Sample Question Paper (Thermodynamics-CBCGS)

1. In an open system, for maximum work, the process must be entirely
   (A) irreversible
   (B) reversible
   (C) adiabatic
   (D) none of the mentioned
2. When a system changes its state from one equilibrium state to another equilibrium state, then the path of successive states through which the system has passed, is known as
   (A) Thermodynamic law
   (B) Thermodynamic process
   (C) Thermodynamic cycle
   (D) None of these
3. Otto cycle consists of
   (A) Two constant volume and two isentropic processes
   (B) Two constant pressure and two isentropic processes
   (C) Two constant volume and two isothermal processes
   (D) One constant pressure, one constant volume and two isentropic processes
4. The efficiency of a gas turbine is given by
   (A) (Net work output)/(Work-done by the turbine)
   (B) (Net work output)/(Heat supplied)
   (C) (Actual temperature drop)/(Isentropic temperature drop)
   (D) (Isentropic increase in temperature)/(Actual increase in temperature)
5. Which of the following is true for a steady flow system?
   (A) mass entering = mass leaving
   (B) mass does not enter or leave the system
   (C) mass entering can be more or less than the mass leaving
   (D) none of the mentioned
6. If the value of n = 0 in the equation $pv^n = C$, then the process is called
   (A) Constant volume process
   (B) Adiabatic process
   (C) Constant pressure process
   (D) Isothermal process
7. A piston cylinder contains air at 600 kPa, 290 K and a volume of 0.01m^3. A constant pressure process gives 54 kJ of work out. Find the final volume of the air.
   (A) 0.05 m^3
   (B) 0.01 m^3
   (C) 0.10 m^3
   (D) 0.15 m^3
8. A hot gas flowing through a pipeline can be considered as a
   (A) reversible process
   (B) irreversible process
   (C) both of the mentioned
   (D) none of the mentioned
9. The latent heat of steam at atmospheric pressure is.....
   (A) 1535 kJ/kg

(B) 1875 kJ/kg
(C) 2257 kJ/kg
(D) 2685 kJ/kg

10. Which of the following laws is applicable for the behaviour of perfect gas
    (A) Boyle's law
    (B) Charle's law
    (C) Gas-Lussac law
    (D) All of the above
11. Otto cycle is a.....
    (A) Constant pressure cycle
    (B) Constant volume cycle
    (C) Constant teperature cycle
    (D) Constant entropy cycle
12. For the same compression ratio,the efficiency of diesel cycle is.....otto cycle
    (A) Greater than
    (B) Less than
    (C) Equal to
    (D) None of the above
13. The locus of standard liquid line and standard vapour line meets at.....
    (A) Boiling point
    (B) Critical point
    (C) Ice point
    (D) Triple point
14. According to kinetic theory of gases,the absolute zero teperature is attained when.....
    (A) Volume of gas is zero
    (B) Pressure of the gas is zero
    (C) Kinetic energy of the molecules is zero
    (D) Specific heat of gas is zero
15. The unit of pressure in S.I. unit is.....
    (A) Kg/cm2
    (B) mm of water column
    (C) Pascal
    (D) Bars
16. An closed system is one in which.....
    (A) Mass does not cross boundaries of the system,through energy may do so
    (B) Neither mass nor energy crosses the boundsries of the system
    (C) Both energy and mass cross the boundaries of the system
    (D) Mass crosses the boundary but not the energy
17. Specific heat of air at constant pressure is equal to.....
    (A) 0.17
    (B) 0.21
    (C) 0.24
    (D) 1.0
18. Characteristic gas constant of a gas is equal to.....
    (A) .Cp/Cv
    (B) Cv/Cp
    (C) Cp-Cv
    (D) Cp+Cv

19. The unit of energy in S.I. unit.....
    (A) Watt
    (B) Joule
    (C) Joule/sec
    (D) Joule/m
20. When cut-off ratio is _____ the efficiency of Diesel cycle approaches to Otto cycle efficiency.
    (A) Zero
    (B) 1/5
    (C) 4/5
    (D) 1
21. The gas turbine cycle with regenerator improves
    (A) Thermal efficiency
    (B) Work ratio
    (C) Avoids pollution
    (D) None of these
22. First law of thermodynamics deals with
    (A) Conservation of heat
    (B) Conservation of momentum
    (C) Conservation of mass
    (D) Conservation of energy
23. Which of the following is a reversible non-flow process?
    (A) Isochoric process
    (B) Isobaric process
    (C) Hyperbolic process
    (D) All of these
24. If in the equation pvn = C, the value of n = ∝, then the process is called
    (A) Constant volume process
    (B) Adiabatic process
    (C) Constant pressure process
    (D) Isothermal process
25. The measurement of a thermodynamic property known as temperature is based on
    (A) First law of thermodynamics
    (B) Second law of thermodynamics
    (C) Zeroth law of thermodynamics
    (D) None of these
26. The compression ratio is the ratio of
    (A) Total volume to swept volume
    (B) Swept volume to clearance volume
    (C) Swept volume to total volume

(D) Total volume to clearance volume

27. In a reversible isothermal expansion process, the fluid expands from 10 bar and 2 m3 to 2 bar and 10 m3. During the process the heat supplied is at the rate of 100 kW. What is the rate of work done during the process?

    (a) 20 kW

    (b) 35 kW

    (c) 80 kW

    (d) 100 kW

28. An ideal gas at 27°C is heated at constant pressure till its volume becomes three times. What would be then the temperature of gas?
    (a) 81° C
    (b) 627° C
    (c) 543° C
    (d) 327° C
29. In a reversible isothermal expansion process, the fluid expands from 10 bar and 2 m3 to 2 bar and 10m3, during the process the heat supplied is 100 kW. What is the work done during the process?
    (a) 33.3 kW
    (b) 100 kW
    (c) 80 kW
    (d) 20 kW
30. The value of compressibility factor for an ideal gas may be: [IES-2002] 1. less or more than one 2. equal to one 3. zero 4. less than zero The correct value(s) is/are given by:
    (a) 1 and 2
    (b) 1 and 4
    (c) 2 only
    (d) 1 only
31. Gauge pressure of air to which the ball must have been originally inflated so that it would equal 1 bar gauge at the stadium is:
    (a) 2.23 bar
    (b) 1.94 bar
    (c) 1.07 bar
    (d) 1.00 bar
32. A 100 W electric bulb was switched on in a 2.5 m × 3 m × 3 m size thermally insulated room having a temperature of 20°C. The room temperature at the end of 24 hours will be
    (a) 321°C
    (b) 341°C
    (c) 450°C
    (d) 470°C
33. A Carnot engine rejects 30% of absorbed that to a sink at 30º C. The temperature of the heat source is
    (a) 100º C

(b) 433º C
(c) 737º C
(d) 1010º C

34. A reversible heat engine rejects 50 percent of the heat supplied during a cycle of operation. If this engine is reversed and operates as a heat pump, then what is its coefficient of performance?
(a) 1.0
(b) 1.5
(c) 2.0
(d) 2.5

35. A heat engine is supplied with 250 kJ/s of heat at a constant fixed temperature of 227°C; the heat is rejected at 27°C, the cycle is reversible, then what amount of heat is rejected?
(a) 250 kJ/s
(b) 200 kJ/s
(c) 180 kJ/s
(d) 150 kJ/s