## TD IMPORTANT QUESTIONS

1. A reversible adiabatic process begins at p1=10bar, T1=3000C and ends with p2=1bar. Find the specific volume and the work done per kg of fluid, if the fluid is air?
2. Derive the expression of work done in Polytropic process
3. Draw the Compressibility Chart of ideal gas?
4. Explain the Dalton's law of partial pressure with an example?
5. An engine of 250mm bore and 375mm stroke works on Otto cycle. The clearance volume is 0.00263 $m^3$. The initial pressure and temperature are 1bar and $50^{0C}$. The maximum pressure is limited to 25bar. Find the air standard efficiency and the mean effective pressure of the cycle? Assume ideal conditions?
6. Derive the thermal efficiency of Diesel cycles?
7. Derive the expression of work done in Adiabatic process
8. A reversible polytropic process begins with a fluid at p1=10bar, T1=2000C and at p2=1bar, the exponent n has the value 1.15. Find the final specific volume, the final temperature and the heat transfer per kg of fluid, if the fluid is air.
9. Explain the Mole fraction and Mass fraction in the Mixture of Perfect gas?
10. State the expression for Vander Wall's equation of state?
11. Derive the thermal efficiency of Otto cycles?
12. An engine working on Otto cycle has a volume of 0.45$m^3$ pressure 1bar and temperature $30^{0C}$ at the beginning of the compression stroke. At the end of the compression stroke the pressure is 11bar. 210kJ of heat is added at constant volume. Determine efficiency and mean effective pressure?
13. With help of a P-T diagram explain Clausius- Clapeyron equation
14. Describe with neat sketch P-V-T surfaces
15. Explain about the Gravimetric analysis
16. The volume analysis of gas and other data are as follows:

| Constituent | Percentage | Molecular Weight |
|---|---|---|
| Oxygen | 23.14 | 32 |
| Nitrogen | 75.53 | 28 |
| Argon | 1.28 | 40 |
| Carbon dioxide | 0.05 | 44 |

Calculate i) Gas constant for air and ii) Apparent molecular weight

17. Derive an expression for the air standard efficiency of diesel cycle
18. Derive an expression for the efficiency of sterling cycle
19. Calculate the state of steam i.e. Whether it is wet, dry or superheated for following cases

    (i) Steam has a pressure of 15 bar and specific volume of 0.12 $m^3/kg$

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| (ii) Steam has a pressure of 10 bar and temperature $200^0$C<br>(iii) Steam has a pressure of 30 bar and if 2700 KJ/kg of heat is required to generate steam |
| 20 Explain clasius clapeyron equation? |
| 21. Explain the Volumetric analysis of a gas mixture ? |
| 22. Explain the properties of atmospheric air? |
| 23. Compare the dual, diesel and otto cycles? |
| 24. The swept volume of a diesel engine working on dual cycle is 0.0053 $m^3$ and clearance volume is 0.00035 $m^3$. The maximum pressure is 65 bar. Fuel injection ends at 5% of the stroke. The temperature and pressure at the start of the compression are $80^0$C and 0.9 bar. Determine the air standard efficiency of the cycle. Take for air as 1.4 |