Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Course: Diesel and Gas Turbine plant **Semester: VIII**
Programme: B.Tech PSE
Course Code :PSEG 335
Time: 03 hrs. **Max. Marks: 100**

SECTION A		
	Marks	**CO**
1. Illustrate Brayton cycle with help of P-V and T-S diagram.	**4**	**CO3**
2. Explain the phenomenon of knocking in CI engine with help of P-θ Diagram.	**4**	**CO1**
3. Suggest any four fuel injection system in diesel plant.	**4**	**CO2**
4. Define forced circulation cooling system with help of diagram.	**4**	**CO2**
5. Differentiate b/w impulse and reaction turbine used in a gas turbine plant.	**4**	**CO4**
SECTION B		
6. Differentiate b/w open and closed cycle gas turbine and discuss the advantages and disadvantages of closed cycle over open cycle.	**10**	**CO4**
7. Derive expression of thermal efficiency of a diesel engine cycle. Assume the compression ratio be r and fuel cutoff ratio p.	**10**	**CO1**
8. A gas turbine operates on a pressure ratio of 7.The inlet air temperature to the compressor is 290 K and air entering the turbine is at a temperature of 600 ℃. if volume rate of air entering the compressor is 240 m^3/s. calculate the net power o/p of	**10**	**C03**

the cycle in MW. Also compute its efficiency .assume that the cycle operates under ideal conditions.		
9. Discuss the working of combined steam and gas turbine plant with help of diagram. **OR** Prove that the overall efficiency of combined gas and steam cycle plant is given by(abbreviations : gt-gas turbine, st-steam turbine.) $\eta_o = \eta_{gt} + \eta_{st} - \eta_{gt} * \eta_{st}$	**10**	**CO5**
SECTION-C		
10. Explain the effects of following methods on efficiency of gas turbine with the help of T-S diagram and flow diagram. a) Effect of intercooling. b) Effect of regeneration. c) Effect of reheating	**20**	**CO4**
11. A gas turbine plant consists of two compressors of equal pressure ratio with intercooling to minimum cycle temperature at inlet to the second compression stage followed by single stage turbine. Isentropic efficiency of compressor and turbine are η_c=85% for both stages, η_t =90% and the minimum and maximum temperature of cycle is 300 K and 1050 K and pressure ratio is 7. Find the specific output of the above cycle and cycle efficiency.(given $C_p = 1$ kJ/kg.K and Υ=1.4 for both air and gas) *or* In a closed cycle gas turbine, the working fluid at 40 ˚C is compressed with an isentropic efficiency of 0.82.it is then heated at constant pressure to 1000 K. The fluid then expands down to initial pressure in a turbine with an isentropic efficiency of 0.85.After expansion fluid is cooled to 40˚C.the pressure ratio is 6. the working fluid is air having $C_p = 1$ kJ/kg.K and Υ=1.4.calculate the net work done and cycle efficiency.	**20**	**CO3**