



Name :
Roll No. :
Invigilator's Signature :

CS/B.Tech(EEE-OLD)/SEM-6/ME-602/2013

2013

HEAT POWER ENGINEERING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Objective Type Questions)

1. Fill in the blanks of the following : 10 × 1 = 10
 - i) Forced circulation is related with
 - ii) De Laval turbine is a turbine.
 - iii) For Parson's reaction turbine, the degree of reaction is
 - iv) An economiser the steam raising capacity of a boiler.
 - v) The molecular mass of nitrogen is than oxygen.
 - vi) The biggest heat loss that takes place in boiler is due to



- vii) The effect of friction in a nozzle dryness fraction of steam.
- viii) The thermal efficiency of an ideal gas turbine power plant is given as
- ix) The maximum efficiency of a reaction turbine is
- x) BP of an engine is always the IP.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. a) Describe classification of turbines.
b) What do you mean by steam generator ?
- 3. a) Calculate degree of reaction of a reaction turbine.
b) Describe types of boiler and performance of boiler.
- 4. a) What do you mean by turbine governing ?
b) Explain mechanical efficiency of an I.C. engine.
- 5. a) Distinguish between SI and CI engine.
b) What do you mean by Environmental Protection-(ESP) ?
- 6. a) Describe Actual gas turbine.
b) Distinguish between induced draught and forced draught.



GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Dry air at a pressure of 12 bar and 573 K is expanded isentropically through a nozzle at a pressure of 2 bar. Determine the maximum discharge through the nozzle of 150 mm^2 area.
- b) Explain the classification of an I.C. engine. $9 + 6$
8. a) Define natural circulation and forced circulation.
- b) Describe merits and demerits of water tube boiler over fire tube boiler. $6 + 9$
9. A furnace wall riser, 18 m long, 76.2 mm OD and 6.1 mm thick receives saturated water at 80 bar and 1.5 m/s velocity. Assuming a circulation ratio 12.5 and a slip ratio of 1.2, determine
- i) the pressure head developed
- ii) the heat transfer rate per unit projected area of the riser tube.
10. A gas engine has piston diameter 150 mm, length of stroke 400 mm and mean effective pressure 5.5 bar. The engine makes 120 explosions per minute. Determine the mechanical efficiency of the engine if its BP is 5 kW.