SECTION-A

Answer all the questions by selecting the most suitable alternative. (1M × 20 = 20M)

1) Which of the following radiation is not characteristic property of gases?
   A) Gases are highly compressible
   B) The volume and the shape of gases are fixed
   C) Gases exert pressure equally in all directions
   D) Gases have much lower density than the solids and liquids

2) At constant temperature ,the pressure of a fixed mass of a gas is reduced to one third, the volume is
   A) Reduced to one third
   B) Increases by three times
   C) Remains same
   D) Cannot be predicted.

3) The temperature of gas in a closed container is 27^0c.If the temperature is raised to 327^0c ,the pressure is
   A) double
   B) reduced to half
   C) reduced to one third
   D) Cannot be calculated from given information.

4) Calculate the volume in liters occupied by 8.8g of CO_2 at 31.1^0c and 1 bar pressure(R=0.0821 bar $dm^3mole^{-1}K^{-1}$)
   A) 20 B) 2 C) 5.05 D) 5.5

5) A, B & C are ideal gases and their molecular masses are 2,4 & 28 respectively. The rate of diffusion of these gases follows the order.
   A) C>B>A
   B) A>B>C
   C) A=B=C
   D) Cannot be predicted.

6) The average kinetic energy of the gas molecule is
   A) Inversely proportional to its absolute temperature
   B) directly proportional to its absolute temperature
   C) equal to square of its absolute temperature
   D) directly proportional l to square of its absolute temperature

7) A gas will approach ideal behavior at
   A) Low temperature and low pressure
   B) Low temperature and high pressure
   C) High temperature and low pressure
   D) High temperature and high pressure.

8) The oxidation state of boron in sodiumborohydride(NaBH4)is
   A) +5 B) -5 C) -3 D) +3

9) Equivalent weight of potassium dichromate (Molecular weight=294.20)in acidic medium is
   A) 294.20 B) 58.84 C) 49.034 D) 98.06

10) The mass percentage of carbon in ethyl alcohol(C_2H_5OH) is
   A) 52.14% B) 26.08 C) 13.13 D) 34.73

11) The empirical formula of sucrose($C_{12}H_{22}O_{11}$) is

A) CH_2O B) CHO C) $C(H_2O)_2$ D) $C_{12}H_{22}O_{11}$

12) The amount of water produced by the combustion of 8g of methane(CH4) is

$$CH_{4\,(g)} + 2O_{2\,(g)} \rightarrow CO_{2(g)} + 2\,H_2O_{(l)}$$

72g B) 54g C) 36g D) 18g

13) 3 moles of "H_2" react with 2 moles of "O_2"to yield water.

$$2H_{2\,(g)} + O_{2\,(g)} \rightarrow 2\,H_2O_{(l)}$$

The limiting reactant is

A) O_2 B) H_2 C) Both D) None of the above.

14) Which of the following statement is not correct

A) Oxidant is a substance which increases the oxidation number of the other substances

B) Reductant is a substance which decreases the oxidation number of the other substances

C) The oxidation number of oxidant decreases

D) In oxidation there is decrease in oxidation number.

15) In the reaction

$$3\,CuO + 2NH_3 \rightarrow N_2 + 3\,H_2O + 3\,Cu\,.$$

The change of NH_3 to N_2 involve

A) Loss of 6 electrons per mole of N_2

B) Loss of 3 electrons per mole of N_2

C) Gain of 6 electrons per mole of N_2

D) Gain of 3 electrons per mole of N_2

16) A system absorbs 30J of energy and does work equivalent to 20J on surroundings. The change in internal energy is

A) -50 B) +50 C) +10 D) -10

17) Which of the following is not an extensive property

A) Density B) Mass C) Enthalpy D) Internal energy

18) For a reaction $3H_{2\,(g)} + N_{2\,(g)} \rightarrow 2\,NH_{3\,(g)}$

Which of the following is valid?

A) $\Delta H=\Delta U$ B) $\Delta H<\Delta U$ C) $\Delta H>\Delta U$ D) None of the above

19) For the process to occur under adiabatic condition's, the correct condition is

A) $\Delta T=0$ B) $\Delta P=0$ C) $q=0$ D) $W=0$

20) ΔH for the combustion of a compound is

A) 0 B) Negative C) Positive D) May be positive or Negative

SECTION –B

Answer any two of the following questions. **(2×5M=10M)**

1) Balance the following Redox reaction in basic medium by ion-electron method **5M**

$MnO_4^{-1}{}_{(aq)} + I^{-1}{}_{(aq)} \rightarrow MnO_{2(s)} + I_{2(s)}$ **2M**

2) a) Sate the Daltons Law of Partial pressures.

b) A neon-dioxygen mixture contains 70.6g of oxygen (atomic mass=32g/mole) and 176.5 g of neon (atomic mass=20g/mole). If pressure of the mixture of gases in the cylinder is 25bar .What is the partial pressure of dioxygen and neon in the mixture. **3M**

3) A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% of chlorine (Atomic mass of Cl =35.453g/mole). Its molar mass is 98.96g .What is its empirical and molecular formulas. **5M** **1M**

4) a) State the HESS'S Law.

b) The combustion of one mole of benzene takes place at 298K and 1 atm. After combustion, $CO_{2\,(g)}$ and $H_2O_{(l)}$ are produced and 3267.0 kJ of heat is liberated .Calculate the standard enthalpy of formation of Benzene .Given standard enthalpies of formation of $CO_{2(g)}$ and $H_2O_{(l)}$ are -393.5 kJ /mole and -285.83 kJ /mole respectively. **4M**