Model Question Paper

Std: XI Standard **Time: 2.30 hours**

Subject: Chemistry **Max Marks: 75 Marks**

PART – A

ANSWER ALL QUESTIONS: **(15X1=15)**

1. Which one of the following is a standard for atomic mass?
   a) $_6C^{12}$ b) $_6C^{14}$ c) $_6C^{13}$ d) $_6C^{14}$
2. The equivalent mass of a divalent metal element is 10g eq^{-1}. The molar mass of its anhydrous oxide is
   a) 46 g b) 36 g c) 52 g d) none of these
3. Consider the following sets of quantum number

	n	l	m	s
(i)	2	1	-1	3/2
(ii)	1	1	1	+1/2
(iii)	1	0	+1	-1/2
(iv)	1	0	0	-1/2

which of the following sets of quantum numbers is not possible

a) (i) and (i) b) (ii) and (iv) c) (i), (ii) and (iii) d) (i), (ii), (iii) and (iv)

4. Based on equation $E = -2.178 \times 10^{-18}\left(\frac{z^2}{n^2}\right)$ Jules, certain conclusions are written. which of them is not correct?

   A. Equation can be used to calculate the energy change when the electron changes orbit.
   B. For n=3, the electron has more negative energy than it does for n=5 which means that the electron is more tightly bound in the smallest allowed orbit.
   C. The negative sign in the equation simply means that the energy of electron bound to the nucleus is lower it would be if the electrons were at the infinite distance from nucleus.
   D. Smaller the value of n, the larger is the orbit radius.
5. Which of the following pairs of elements exhibit diagonal relationship?
   a) Be and Mg b) Be and Al c) Be and B d) C and Si

6. The first ionization energy (IE_1) and second ionization energy (IE_2) of elements A, B and C are given below

Element	A	B	C
IE1 $KJ\ mol^{-1}$	2370	522	1680
IE2 $KJ\ mol^{-1}$	5250	7298	3381

which one of the above elements is the most reactive metal?

(a) A (b) B (c) C (d) A and C

7. Ionic hydrides are formed by

(a) Halogens (b) Chalcogens (c) Alkalimetals (d) Inert gases

8. Volume strength of 0.5N H_2O_2 is

(a) 2.8 (b) 8.4 (c) 5.6 (d) 16.8

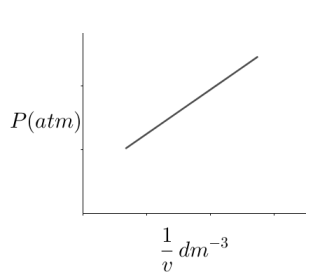
9. Ionic radius of alkali metals are in the following order

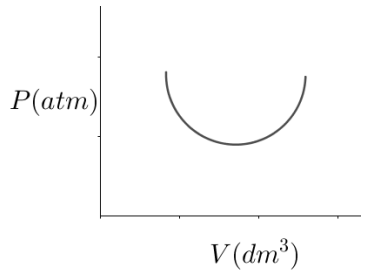
(a) Li < Na < K < Rb < Cs
(b) Na < Li < K < Rb < Cs
(c) Li > Na > K > Rb > Cs
(d) Na < Li < Rb < K < Cs

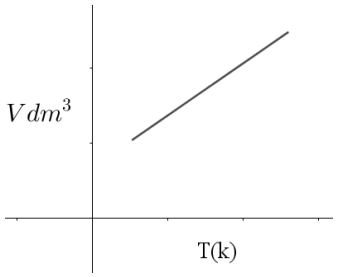
10. Which one of the following is true?

(a) Lithium on direct combination with nitrogen from Li_3N.
(b) Magnesium on direct combination with nitrogen from Mg_3N.
(c) Both (a) and (b)
(d) Lithium and magnesium form bicarbonates.

11. Which of the following correctly represents Boyle's Law

(a) 

(b) 

(c) 

(d) All of these

12. What is the density of oxygen gas at 2270C and 4 atm pressure (R = 0.082 L atom k^{-1} mol^{-1})

(a) 3.12 g/L (b) 3.41 g/L (c) 2.81 g/L (d) none of these

13. Which one of the following is an Extensive property?

(a) Molar Volume (b) Molality

(c) Gibs free energy (d) Free energy change

14. Pressure – Volume work involved in an isothermal compression is

(a) $-2.303nRT\log\left(\frac{V_f}{V_i}\right)$

(b) $2.303nRT\log\left(\frac{V_f}{V_i}\right)$

(c) $-\int_{V_i}^{V_f} vdv$

(d) $\left(\frac{\Delta V}{\Delta T}\right)$

15. An ideal gas expands form the volume of 1 x 10^{-3} m^3 to 1 x 10^{-2} m^3 at 300k against a constant pressure at 1 x 10^5 Nm^{-2}. The work done is

(a) -900 J (b) 900 KJ (c) 270 KJ (d) -900 KJ

PART – B (6X2=12)

Answer six questions. Question No. 24 is compulsory. Answer any five from the remaining.

16. Define equivalent mass
17. Consider the following electronic arrangement for P^3 configuration.

(a) | | | | (b) | | | | (c) | | | | (d) | | | |

Which of these represents the ground state? Substantiate your answer with a proper reason.

18. Calculate the De Broglie wavelength of a particle whose momentum is 66.26 x 10^{-28} $kgms^{-1}$
19. Is the definition given below for ionization enthalpy is correct? Why?

