

Roll no. _____

ID: 181732/121732/031732/094834/117232

Semester: 3rd

Branch: Mech, Prod, GE, CAD/CAM, CNC, Metallurgy, Print Making Tech., Mech (Ad. Manu. Tech.), Mech Engg (Fabrication Tech)

Subject Name: Thermodynamics - I / Thermodynamics / Pr. Of Therm. Engg.

Time Allowed : 3 Hrs.

MM:100

Section –A

Note: Multiple Choice questions. All questions are compulsory.

10x1=10

- Q.1. Zeroth's law of thermodynamics forms the basis of measurement of
a) Pressure b) Temperature c) Energy d) Work
- Q.2. The volume of 1 kg-mol of any gas at N.T.P. is
a) 22 m³ b) 22.1 m³ c) 22.2 m³ d) 22.4 m³
- Q.3. Area under temperature-entropy diagram gives
a) Work b) Power c) Heat d) None of these
- Q.4. Work done during constant volume process is
a) Maximum b) Zero c) Positive d) Negative
- Q.5. Which of the following parameter remains constant during superheating of steam
a) Volume b) Pressure c) Internal energy d) Enthalpy
- Q.6. The thermodynamic cycle in which heat is supplied partly under constant pressure and partly under constant volume is known as:-
a) Dual Cycle b) Carnot Cycle c) Rankine Cycle d) Diesel Cycle
- Q.7. The efficiency of perpetual motion machine of second kind is
a) 0% b) 50% c) 75% d) 100%
- Q.8. Which of the following is correct?
a) $dS = T\delta Q$ b) $\delta Q = \frac{T}{dS}$ c) $\delta Q = TdS$ d) $T = \frac{\delta Q}{dS}$
- Q.9. The device which supply feed water to the boiler is called
a) Economizer b) Water level indicator
c) Feed pump d) Safety valve
- Q.10. The volumetric efficiency of a compressor
a) Decreases with decrease in compression ratio
b) Increases with decrease in compression ratio
c) Decreases with increase in compression ratio
d) Increases with increase in compression ratio

Section-B

Note: Objective type questions. All questions are compulsory.

10x1=10

- Q.11. The property of a system whose value does not depend upon mass is called _____.
- Q.12. The polytropic index is unity for _____ process.
- Q.13. In an adiabatic process, transfer of heat energy takes place. (True/False)
- Q.14. The units of specific volume are _____.
- Q.15. The high pressure boilers are _____ tube boilers.
- Q.16. _____ water is used for boiler.
- Q.17. Efficiency of Carnot cycle increase with _____ of sink temperature.
- Q.18. At critical pressure latent heat becomes _____.
- Q.19. Otto cycle is also known as _____.
- Q.20. Pressure gauges record the absolute pressure of the steam. (True/False)

Section –C

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

- Q.21. What do you mean by property of a system? Differentiate between extensive and intensive properties of a system giving two examples each.
- Q.22. Define Boyle's & Charles's law. Hence deduce gas equation from these laws.
- Q.23. What are the limitations of first law of thermodynamics?
- Q.24. Find out the expression to calculate the work done in case of isothermal process.
- Q.25. Derive the steady flow energy equation and write the assumptions made in deriving this particular Equation.
- Q.26. Draw and briefly make understood the phase equilibrium diagram on P-T coordinates.
- Q.27. Explain the terms wet steam, dry and saturated steam and superheated steam.
- Q.28. Briefly explain the process of measuring the quality of steam using throttling calorimeter.
- Q.29. Steam at a pressure of 10 bar and 0.95 dry expands isentropically to a pressure of 4 bar. Determine the final fraction of steam by 1. Using steam tables and 2. Using Mollier Chart.
- Q.30. Compare water tube and fire tube boilers.
- Q.31. Enlist the assumptions made in air standard cycle.
- Q.32. In an ideal engine working on Carnot cycle 1/5th of the heat input is converted into work. The efficiency gets doubled if the temperature of sink is reduced by 60°C. Find the temperature of source and sink.
- Q.33. Differentiate between Reciprocating and Rotary Compressors.
- Q.34. Enlist the advantages of Multistage Compressors over Single Stage Compressors.
- Q.35. Explain triple point with P-T diagram.

Section-D

Note: Long answer questions. Attempt any two questions out of three questions.

2x10=20

- Q.36. Explain with the help of neat sketch the working of Babcock and Wilcox boiler.
- Q.37. Density of a H_2 gas is 0.09kg/m^3 at N.T.P. and the value of γ is 1.4. Find the characteristic gas constant for H_2 gas and its both specific heats.
- Q.38. Explain the construction and working of axial flow compressor with the help of neat sketch.