27.01.2020   Revision–I   Marks:90
Std: XI (A-D)   Chemistry   Time: 3 Hrs

I. Choose the correct answer: 15x1=15

1. Which of the following is/are true with respect to carbon-12?
   a) relative atomic mass is 12u
   b) oxidation number of carbon is +4 in all its compounds
   c) 1 mole of carbon 12 contain 6.022×10^{22} carbon atoms
   d) All of these

2. The electronic configuration of Eu (At.No.63) Gd (At.no.64) and Tb (At.No.65)
   a) $[Xe] 4f^6 5a^1 6s^2$, $[Xe] 4f^7 5d^1 6s^2$ and $[Xe] 4f^8 5d^1 6s^2$
   b) $[Xe] 4f^7, 6s^2$, $[Xe] 4f^7 5d^1 6s^2$ and $[Xe] 4f^9 6s^2$
   c) $[Xe] 4f^7 6s^2$, $[Xe] 4f^8 6s^2$ and $[Xe] 4f^8 5d^1 6s^2$
   d) $[Xe] 4f^6 5d^1 6s^2$, $[Xe] 4f^7 5d^1 6s^2$ and $[Xe] 4f^9 6s^2$

3. In a given shell the order of screening effect is
   a) s>p>d>f   b) s>p>f>d   c) f>d>p>s   d) f>p>s>d

4. A commercial sample of hydrogen peroxide marked as 100 volume H_2O_2, it means that
   a) 1ml of H_2O_2 will give 100ml O_2 at STP
   b) 1L of H_2O_2 will give 100ml O_2 at STP
   c) 1L of H_2O_2 will give 22.4L O_2
   d) 1ml of H_2O_2 will give 1mole of O_2 at STP

5. For alkali metals, which one of the following trends is incorrect?
   a) Hydration energy: Li > Na > K > Rb
   b) Ionisation energy: Li > Na > K > Rb
   c) Density: Li < Na < K < Rb
   d) Atomic size: Li < Na < K < Rb

6. The units of Vanderwaals constants b and a respectively
   a) mol L^{-1} and L atm^2 mol^- b) mol L and L atm mol^2
   c) mol^{-1} L and L^2 atm mol^{-2} d) none of these

7. 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) $\Delta H < \Delta U$

8. 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 at 1×10^5 Nm^{-2}. The workdone is
   a) -900 J   b) 900 KJ   c) 270 KJ   d) -900 KJ

9. Consider the following statements:
   (i) Atmospheric pressure is less at the top of a mountain than at sea level
   (ii) Gases are much more compressible than solids and liquids
   (iii) When the atmospheric pressure increases the height of the mercury column rises.
   Select the correct statement
   a) I and II   b) II and III   c) I and III   d) I, II and III

10. Assertion: Generally alkali and alkaline earth metals form superoxides.
    Reason: There is a single bond between O and O in superoxides.
    a) Both assertion and reason are true and reason is the correct explanation of assertion
    b) Both assertion and reason are true but reason is not the correct explanation of assertion
    c) Assertion is true but reason is false
    d) Both assertion and reason are false

11. In solid ice, oxygen atom is surrounded
    a) tetrahedrally by 4 hydrogen atoms
    b) octahedrally by 2 oxygen and 4 hydrogen atoms
    c) tetrahedrally by 2 hydrogen and 2 oxygen atoms
    d) octahedrally by 6 hydrogen atoms

12. Identify the wrong statement
    a) Amongst the isoelectronic species, smaller the positive charge on cation, smaller is the ionic radius
    b) Amongst isoelectric species greater the negative charge on the anion, larger is the ionic radius
    c) Atomic radius of the elements increases as one make down the first group of the periodic table
    d) Atomic radius of the elements decreases as one moves across from left to right in the 2nd period of the periodic table.

