Sample Paper-04

Class 11th NEET (2024)

CHEMISTRY

SECTION-A

1. The electrons, identified by quantum numbers n and l (i) n = 4, l = 1 (ii) n = 4, l = 0 (iii) n = 3, l = 2 (iv) n = 3, l = 1 can be placed in order of increasing energy, from the lowest to highest, as:-

(1) (iv) < (ii) < (iii) < (i)

(2) (ii) < (iv) < (i) < (iii)

(3) (i) < (iii) < (ii) < (iv)

(4) (iii) < (i) < (iv) < (ii)

2. **Assertion:** pH of pure water increases with increase in temperature.

Reason: Self ionization of water is an endothermic reaction.

(1) Both **Assertion (A)** and **Reason (R)** are the true, and **Reason (R)** is a correct explanation of **Assertion (A)**.

(2) Both **Assertion (A)** and **Reason (R)** are the true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.

(3) **Assertion (A)** is true, and **Reason (R)** is false.

(4) **Assertion (A)** is false, and **Reason (R)** is true.

3. **Assertion:** The number of radial nodes in 3s and 4p orbitals is not equal.

Reason: The number of radial nodes in any orbital depends upon the values of 'n' & 'l' which are different for 3s and 4p orbitals.

(1) Both **Assertion (A)** and **Reason (R)** are the true, and **Reason (R)** is a correct explanation of **Assertion (A)**.

(2) Both **Assertion (A)** and **Reason (R)** are the true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.

(3) **Assertion (A)** is true, and **Reason (R)** is false.

(4) **Assertion (A)** is false, and **Reason (R)** is

4. Benzene burns in oxygen according to the following reactions.

$$C_6H_6(1)+\frac{15}{2}O_2(g)\rightarrow 3H_2O(1)+6CO_2(g)$$

If the standard enthalpies of formation of $C_6H_6(l)$, $H_2O(l)$ and $CO_2(g)$ are 11.7, –68.1 and –94 kcal/mole, respectively, the amount of heat that will liberated by burning 780 g of benzene is;

(1) 7800 kcal (2) 780 kcal

(3) 78 kcal (4) 608.4 kcal

5. Which of the following order of radii is correct?

(1) Li < Be < Mg (2) $H^+ < Li^+ < H^-$

(3) O < F > Ne (4) $Na^+ > F^- > O^{2-}$

6. The second ionization potentials in electron volts of oxygen and fluorine atoms are respectively given by;

(1) 35.1, 38.3 (2) 38.3, 38.3

(3) 38.3, 35.1 (4) 35.1, 35.1

7. Vapour density of PCl_5 is 104.16 but when heated to 230°C its vapour density is reduced to 62. The degree of dissociation of PCl_5 at this temperature will be:

(1) 6.8% (2) 68%

(3) 46% (4) 64%

8. The type of hybrid orbitals used by chlorine atom in ClO_2^- ions:

(1) sp^3 (2) sp^2

(3) sp (4) dsp^3

9. The statement that is **incorrect** for periodic classification of elements is

(1) the properties of elements are a periodic function of their atomic numbers.

(2) number of Non-metallic elements is less than the metallic elements

(3) the first ionization energies of elements along a period do not vary in a regular manner with increase in atomic number at some places.

(4) for transition elements, the d-subshells are filled with electrons uniformly with increase in atomic number without any exceptions

10. Quantum numbers of an atom can be defined on the basis of;
(1) Hund's rule
(2) Pauli's exclusion principle
(3) Aufbau's principle
(4) Heisenberg's uncertainity principle

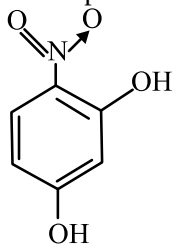
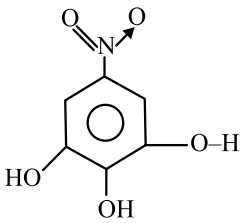
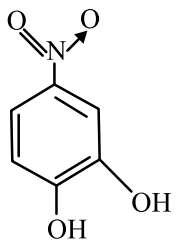
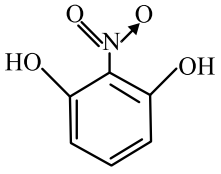
11. The total number of π-electrons in the given compound $OHC-C\equiv C-\underset{H}{\underset{|}{C}}=\underset{H}{\underset{|}{C}}-CHO$ are;
(1) 6 (2) 8
(3) 10 (4) 12

12. A diatomic molecule have a dipole moment of 1.92 D and a bond length of 2.0Å. What is the percentage ionic character in the molecule if e = 4.8×10^{-10}esu?
(1) 33% (2) 25%
(3) 20% (4) 50%

13. Atomic number of the element with the symbol Uuu is :
(1) 100 (2) 111
(3) 110 (4) 101

14. The enthalpies of combustion of $C_{(graphite)}$ and $C_{(diamond)}$ are −393.5 and −395.4 kJ/mol respectively. The enthalpy of conversion of $C_{(graphite)}$ to $C_{(diamond)}$ in kJ/mol is
(1) −1.9 (2) −788.9
(3) 1.9 (4) 788.9

