STD: XI **ONE MARK TEST – 3** **Lesson: 7**
Marks: 30 / Time: 45 Min. **CHEMISTRY**
Choose the correct answer.

1. In a reversible process, the change in entropy of the universe is
   a) >0 b) ≥ 0 c) < 0 d) = 0
2. For a cyclic process involving isothermal expansion of an ideal gas
   a) $\Delta U = 0$ b) $\Delta U = q$ c) $\Delta U = q + w$ d) $\Delta U = q - w$
3. All the naturally occurring processes proceed spontaneously in a direction which leads to
   a) decrease in entropy b) increase in enthalpy
   c) increase in free energy d) decrease in free energy
4. If one mole of ammonia and one mole of hydrogen chloride are mixed in a closed container to form ammonium chloride gas, then
   a) $\Delta H > \Delta U$ b) $\Delta H - \Delta U = 0$ c) $\Delta H + \Delta U = 0$ d) $\Delta H < \Delta U$
5. The enthalpy of neutralization of strong acid vs strong base is approximately equal to _____(in kJ).
   a) 57.32 b) – 57.32 c) 5.98 d) – 5.98
6. When 15.68 litres of a gas mixture of methane and propane are fully combusted at 0°C and 1 atmosphere, 32 litres of oxygen at the same temperature and pressure are consumed. The amount of heat released from this combustion in kJ is (ΔH_C (CH_4) = – 890 kJ mol^{-1} and ΔH_C (C_3H_8) = -2220 kJ mol^{-1})
   a) -889 kJ b) -1390 kJ c) -3180 kJ d) -632.68 kJ
7. In Calorimeter, the expression used to calculate the amount of heat change in the process is
   a) C = qmΔT b) C = m/qΔT c) C = q/mΔT d) C = qΔT/m
8. In an adiabatic expansion of an ideal gas
   a) w = -Δu b) w = Δu + ΔH c) Δu = 0 d) w = 0
9. The maximum efficiency of an automobile engine working between the temperatures 816°C and 21°C is
   a) 73 % b) 45% c) 67% d) 78%
10. Which of the following is not a thermodynamic function?
    a) internal energy b) enthalpy c) entropy d) frictional energy
11. The bond dissociation energy of methane and ethane are 360 kJ mol^{-1} and 620 kJ mol^{-1} respectively. Then, the bond dissociation energy of C-C bond is
    a) 170 kJ mol^{-1} b) 50 kJ mol^{-1} c) 80 kJ mol^{-1} d) 220 kJ mol^{-1}
12. Which of the following process is feasible at all temperatures?
    a) $\Delta H>0$, $\Delta S>0$ b) $\Delta H>0$, $\Delta S<0$ c) $\Delta H<0$, $\Delta S>0$ d) $\Delta H<0$, $\Delta S<0$
13. The heat of formation of CO and CO_2 are -26.4 kCal and -94 kCal, respectively. Heat of combustion of carbon monoxide will be
    a) +26.4 kcal b) -67.6 kcal c) -120.6 kcal d) +52.8 kcal
14. For a cyclic process involving isothermal expansion of an ideal gas, q =
    a) q =0 b) q =PΔV c) q =w d) q = – w
15. The temperature of the system, decreases in an _____.
    a) Isothermal expansion b) Isothermal compression
    c) adiabatic expansion d) adiabatic compression
16. Which one of the following spontaneous reaction is endothermic?
    a) combustion of methane b) dissolution of ammonium nitrate
    c) acid-base neutralization reaction d) none of the above
17. Change in internal energy, when 4 kJ of work is done on the system and 1 kJ of heat is given out by the system is
    a) +1 kJ b) -5 kJ c) +3 kJ d) -3 kJ
18. In an isothermal reversible compression of an ideal gas the sign of q, ΔS and w are respectively
    a) +, -, – (b) -, +, – c) +, -, + d) -, -, +

19. The total entropy change for a system and its surroundings increases, if the process is
a) reversible b) irreversible c) exothermic d) endothermic

20. The amount of heat exchanged with the surrounding at constant pressure is given by the quantity
a) ΔE b) ΔH c) ΔS d) ΔG

21. In which of the following process, the process is always non-feasible?
a) $\Delta H>0, \Delta S>0$ b) $\Delta H>0, \Delta S<0$ c) $\Delta H<0, \Delta S>0$ d) $\Delta H<0, \Delta S<0$

22. C(diamond) $\rightarrow$ C(graphite), ΔH = -ve, this indicates that
a) graphite is more stable than diamond b) graphite has more energy than diamond
c) both are equally stable d) stability cannot be predicted

23. An ideal gas expands from the volume of 1×10^{-3} m^3 to 1×10^{-2} m^3 at 300K against a constant pressure 1×10^5 Nm^{-2}. The work done is
a) – 900 J b) 900 kJ c) 270 kJ d) – 900 kJ

24. Which one of the following is incorrect about Gibbs free energy?
a) Extensive property b) path function
c) $\Delta G < 0$ for a spontaneous process d) $\Delta G > 0$ for a non-spontaneous process

25. Molar heat of vaporization of a liquid is 4.8 kJ mol^{-1}. If the entropy change is 16 J mol^{-1} K^{-1}, the boiling point of the liquid is
a) 323 K b) 27°C c) 164 K d) 0.3 K

26. A reaction that occurs under the given set of conditions without any external driving force is called reactio
a) Reversible b) spontaneous c) irreversible d) cyclic

27. The values of ΔH and ΔS for a reaction are respectively 30 kJ mol^{-1} and 100 JK^{-1} mol^{-1}. Then the temperature above which the reaction will become spontaneous is
a) 300 K b) 30 K c) 100 K d) 20°C

28. In which of the enlisted cases, Hess's law is not applicable?
a) Determination of lattice energy
b) Determination of resonance energy
c) Determination of enthalpy of transformation of one allotropic form to another
d) Determination of entropy

29. The value of ΔH for cooling 2 moles of an ideal monoatomic gas from 125°C to 25°C at constant pressure will be [given $C_P = \frac{5}{2}R$]
a) -250 R b) -500 R c) 500 R d) +250 R

30. Match the following:

(A) Adiabatic	(i) dp = 0	(a) A – iii, B – iv, C – i, D – ii
(B) Isothermal	(ii) dV = 0	(b) A – ii, B – iv, C – iii, D – i
(C) Isobaric	(iii) dq = 0	(c) A – iv, B – iii, C – i, D – ii
(D) Isochoric	(iv) dT = 0	(d) A – i, B – iv, C – ii, D – iii

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ANSWER KEY

S.NO

1) d) = 0

2) a) $\Delta U = 0$

3) d) decrease in free energy

4) d) $\Delta H < \Delta U$

5) b) -57.32

6) d) -632.68 kJ

7) c) $c = q/m\Delta T$

8) a) $w = -\Delta U$

9) b) 45%

10) d) frictional energy

11) c) 80 kJ mol^{-1}

12) c) $\Delta H < 0, \Delta S > 0$

13) b) -67.6 kcal

14) d) $q = -w$

15) c) adiabatic expansion

16) b) dissolution of ammonium nitrate

17) c) +3 kJ

18) d) -, -, +

19) b) irreversible

20) b) ΔH

21) c) $\Delta H < 0, \Delta S < 0$

22) a) graphite is more stable than diamond

23) a) -900 J

24) b) path function

25) b) 27°C

26) b) spontaneous

27) a) 300 k

28) d) Determination

29) b) -500 R

30) a) A-iii, B-iv, C-i, D-ii