Engineering Thermodynamics Quiz

Name of the Student: **Roll No.**

Answers:
MCQ:

1	A	**B**	C	D	14	A	**B**	C	D
2	A	B	C	**D**	15	A	B	C	**D**
3	A	B	C	**D**	16	A	B	C	**D**
4	A	B	C	**D**	17	A	B	C	**D**
5	A	B	**C**	D	18	A	B	C	**D**
6	A	B	C	**D**	19	A	B	C	**D**
7	A	**B**	C	D	20	A	B	**C**	D
8	A	B	**C**	D	21	A	B	C	**D**
9	A	**B**	C	D	22	A	B	C	**D**
10	A	B	C	**D**	23	A	B	**C**	D
11	A	B	C	**D**	24	**A**	B	C	D
12	A	B	C	**D**	25	A	B	C	**D**
13	A	B	**C**	D	26 F	27 T	28 T	29 F	30 F

Multiple choice questions (Tick the most appropriate answers)

1. The Zeroth law of thermodynamics defines
   a. Pressure
   b. Temperature
   c. Enthalpy
   d. Internal energy
2. A system is said to be in thermodynamic equilibrium with its surroundings provided it maintains
   a. thermal equilibrium with its surrounding
   b. mechanical equilibrium with its surrounding
   c. chemical equilibrium with its surrounding
   d. all of the three simultaneously
3. Select the most fitting option.
   a. Heat is the form of energy in transit
   b. Work is the form of energy in transit
   c. Heat, but not work, is the form of energy in transit
   d. Both (a) and (b) are correct
4. Examples of high grade energy are
   a. Mechanical work and electrical work, not tidal energy
   b. Electrical work and hydel energy, but not mechanical work
   c. Mechanical work and electrical work, but not hydel energy
   d. Animal and mutual energy, hydel energy and tidal energy
5. Identify the wrong options: a pure substance
   a. Has a uniform and invariable chemical composition
   b. Is a substance whose state can be completely defined when any two independent intensive properties are specified
   c. Is an equilibrium mixture of solid liquid and vapour
   d. None of the above
6. At the triple point of a pure substance

a. Liquid and vapour phase coexist in equilibrium
b. Solid and liquid phases co-exist in equilibrium
c. Solid and vapour phases co-exist
d. Solid, liquid and vapour phases co-exist

7. The expression $\int_1^2 Pdv$ is a measure of work done during a
   a. Steady flow reversible process
   b. Non-flow reversible process
   c. Reversible/irreversible process in a closed system
   d. Reversible/irreversible process in an open system
8. A gas expands in accordance with the law PV^n= constant, from an initial state of P_1,V_1 to the final volume $V_2=2V_1$, the maximum work will be obtained if n equals
   a. 1
   b. 1.4
   c. Zero
   d. ∞
9. Tick the wrong option : during a thermodynamic work
   a. $W = \int PdV$ for a reversible process only
   b. $W = 0\ if\ dV = 0$
   c. $W \neq \int PdV$ for a free expansion process
   d. W is an inexact differential
10. For a polytrophic process (PV^n=C), the work done during an expansion is
    a. P_2v_2-P_1v_1
    b. (P_2v_2-P_1v_1)/(n+1)
    c. (P_2v_2-P_1v_1)/(n-1)
    d. (P_1v_1-P_2v_2)/(n-1)
11. For a gas expanding in a closed system, the maximum work output will ba available provided the expansion takes place at
    a. Constant temperature
    b. Constant enthalpy
    c. Constant entropy
    d. Constant pressure
12. Tick the wrong option: enthalpy is
    a. A composite property
    b. An extensive property
    c. A quantity that must be obtained from other measurable quantities
    d. None of the above
13. The first law of thermodynamics refer to the conservation of
    a. Momentum
    b. Mass
    c. Energy
    d. Force
14. Identify the wrong options:
    a. The first law is applicable to reversible as well as irreversible process
    b. Quartz clock works ceaselessly. So it represent perpetual motion machine I
    c. The cyclic $\int \delta Q$ =cyclic $\int \delta W$
    d. The difference $\delta Q - \delta W$ represent an exact differential, though δQ and δW are inexact differential in each
15. The identity $\delta q = Pdv + du$ is valid for
    a. Any process occurring in an open system
    b. Any process occurring in a closed system
    c. Any process occurring in any system
    d. Reversible process occurring in a closed system
16. PMM I (perpetual motion machine of first kind) is a
    a. Fully reversible machine

b. Machine that converts input heat completely into work
c. Machine that registers that highest performance efficiency
d. Machine that generates its own driving power and giving work output

17. Internal energy consists of
    a. Sensible heat
    b. Latent heat
    c. Chemical energy
    d. All the above
18. Heat cannot be transported from a low temperature reservoir to a high temperature reservoir without the aid of the external work input this is :
    a. The kelvin-plank statement
    b. The Carnot theorem
    c. The Joule Law
    d. The Clausius statement
19. The process involved in a Carnot cycle are
    a. One isothermal, one adiabatic, one polytropic, one isobaric
    b. Two isothermal, one polytropic, and one isochoric
    c. One isobaric, one isochoric and two polytropic
    d. None of the above
20. In a Carnot cycle, the addition and rejection of heat takes place at a
    a. Constant pressure
    b. Constant volume
    c. Constant temperature
    d. Constant enthalpy
21. The efficiency of the Carnot heat engine depends on
    a. the temperature limits between which it operates
    b. The nature of the working fluids
    c. The quantity of heat absorbed and rejected
    d. Both (a) and (c) are true
22. The Carnot cycle is impracticable because it :
    a. Requires a perfect gas to operate
    b. Requires 0K as the sink temperature
    c. Demands a very high speed of operation
    d. Require that all compressing process should essentially be reversible
23. A reversible heat engine operating between two temperature reservoirs of heat, 600K and 300K absorbs 300kJs^{-1} of heat and rejects Q_2 of heat to the sink
    a. $\dot{Q}_2$= 75 kJs^{-1}
    b. $\dot{Q}_2$= 100 kJs^{-1}
    c. $\dot{Q}_2$= 150 kJs^{-1}
    d. $\dot{Q}_2$= 200 kJs^{-1}
24. Heat transfer can occur only when there is a temperature difference between a system and its surroundings. As dT approaches zero, the process becomes less and less.
    a. Irreversible
    b. Reversible
    c. Quasi-static
    d. None of the above
25. A process is called totally reversible, if it involves
    a. No heat transfer through a finite temperature difference
    b. No quasi-equilibrium changes and No friction
    c. No dissipative effects
    d. All the true

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Answer with True/False for the following statements:

26. Entropy is a property evolved from first law of thermodynamics (T/F)

27. A constant mass goes through a process where 100 kJ of heat transfer comes in and 100 kJ of work leaves. The state of the mass (substance) is changed. (T/F)

28. Entropy of the universe is increasing (T/F)

29. There are no changes of the properties w.r.t. time for an unsteady flow process (T/F)

30. Heat pump can have COP less than one (T/F)