15. The enthalpy of neutralisation of four acids A, B, C, D with sodium hydroxide are –13.1, –9.8, –7.9, and - 10.3 kcal respectively. The weakest acid is
(1) A (2) B
(3) C (4) D

16. Which compound will have lowest B.P?
(1) 
(2) 
(3) 
(4) 

17. How many unpaired electrons are present in N_2^+ ?
(1) 1 (2) 2
(3) 3 (4) 4

18. Match **List-I** with **List-II** to find out the **correct** option.

List I		**List II**	
(A)	H_2O	(I)	Trigonal planar
(B)	CO_2	(II)	Tetrahedral
(C)	BF_3	(III)	Linear
(D)	NH_4^+	(IV)	Bent

(1) (A) – (III), (B) – (I), (C) – (IV), (D) – (II)
(2) (A) – (IV), (B) – (III), (C) – (II), (D) – (I)
(3) (A) – (IV), (B) – (III), (C) – (I), (D) – (II)
(4) (A) – (II), (B) – (III), (C) – (IV), (D) – (I)

19. Azimuthal quantum number defines:
(1) e/m ratio of electron.
(2) angular momentum of electron.
(3) spin of electron.
(4) magnetic momentum of electron.

20. When 10 ml of a strong acid is added to 10 mL of an alkali, the temperature rises by 5°C. If 100 mL of each liquid is mixed, the temperature rise would be
(1) 5ºC (2) 10ºC
(3) 2.5ºC (4) 0.5ºC

21. The hydrolysis of the salt of strong acid and a weak base is called:
(1) anionic hydrolysis
(2) cationic hydrolysis
(3) amphoteric hydrolysis
(4) None of these

22. In the following reaction:
$Ag_2O + H_2O + 2e^- \rightarrow 2Ag + 2OH^-$
(1) hydrogen is reduced
(2) electrons are reduced
(3) water is oxidised
(4) silver is oxidised

23. Which of the following reaction will be favoured at low pressure?
(1) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
(2) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
(3) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$
(4) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

24. Which is Lewis acid?
(1) C_2H_5OH (2) BF_3
(3) Cl^- (4) NH_3

25. Correct formula of borax is:
(1) $Na_2[B_4O_5(OH)_4].8H_2O$
(2) $Na[B_4O_5(OH)_5].8H_2O$
(3) $Na_2[B_4O_5(OH)_4].10H_2O$
(4) $Na_2[B_4O_5(OH)_4].6H_2O$

26. The set representing the correct order of first ionisation potential is:
(1) Ca > Mg > Be
(2) Be > Mg > Ca
(3) Mg > Ca > Be
(4) Be > Ca > Mg

27. Which of the following statements is correct with respect to the property of elements with increase in atomic number in the carbon family (group 14)?
(1) Their metallic character decrease.
(2) The stability of +2 oxidation state increase.
(3) Their ionization energies increase.
(4) Their atomic size decrease.

28. Which of the following is true for diamond?
(1) It is a good conductor of electricity
(2) It is soft
(3) It is a good conductor of heat
(4) It is made up of C, H and O

29. For two weak acid A and B, the ratio of their percent ionization is 4 : 9. The ratio of their K_a would be:
(1) 4: 9
(2) 2: 3
(3) 16: 81
(4) 3: 2

30. **Statement I:** 1g O_2 and 1g O_3 have equal number of atoms.
Statement II: Mass of 1-mole atom is equal to its gram-atomic mass.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct, but Statement II is incorrect.
(3) Statement I is incorrect, but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

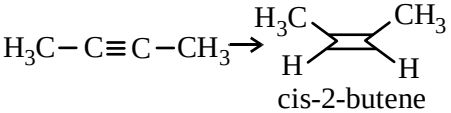
31. **Statement I**: One atomic mass unit is defined as one twelfth of the mass of one carbon – 12 atom.
Statement II: Carbon-12 isotope is not abundant isotope of carbon and has been chosen as standard.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct, but Statement II is incorrect.
(3) Statement I is incorrect, but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

32. **Statement I:** The energy of an electron is mainly determined by principal quantum number.
Statement II: The principal quantum number is the measure of the most probable distance of finding the electron around the nucleus.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct, but Statement II is incorrect.
(3) Statement I is incorrect, but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

33. Aluminium does not oxidise readily in air because-
(1) it is high in the electrochemical series
(2) it is low in the electrochemical series
(3) metal does not combine with oxygen
(4) metal is covered with a layer of oxide which does not rub off

34. Ozonolysis of 3-methyl-1-butene gives a mixture of _____.
(1) Propanal and ethanol
(2) Propanone and ethanol
(3) 2-Methylpropanal and methanal
(4) Butanone and methanal

35. The most suitable reagent for the following conversion is:



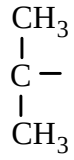
cis-2-butene
(1) Na/liquid NH_3
(2) H_2, Pd/C, quinoline
(3) Zn/HCl
(4) Hg^{2+}/H^+, H_2O

