SECTION-A

I. Answer all the questions by selecting the most suitable alternative. (1M × 30 = 30M)

1) In the spectrum of hydrogen atom ,the series which falls in ultraviolet region is
   A) Lyman B) Balmer C) Paschen D) Brackett
2) Which of the following electromagnetic radiation has highest wavelength
   A) X-Rays B) Microwaves C) gamma rays d) IR
3) The wavelength of large objects is of no significance as it is too--------- to be measurable.
   A) Small B) Large C) Heavy D) None of these
4) If the (n+l) is more than 3 and less than 6 ,what will be the possible number of orbital's
   A) 6 B) 9 C) 10 D) 13
5) Which of the following set of quantum numbers is impossible for an electron?
   A) n=1 l=0 m_l= 0 m_s= +1/2 **C) n=2 l=1 m_l=0 m_s= +1/2**
   B) n=3 l=2 m_l= -3 m_s= +1/2 **D) n=9 l=7 m_l= -6 m_s= -1/2**
6) which of the following rule could explain the presence of three unpaired electrons in "**N**"-atom
   A) Aufbaus principle
   B) Hunds rule
   C) Paulis exclusion principle
   D) All the above.
7) The maximum number of elements in the 3rd period is
   A) 8 B) 18 C) 36 D) 54
8) Which of the following has largest negative electron gain enthalpy
   A) I B) Br C) Cl D) F
9) Which element has smallest size
   A) Al B) P c) B D) N
10) Which of the following has highest ionization enthalpy
   A) N B) P C) O D) S
11) Which of the following molecule is not an exception to octet rule
   A) BF_3 B) PF_5 C) CO_2 D) IF_7
12) Which of the following has maximum covalent character
   A) LiF B) LiCl C) LiBr D) LiI
13) Which of the following molecule has net dipole moment
   A) $CHCl_3$ B) H_2 C) BF_3 D) CH_4.
14) The shape of ClF_3 molecule is
   A) seesaw
   B) square pyramidal
   C) T-shape
   D) Square planar
15) The formal charge of **carbon** in carbonate ion(CO_3^{-2}) is
   A) -1 B) +1 C) -2 D) 0

16) Which of the following molecule do not form hydrogen bond

A) H_2O **B)** NH_3 **C)** HBr **D)** HF

17) 2.8g of a gas at 1 atm and 273K occupies a volume of 2.24L ,the gas cannot be

A) N_2 **B)** O_2 **C)** CO **D)** C_2H_2

18) A vessel of 120ml capacity contains a certain amount of gas at 35^0c and 1.2 bar pressure. The gas is transferred to another vessel of volume 180ml at 35^0c .what would be its pressure in bar

A) 1.2 B) 2.4 C) 0.8 d) 0.6

19) What is the increase in volume when the temperature of 800ml of air increases from 27^0c to 47^0c under constant pressure.

A) 853.3 ml B) 1653.3 C) 53.3 ml D) 103.36 ml

20) Gas **'X'** diffuses twice fast as another gas 'Y' .If the vapor density of a gas **'X'** is 2, the molecular mass of gas **'Y'** is

A) 2 B) 4 C) 8 D) 16

21) The oxidation state of sulphur in Sulphuric acid (H_2SO_4)is

A) +6 B) -6 C) +2 D) -2

22) Equivalent weight of potassium permanganate (Molecular weight=158.04) in acidic medium is

A) 158.04 B) 52.68 C) 31.60 D) 49.034

23) Four grams of copper chloride on analysis was found to contain 1.890g of copper and 2.110g of chlorine .The percentage of copper in copper chloride is

A) 47.3 B) 52.7 C) 44.5 D) 45.5

24) How many moles of methane are required to produce 22g of $CO_{2(g)}$ after combustions

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

A) 2 moles B) 1.5 moles C) 1 mole D) 0.5 mole

25) 56 g of "N_2" react with 10 g of "H_2"to yield Ammonia.

$$3H_{2\,(g)} + N_{2\,(g)} \rightarrow 2\,NH_{3\,(g)}$$

The excess reactant is

A) H_2 B) N_2 C) Both D) None of the above.

26) Which of the following statement is not correct

A) Reduction involves gain of electrons
B) The oxidation number of reductant decreases
C) Oxidizing agent helps to increase the oxidation number of reducing agent
D) Oxidation involves loss of electrons.

27) A system gives out 30J of heat and does work equivalent to 75J of work. The change in internal energy is

A) -45 B) +45 C) +105 D) -105

28) Which of the following is an extensive property

A) Surface area B) temperature C) pressure D) density

29) For a reaction $C_{(s)} + O_{2\,(g)} \rightarrow CO_{2\,(g)}$

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

30) For the process to occur under Isothermal process , the correct condition is

A) $\Delta p=0$ B) $\Delta T=0$ C) $Q=0$ D) $W=0$

SECTION –B

Answer any THREE of the following questions (3 × 10M =30M)

1) **a)** Balance the following Redox reaction in acidic medium by oxidation number method
$Cr_2O_7^{-2}{}_{(aq)} + SO_3^{-2}{}_{(aq)} \rightarrow Cr^{+3}{}_{(aq)} + SO_4^{-2}{}_{(aq)}$ 5M

b) A compound contains 2.1% hydrogen, 12.8% carbon and 85.1% of Bromine (Atomic mass of Br =79.91g/mole). Its molar mass is 187.9 .What is its empirical and molecular formulas. 5M

2) **a)** A gaseous mixture containing 50g of Di nitrogen and 10g of Dioxygen Were enclosed in a vessel of 10L capacity at 27^0c. Calculate Partial pressure of each gas & Total pressure of gaseous mixture. 5M

b) Write the differences between ideal gas and real gas 5M

3) **a)** Explain sp^3 hybridization with suitable example. 5M

b) Draw the molecular orbital energy level diagram of " N_2 " Molecule and Calculate the bond order and determine the magnetic character 5M

4) Write an essay on s,p,d& f block elements 10 M

5) **a)** Explain Briefly the Planks quantum Theory. 5M

b) When electromagnetic radiation of wavelength 300nm strikes a metal Surface of sodium, electrons are emitted with a kinetic energy of 1.68×10^5 J/mole. What is the minimum energy needed to remove electron from sodium? What is the maximum wavelength in nanometer that will cause a Photoelectron emitted ? 5M

6) **a)** What are open, closed, and isolated systems .Give one example for each. 5M

b) Calculate the standard enthalpy of formation of $CH_3OH_{(l)}$ from the following data.

$CH_3OH_{(l)} + 3/2\ O_{2(g)} \rightarrow CO_{2(g)} + H_2O_{(l)} : \Delta_rH^0 = -726$ kJ/mole

$C_{(S)} + O_{2(g)} \rightarrow CO_{2(g)} : \Delta_cH^0 = -393$ kJ/mole

$H_{2(g)} + \frac{1}{2}\ O_{2(g)} \rightarrow H_2O_{(l)} : \Delta_fH^0 = -286$ kJ/mole 5M