**Roll no._____** **ID: 171743/030434/452**

**Semester: 4th**

**Branch: Mechanical**

**Subject Name: Thermodynamics-I**

**Time Allowed : 3 Hrs.** **MM:100**

## Section –A

**Note: Multiple Choice questions. All questions are compulsory.** **10x1=10**

Q1. A system which consists of single phase is known as (CO1)
(a) Closed system (c) Open System
(c) Heterogeneous system (d) Homogeneous system

Q2. The value of characteristic gas constant (R) for atmospheric air is (CO2)
(a) 287 J/Kg K (c) 2.87 J/Kg K
(c) 0.287 J/Kg K (d) 28.7 J/Kg K

Q3. Constant volume process is also known as (CO3)
(a) Isochoric process (c) Isothermal process
(c) Isobaric process (d) Throttling process

Q4. Second Law of thermodynamics defines (CO4)
(a) Internal energy (c) Temperature
(c) Entropy (d) Heat

Q5. Kelvin Planck's statement deals with (CO4)
(a) Conservation of heat (c) Conservation of mass
(c) Conservation of momentum (d) Conservation of heat into work

Q6. The point at which all the three phases- solid, liquid and vapour co-exist in equilibrium is called (CO5)
(a) Critical point (c) Point of contraflexure
(c) Triple point (d) Ideal point

Q7. During which process, a solid changes directly to the gaseous form without ever being a liquid (CO6)
(a) Condensation (c) Sublimation
(c) Evaporation (d) Crystallisation

Q8. Which of the followings is a boiler accessory (CO7)
(a) Pressure gauge (c) Safety Valve
(c) Economiser (d) Water level indicator

Q9. Diesel cycle is also known as (CO8)
(a) Constant temperature cycle (c) Constant volume cycle
(c) Constant entropy cycle (d) Constant pressure cycle

Q10. For same compression ratio, the efficiency of Otto cycle is_____ Diesel cycle. (CO9)
(a) Greater than (c) Equal to
(c) Less than (d) None of the above

## Section-B

**Note: Objective type questions. All questions are compulsory.** **10x1=10**

Q11. The SI unit of heat is_____. (CO1)

Q12. Name any two extrinsic properties. (CO2)

Q13. For a polytropic process, $PV^n$=_____. (CO3)

Q14. According to first law of thermodynamics, heat and mechanical work are _____. (CO4)

Q15. Define Enthalpy. (CO1)

Q16. For dry steam, dryness fraction=_____. (CO6)

Q17. Give any two examples of water tube boilers. (CO7)

Q18. A thermodynamic cycle using air as the working sustance is known as _____. (CO8)

Q19. Roots blower compressor is a type of _____compressor. (CO9)

Q20. The gas which obeys the law Pv=RT at all temperatures and pressures is known as_____. (CO5)

## Section –C

**Note: Short answer type Questions. Attempt any twelve questions out of fifteen questions. 12x5=60**

Q21. Write five uses of Compressed air. (CO9)

Q22. Determine the volume occupied by a given mass of air at a temperature of $245^0$ C, if the same mass of air occupies $2m^3$ at $23^0$ C. The pressure of the air remains unchanged. CO2)

Q23. State and explain Charle's Law. (CO2)

Q24. Explain any two applications of general steady flow equation. (CO4)

Q25. Explain Vanderwall's Equation of state. (CO5)

Q26. If the dryness fraction of a given sample of steam is 0.85, find the mass of water particles contained in 2Kg of this steam. (CO6)

Q27. Give classification of boilers in detail. (CO7)

Q28. Find the compression ratio of an Otto cycle, if the efficiency of Otto cycle is 50 % and $\gamma$=1.5 (CO8)

Q29. Write any five differences between Reciprocating and Rotary air compressor. (CO9)

Q30. Define specific heat. Give the relation between $C_P$ and $C_v$. (CO2)

Q31. A Carnot engine working between 620 K and 300K gives 200KJ of work. Calculate the thermal efficiency of engine and heat added during the process. (CO4)

Q32. Explain P-V-T Surface of an Ideal gas. (CO5)

Q33. Explain the working of throttling calorimeter. (CO6)

Q34. What are the objectives of Boiler mountings? Name any four boiler mountings. (CO7)

Q35. Define Thermodynamic process. Explain its types. (CO3)

## Section-D

**Note: Long answer questions. Attempt any two questions out of three questions. 2x10=20**

Q36. Explain the construction and working Lancashire Boiler with a neat sketch. (CO7)

Q37. Explain the construction and working of Centrifugal Compressor with a neat sketch. (CO9)

Q38. 1 Kg of an ideal gas is heated from $19.3^0$ C to $95.3^0$ C. Assuming R=0.287KJ/KgK and $\gamma$=1.4 for the gas, find:
Specific heats
Change in internal energy
Change in enthalpy (CO6)