13. Which of the following does not represent the mathematical expression for the Heisenberg uncertainity principle?
    a) $\Delta x. \Delta p \geq \frac{h}{4\pi}$ b) $\Delta x. \Delta v \geq \frac{h}{4\pi m}$ c) $\Delta E. \Delta t \geq \frac{h}{4\pi}$ d) $\Delta E. \Delta x \geq \frac{h}{4\pi}$

14. Which one of the following represents 180g of water?
    a) 5 moles of water
    b) 90 moles of water
    c) $\frac{6.022 \times 10^{23}}{180}$ molecules of water
    d) 6.022×10^{24} molecules of water
15. Consider the following statements and identify the true statements with respect to entropy.
    (i) The SI unit of entropy is JK^-
    (ii) When solid → liquid, the entropy of a process increases
    (iii) For a reversible process Δs universe=0
    a) only (i) b) only (iii)   c) Both (i) and (ii)   d) (i), (ii) and (iii)

II. Answer any 6 of the following: 6x2=12
   Q.No.24 is compulsory
16. What is the empirical formula of the following?
    (i) Fructose $(C_6H_{12}O_6)$ found in honey
    (ii) Caffeine $(C_8H_{10}N_4O_2)$ a substance found in tea and coffee.
17. Which quantum number reveal information about the shape, energy, orientation and size of orbitals?
18. State Mendeleev's period law.
19. Draw the structures of a) H_2O and b) H_2O_2
20. How is plaster of paris prepared?
21. Distinguish between diffusion and effusion.
22. State the third law of thermodynamics.
23. Calculate the oxidation number of underlined atoms of the following: (i) $\underline{N}O_3^-$ (ii) $K\underline{Mn}O_4$
24. A sample of gas has a volume of $8.5dm^3$ at an unknown temperature. When the sample is submerged in ice water at 0^0c, its volume gets reduced to 6.37 dm^3. What is its initial temperature?

III. Answer any 6 of the following: 6x3=18
   Q.No.33 is compulsory
25. Write down the Born-Haber cycle for the formation of $Cacl_2$.
26. Define Graham's Law of diffusion.
27. Write solvey method for preparation of sodium hydroxide.
28. Explain the pauling method for the determination of ionic radius.
29. Derive deBroglie equation.

30. Calculate the amount of water produced by the combustion of 30g of methane.
31. State and explain paulis exclusion principle.
32. What are intra molecular hydrogen bonding? Explain with an example.
33. Calculate the effective nuclear charge of the last electron in an atom whose configuration is $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^5$.

IV. Answer the following questions: 5x5=25
34. a) (i) Balance the following equation by oxidation number method.   (3M)
       $K_2Cr_2O_7 + KI + H_2SO_4 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + I_2 + H_2O$
    (ii) What is decomposition reaction?   (2M)
                          (OR)
    b) (i) Write a note on Azimuthal quantum number.   (3M)
    (ii) Which has the stable electronic configuration Ni^{2+} or Fe^{3+} (2M)
35. a) (i) Explain the following:
       Ionisation potential of N is greater than that of O.   (3M)
    (ii) Give the temporary name for atomic number: a) 107   b) 116
                          (OR)
    b) (i) Water is an amphoteric oxide. Explain.   (3M)
    (ii) What are Zeolites?   (2M)
36. a) (i) Write the similarities between lithium and magnesium.(3M)
    (ii) Draw the structure of $Becl_2$.   (2M)   (OR)
    b) (i) Write the preparation of sodium hydroxide using Castner-Kellner cell. (3M)
    (ii) Give the compressibility factor for real gases. (2M)
37. a) Write the Vanderwaals equation for a real gas. Explain the correction term for pressure and volume. (5M)
                          (OR)
    b) (i) Write the relation between c_p and c_v for an ideal gas. (3M)
    (ii) What is isothermal process? (2M)
38. a) (i) Briefly give the basis for pauling's scale of electronegativity. (3M)
    (ii) What is water-gas shift reaction? (2M)   (OR)
    b) Calculate the standard heat of formation of propane, if its heat of combustion is -2220.2KJ mol-, the heat of formation of $CO_{2(s)}$ and $H_2O(l)$ are -393.5 and -2858 KJmol-1 respectively.