"Ionisation enthalpy is defined as the energy required to remove the most loosely bound electron from the valence shell of an atm"

20. What is meant by intramolecular hydrogen bond. Give one example.
21. Complete the following chemical reactions and classify them into

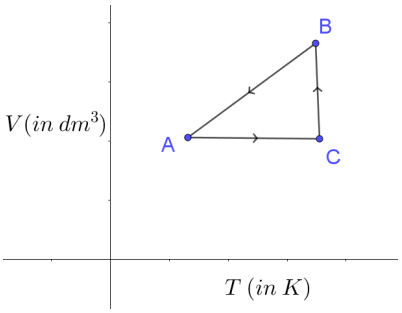
(a) Hydrolysis (b) redox (c)hydration reactions

(i) $KMnO_4 + H_2O_2$

(ii) $CaO + H_2O$

22. Give the reaction of sodium with ethyne
23. Distinguish between diffusion and effusion
24. One mole of an ideal gas is put through a series of changes as shown below in a cyclic process

Name the process A B, B C and C A



Part – C (6X3=18)

Answer six question: Question No. 32 compulsory. Answer any 5 form the remaining

25. Statement 1: Two mole of glucose contains 12.044 X 10^{23} molecules of glucose
Statement 2: Total number of entities present in one mole of any substance is equal to 6.02X10^{22}.

Whether the above statements are true. Is there any relation between these two statements?

26. Calculate the total number of electrons present in 17g of ammonia

27. Match table -1 using the options given in table – 2

Table - 1	Table-2
(a) angular momention of an election in 2s orbital	(i) 1/3
(b) Uncertainty principle	(ii) zero
(c) Cr^{3+}	(iii) $\hat{H}\Psi = E\Psi$
(d) $\frac{\text{Velocity of election in } 3^{rd}\text{orbit}}{\text{Velocity of election in } 1^{st}\text{orbit}}$	(iv) $\Delta E . \Delta t \geq \frac{h}{4\pi}$
	(v) $\sqrt{l(l+1)}\frac{h}{2\pi}$
	(vi) Half filled configuration
	(vii) $\Delta x . \Delta P \leq \frac{h}{4\pi}$

28. First ionization potential of carbon atom is greater than that of boron atom, where as the reverse is true for second ionization potential – give appropriate reason.

29. Atomic number of elements X,Y,Z and A are 4,8,7 and 12 respectively. Arrange them in the decreasing order of their electro negativity.

30. Give the uses of heavy water.

31. How is plaster of Paris Prepared?

32. At identical temperature and pressure, the rate of diffusion of hydrogen gas is 3 $\sqrt{3}$ times that of a hydrocarbon having molecular formula C_nH_{2n-2} what is the Value of *n*.

33. State the first law of thermodynamics.

Part – C **(5X5=25)**

Answer all five questions

34. (a) Define oxidation number Balance the following equation using oxidation number method.

$$As_2S_3 + HNO_3 + H_2O \rightarrow H_3AsO_4 + H_2SO_4 + NO$$

(OR)

(b)Define limiting reagent (2)

In the reaction, $2Al + Fe_2O_3 \rightarrow Al_2O_3 + 2Fe.$ 324 g of aluminum is allowed to react with 1.12 kg of ferric oxide. How much of the excess reagent is left at the end of the reaction (3)

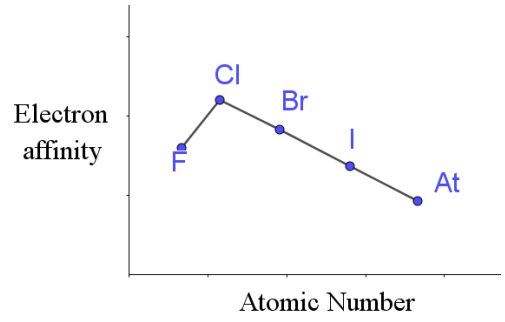
35. (a) Describe Aufbau principle. write the electronic configuration for Ni^{2+} using Aufbau principle

(OR)

(b)What is the de Broglie wave length of an election, which is accelerated from the rest, through a potential difference of 100V.

Give the relation between Bohr radius (r) and the de Broglie wavelength (L)

36. (a)



(i) Explain the above variations of electron affinity

(ii) Define electronegativity

(or)

(b) (i) What is water gas shift reaction?

(ii) NH_3 has exceptionally high melting point and boiling point as compared to those of the hydrides of the remaining element of group15. Explain

37. (a) (i) Hydrogen Peroxide can function as an oxidizing agent as well as reducing agent. Substanciate this statement with one example for each

(ii) Name the three types of covalent hydrides

(or)

(b) (i) Alkaline earth metal (A) belongs to 3^{rd} period reacts with oxygen and nitrogen to form compounds (B) and (C) respectively. It undergo metal displacement reation with $AgNO_3$ solution to form compound (D). Identify (A), (B), (C) and (D). Give the reactions.

(ii) Why Sodium hydroxide is much more soluble than its chloride?

38. Write the Vander Waals equation for a real gas. Explain the correction term for pressure and volume.

or

Give the relation between enthalpy (H) and internal energy (U).

Calculate ΔH^0_f for the reactions

$CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O(g)$ given that ΔH^0_f for $CO_2(g)$, $CO(g)$ and $H_2O(g)$ are −393.5, −111.31 and −242 KJ mol^{-1} respectively.