

Total No. of Questions : 6]

SEAT No. :

P97

[Total No. of Pages : 2

**OCT/BE/Insem.-21**  
**B.E. (Mechanical - Heat Power Engg.)**  
**GAS TURBINE PROPULSION**  
**(2012 Pattern)**

*Time : 1 Hour]*

*[Max. Marks : 30*

*Instructions to the candidates:*

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.*
- 2) *Draw Neat diagrams wherever necessary.*
- 3) *Use of scientific calculator is allowed.*
- 4) *Assume suitable data wherever necessary.*
- 5) *Figures to the right indicate full marks.*

- Q1)** a) List down assumptions in gas turbine cycle and explain simple gas turbine cycle. [5]
- b) Explain with neat sketch cogeneration cycle. [5]
- Q2)** a) With the help of neat diagram explain reheat gas turbine cycle. [5]
- b) Give advantages of gas turbine plants over steam power plants. [5]
- Q3)** a) Explain intercooled compression cycle with T-S diagram. [5]
- b) A simple gas turbine cycle has following details: Intake at 1 bar 20°C, final pressure 6 bar 300°C. Neglecting losses, find out specific power input to compressor and specific power output of turbine. Show the cycle on T-S chart. Assume standard properties of air and neglect effect of mass of fuel. [5]
- Q4)** a) What do you understand by component losses? How they affect performance of GT unit? [5]
- b) Explain polytropic efficiency and combustion efficiency. [5]

**P.T.O.**

**Q5) a)** A turbo jet unit mounted on aircraft has following data: [6]

Isentropic efficiencies for compressor, turbine and nozzle are 80%, 85%, 90% respectively, inlet conditions are 0.8 bar, 280 K, final pressure 4 bar,  $C_{pa} = 1 \text{ kJ/kg K}$ ,  $\gamma = 1.4$ ,  $C_{pg} = 1.2 \text{ kJ/kg.K}$ ,  $\gamma_g = 1.35$ , fuel calorific value 42000 kJ/kg, nozzle back pressure 0.6 bar, maximum cycle temperature 550°C, craft speed 720 km/hour, air flow 20 kg/second.

Find out power required to drive compressor and air fuel ratio.

b) Explain with neat sketch a turbo fan engine. [4]

**Q6) a)** Write short note: Parameters affecting flight performance. [4]

b) What is turbo jet engine? What are its advantages? [6]

