) Answer each next main Question 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.

Marks

1. a) **Attempt any <u>SIX</u> of the following:** **12**

i) Enlist different types of ideal gas processes.

ii) Define latent heat.

iii) Define capacity of compressor and free air delivery.

iv) Enlist any two applications of compressed air.

v) Give classification of gas turbine.

vi) Enlist any four 'non-conventional' type sources of energy.

vii) Define "calorific value" of fuel.

viii) Enlist any four types of gaseous fuels.

Marks

b) **Attempt any <u>TWO</u> of the following:** **08**

i) Draw P-V and T-S diagram representing Isobaric, Isochoric, Isothermal and adiabatic process.

ii) Explain formation of superheated steam from water, at 0°C at constant pressure.

Give enthalpy of following points:

1) point in wet region.

2) point in dry saturated condition.

3) point in superheated condition.

iii) Describe construction and working of turboprop engine.

2. Attempt any <u>FOUR</u> of the following: **16**

a) Represent the diesel cycle on P-V and T-S diagram from Figure explain cut-off ratio.

b) Explain convection and radiation.

c) Draw neat labelled sketch of three pass packaged type boiler.

d) Explain working of La Mont Boiler.

e) Enlist factors affecting volumetric efficiency of reciprocating air compressors.

f) State any four applications of gas turbine.

Marks

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

a) Differentiate between single state and two stage reciprocating air compressor.

b) Draw Brayton cycle on P-V and T-S diagram.

c) Only draw a neat sketch of thermal power plant.

d) Describe construction of gas turbine power plant.

e) Give comparison between natural and artificial liquid fuels.

f) A coal has the following composition by mass carbon 80%, Hydrogen 5%, Oxygen 6%, Nitrogen 2.5%, Sulphur 1.5% and ash 5%. Calculate HCV and LCV per kg of coal.

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

a) Describe with neat sketch construction and working Nuclear Power Plant.

b) Explain ultimate analysis and proximate analysis of coal. Explain H.C.V. and L.C.V. of fuels.

c) Describe with neat sketch construction and working of Bomb calorimeter. Write Dulong's formula and state its use.

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

a) Derive relation between P, V and T during adiabatic process.

b) Explain with neat sketch two pass down flow surface condenser. State functions of condenser in steam power plant.

c) Describe with neat sketch construction and working of centrifugal compressor.

Marks

6. Attempt any <u>FOUR</u> of the following: 16

a) Explain the air standard efficiency of Carnot and Otto cycle.

b) Enlist sources of air leakage in condenser.

c) State the necessity of multistaging with intercooling in air compressor.

d) Differentiate between open cycle and closed cycle gas turbine.

e) Explain construction and working of turbojet.

f) Describe with neat sketch construction and working of screw compressor.

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