GYANMANJARI INSTITUTE OF TECHNOLOGY
MECHANICAL ENGINEERING DEPARTMENT
CLASS TEST No.1

Subject: Elements of Mechanical Engg. **Date: 12-9-2015**
Semester: 1ST **Marks: 30**
Time: - 2.15 to 3.15

A	B	Mark
1.What is adiabatic process? Prove with usual notations the law of governing adiabatic process p as PV^{γ} = Constant.	**1.**Explain Isothermal Process. For Isothermal process. Find expression of work done, Change in Internal Energy, Change in Enthalpy and Heat transfer.	07
2.Derive PV/T=C with usual notation	**2.**With usual notations prove that Cp – Cv = R.	07
3.0.3m3 of air of mass 1 kg at an initial pressure of 5.5 bar expands toa final volume of 0.5m3 If the expansion is according to the law $pv^{1.3}$= C, Find the work done, the change in internal energy and heatreceived or rejected during the process.Take Cv = 0.708 kJ/kg K and R = 0.287 kJ/kg K for air.	**3.**1 kg of air at 9 bar pressure and 80o C temperature undergoes a non-flow work polytropic process. The law of expansion is $PV^{1.1}$ = C. The pressure falls to 1.4 bar during process. Calculate (1) Final temperature (2) Work done (3) Change in internal energy (4) Heat exchange. Take R=287 J/kg and γ = 1.4 for air.	07
4.3kg of ethane gas is compressed according to law $PV^{1.3}$=C from 1.013 bar, 27°C to 8 bar pressure determine (i)heat transfer (ii)workdone (iii)change in internal energy.Cp=1.75 kJ/kg K for ethane. assume ethane as a perfect gas take R0=8314.4 J/kg mol K	**4.**One cubic meter of air at pressure of 1bar and 60°C is compressed to final pressure 6bar and volume 0.25 m^3 determine (i) mass of air (ii) index n for compression (iii) change in internal energy (iv) heat transfer during compression. Take R=287 J/kg and γ = 1.4 for air.	07
5.Write a short note on universal gas constant		02