

TED (10)–5017

Reg. No.

(REVISION—2010)

Signature

FIFTH SEMESTER DIPLOMA EXAMINATION IN MECHANICAL
ENGINEERING—OCTOBER, 2013

POWER PLANT ENGINEERING

[Time : 3 hours

(Maximum marks : 100)

(Note : Use of steam table and mollier charts are permitted)

Marks

PART—A

(Maximum marks : 10)

I Answer all questions in one or two sentences. Each question carries 2 marks.

1. State the function of stop valve in Boiler.
2. State the function of cooling tower.
3. Classify steam nozzle.
4. What are the different fuels used in gas turbine ?
5. State the function of moderator in nuclear power plants.

(5×2=10)

PART—B

(Maximum marks : 30)

II Answer *any five* of the following. Each question carries 6 marks.

1. Write the equation for finding enthalpy of steam with usual notations :
 - (i) Wet steam
 - (ii) Dry and saturated steam
 - (iii) Superheated steam.
2. Explain water level indicator with sketch.
3. Explain velocity compounding of turbine.
4. Draw flow diagram and T-S diagram of closed type Gas turbine.
5. List the advantages of Gas turbine.
6. Explain parabolic concentrators.
7. State the function of :
 - (i) Control rods
 - (ii) Thermal shielding
 - (iii) Biological shield.

(5×6=30)

PART—C
(Maximum marks : 60)

(Answer one full question from each unit. Each question carries 15 marks.)

UNIT—I

- III (a) With diagram explain 'U' tube type super heater. 8
- (b) Steam being generated in a boiler at a pressure of 10 bar. Determine the specific enthalpy of steam when :
- (i) Steam is dry and saturated.
- (ii) Steam at a dryness fraction 0.95.
- (iii) Steam at a temperature of 250° C.

Given C_p of steam is 2.1KJ/Kg.

Absolute pressure bar P	Saturation temp: (t) °C	Specific Enthalpy KJ/Kg	
		Liquid (hf)	Latent heat (hfg)
10	179.88	762.61	2013.6

7

OR

- IV (a) Explain the formation of steam at constant pressure with relevant graph. 8
- (b) Explain with sketch dead weight safety valve. 7

UNIT—II

- V (a) Dry and saturated steam at a pressure of 10 bar is expanded in a nozzle to a pressure of 1 bar. Find the final velocity of steam and the condition of steam, using mollier chart. 8
- (b) Explain with sketch the working of De Laval Turbine. 7

OR

- VI (a) List the advantages of steam turbine. 8
- (b) Draw and explain a surface condenser. 7

UNIT—III

- VII (a) Explain with sketch the working of turbo prop engine. 8
- (b) List the advantages and limitations of gas turbine. 7

OR

- VIII (a) In a simple gas turbine, the initial air pressure is 1 bar and temperature is 15°C. The temperature of air at inlet to the turbine is 800°C. The pressure ratio being 5. Calculate :
- (i) Work done on the compressor (iii) Network done.
- (ii) Work done by the turbine
- Given : Mass flow rate of air as 1Kg/s, Compression and expansion index $r = 1.4$ and C_p of air 1KJ/Kg K. 8
- (b) (i) State the use of Gas turbine. 4
- (ii) List the different type of Gas turbine. 3

UNIT—IV

- IX (a) Draw the schematic diagram of a nuclear power plant and explain. 8
- (b) What are the advantages of wind mill ? 7

OR

- X (a) Write short notes on :
- (i) Nuclear fission. 8
- (ii) Nuclear fusion. 8
- (b) With sketch explain a solar grain drier. 7
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