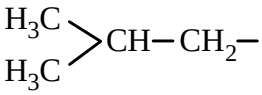
SECTION - B

36. The compound having isobutyl group among the following is:

(1) $CH_3-CH_2-CH_2-CH_3$

(2) $CH_3-CH_2-CH_2-CH_2$

(3) 

(4) 

37. Which of the following is a redox reaction?

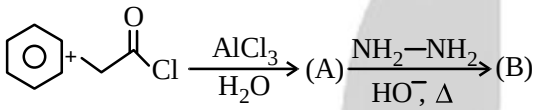
(1) $NaCl + KNO_3 \rightarrow NaNO_3 + KCl$

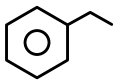
(2) $CaC_2O_4 + 2HCl \rightarrow CaCl_2 + H_2C_2O_4$

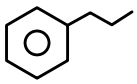
(3) $Mg(OH)_2 + 2NH_4Cl \rightarrow MgCl_2 + 2NH_4OH$

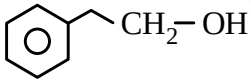
(4) $Zn + 2AgCN \rightarrow 2Ag + Zn(CN)_2$

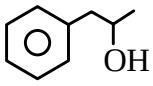
38. Product (B) in the below mentioned reaction is:



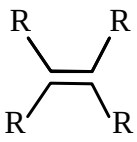
(1) 

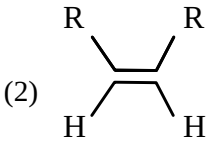
(2) 

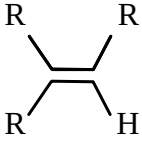
(3) 

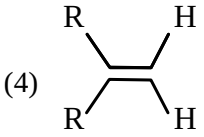
(4) 

39. Which of the following alkenes will react faster with H_2 under catalytic hydrogenation conditions:
[R = Alkyl Substituent]

(1) 

(2) 

(3) 

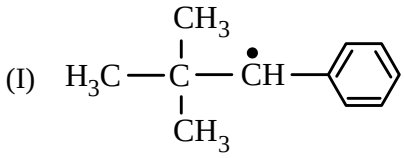
(4) 

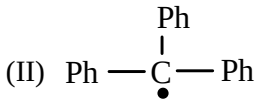
40. The dihedral angle of the least stable conformer of ethane is:

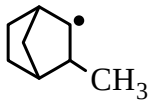
(1) 60° (2) 0°

(3) 120° (4) 180°

41. Consider the following compounds.

(I) 

(II) 

(III) 

Hyperconjugation occurs in:

(4) II only (2) III only

(3) I and III (4) I only

42. The Prussian blue colour obtained during the test of nitrogen by Lassaigne's test is due to the formation of

(1) $Fe_4[Fe(CN)_6]_3$

(2) $Na_3Fe(CN)_6]$

(3) $Fe(CN)_3$

(4) $Na_4[Fe(CN)_5NOS]$

43. The element having greatest difference between its first and second ionization energies, is

(1) Ca (2) Sc

(3) K (4) Ba

44. pH of 10^{-2} M $Ca(OH)_2$ aqueous solution is nearly

(1) 1.7 (2) 2

(3) 12.3 (4) 13.6

45. In the reaction $I_2 + I^- \rightarrow I_3^-$, the Lewis base is:

(1) I_3^- (2) I_2

(3) I^- (4) None of these

46. Following reaction occurs in an automobile

$2C_8H_{18}(g) + 25O_2(g) \rightarrow 16CO_2(g) + 18H_2O(g)$

The sign of ΔH, ΔS and ΔG would be:

(1) +, –, + (2) –, +, –

(3) –, +, + (4) +, +, –

47. Match **List-I** with **List-II** to find out the **correct** option.

List I		**List II**	
(A)	Equilibrium	(I)	$\Delta G > 0, K < 1$
(B)	Spontaneous reaction	(II)	$\Delta G = 0$
(C)	Non-Spontaneous reaction	(III)	$\Delta G^\circ = 0$
		(IV)	$\Delta G < 0, K > 1$

(1) (A) – (II), (B) – (III), (C) – (I)
(2) (A) – (I), (B) – (II), (C) – (III)
(3) (A) – (IV), (B) – (I), (C) – (III)
(4) (A) – (II), (B) – (IV), (C) – (I)

48. Enthalpy of formation of HF and HCl are –161 kJ and –92 kJ respectively. Which of the following statements is **incorrect**?
(1) HCl is more stable than HF.
(2) HF and HCl are exothermic compounds.
(3) The affinity of fluorine to hydrogen is greater. than the affinity of chlorine to hydrogen
(4) HF is more stable than HCl.

49. The transition elements have a characteristic electronic configuration which can be represented as:
(1) $(n-2)s^2p^6d^{1-10}\ (n-1)s^2p^6\ ns^2$
(2) $(n-2)s^2p^6d^{1-10}(n-1)s^2p^6d^{1\text{ or }2}\ ns^1$
(3) $(n-1)s^2p^6d^{10}ns^2\ np^6\ nd^{1-10}$
(4) $(n-1)s^2p^6d^{1-10}\ ns^{1\text{ or }2}$

50. Which of the following is a d-block element?
(1) Fr (2) Al
(3) Zn (4) Ge