OBJECTIVE TYPE QUESTIONS

Choose the Correct Answer :

1. Second law of thermodynamics defines

(*a*) heat (*b*) work (*c*) enthalpy

(*d*) entropy (*e*) internal energy.

2. For a reversible adiabatic process, the change in entropy is

(*a*) zero (*b*) minimum (*c*) maximum

(*d*) infinite (*e*) unity.

3. For any reversible process, the change in entropy of the system and surroundings is

(*a*) zero (*b*) unity (*c*) negative

(*d*) positive (*e*) infinite.

4. For any irreversible process the net entropy change is

(*a*) zero (*b*) positive (*c*) negative

(*d*) infinite (*e*) unity.

5. The processes of a Carnot cycle are

(a) two adiabatic and two constant volume

(b) one constant volume and one constant pressure and two isentropics

(c) two adiabatics and two isothermals (d) two constant volumes and two isothermals

(e) two isothermals and two isentropics.

6. Isentropic flow is

(a) irreversible adiabatic flow (b) ideal fluid flow (c) perfect gas flow

(d) frictionless reversible flow (e) reversible adiabatic flow.

7. In a Carnot engine, when the working substance gives heat to the sink

(a) the temperature of the sink increases

(b) the temperature of the sink remains the same

(c) the temperature of the source decreases

(d) the temperatures of both the sink and the source decrease

(e) changes depend on the operating conditions.

8. If the temperature of the source is increased, the efficiency of the Carnot engine

(a) decreases (b) increases

(c) does not change (d) will be equal to the efficiency of a practical engine

(e) depends on other factors.

9. The efficiency of an ideal Carnot engine depends on

(a) working substance (b) on the temperature of the source only

(c) on the temperature of the sink only

(d) on the temperatures of both the source and the sink

(e) on the construction of engine.

10. The efficiency of a Carnot engine using an ideal gas as the working substance is

(a) $\frac{T_1 - T_2}{T_1}$ (b) $\frac{T_1}{T_1 - T_2}$ (c) $\frac{T_1 T_2}{T_1 - T_2}$

(d) $\frac{T_1 - T_2}{T_1 T_2}$ (e) $\frac{T_2(T_1 - T_2)}{T_1(T_1 + T_2)}$.

11. In a reversible cycle, the entropy of the system

(a) increases (b) decreases

(c) does not change (d) first increases and then decreases

(e) depends on the properties of working substance.

12. A frictionless heat engine can be 100% efficient only if its exhaust temperature is

(a) equal to its input temperature (b) less than its input temperature

(c) 0°C (d) 0°K (e) – 100°C.

13. Kelvin-Planck's law deals with

(a) conservation of energy (b) conservation of heat (c) conservation of mass

(d) conversion of heat into work (e) conversion of work into heat.

14. Which of the following statements is *correct* according to Clausius statement of second law of thermodynamics ?

(a) It is impossible to transfer heat from a body at a lower temperature to a body at a higher temperature

(b) It is impossible to transfer heat from a body at a lower temperature to a body at a higher temperature, without the aid of an external source.

(c) It is possible to transfer heat from a body at a lower temperature to a body at a higher temperature by using refrigeration cycle

(d) None of the above.

15. According to Kelvin-Planck's statement of second law of thermodynamics

(*a*) It is impossible to construct an engine working on a cyclic process, whose sole purpose is to convert heat energy into work

(*b*) It is possible to construct an engine working on a cyclic process, whose sole purpose is to convert the heat energy into work

(*c*) It is impossible to construct a device which while working in a cyclic process produces no effect other than the transfer of heat from a colder body to a hotter body

(*d*) When two dissimilar metals are heated at one end and cooled at the other, the e.m.f. developed is proportional to the difference of their temperatures at the two end.

(*e*) None of the above.

16. The property of a working substance which increases or decreases as the heat is supplied or removed in a reversible manner is known as

(*a*) enthalpy (*b*) internal energy

(*c*) entropy (*d*) external energy.

17. The entropy may be expressed as a function of

(*a*) pressure and temperature (*b*) temperature and volume

(*c*) heat and work (*d*) all of the above

(*e*) none of the above.

18. The change of entropy, when heat is absorbed by the gas is

(*a*) positive (*b*) negative (*c*) positive or negative.

19. Which of the following statements is *correct* ?

(*a*) The increase in entropy is obtained from a given quantity of heat at a low temperature

(*b*) The change in entropy may be regarded as a measure of the rate of the availability of heat for transformation into work

(*c*) The entropy represents the maximum amount of work obtainable per degree drop in temperature

(*d*) All of the above.

20. The condition for the reversibility of a cycle is

(*a*) the pressure and temperature of working substance must not differ, appreciably from those of the surroundings at any stage in the process

(*b*) all the processes taking place in the cycle of operation, must be extremely slow

(*c*) the working parts of the engine must be friction free

(*d*) there should be no loss of energy during the cycle of operation

(*e*) all of the above.

21. In an irreversible process there is a

(*a*) loss of heat (*b*) no loss of work

(*c*) gain of heat (*d*) no gain of heat.

22. The main cause for the irreversibility is

(*a*) mechanical and fluid friction (*b*) unrestricted expansion

(*c*) heat transfer with a finite temperature difference

(*d*) all of the above.

23. The efficiency of the Carnot cycle may be increased by

(*a*) increasing the highest temperature (*b*) decreasing the highest temperature

(*c*) increasing the lowest temperature (*d*) decreasing the lowest temperature

(*e*) keeping the lowest temperature constant.

24. Which of the following is the *correct* statement ?

(a) All the reversible engines have the same efficiency

(b) All the reversible and irreversible engines have the same efficiency

(c) Irreversible engines have maximum efficiency

(d) All engines are designed as reversible in order to obtain maximum efficiency.

Answers

1. (d)	**2.** (a)	**3.** (a)	**4.** (b)	**5.** (e)	**6.** (e)	**7.** (b)
8. (b)	**9.** (d)	**10.** (a)	**11.** (c)	**12.** (d)	**13.** (d)	**14.** (b)
15. (e)	**16.** (c)	**17.** (a)	**18.** (a)	**19.** (d)	**20.** (e)	**21.** (a)
22. (d)	**23.** (d)	**24.** (a).				