

Bhavan's Tripura Vidyamandir
1st Terminal Examination : (2024-2025)

Class:- 11

Time:- 3 Hours

Name of the student :

Subject:- Chemistry

Total :- 70 Marks

Roll: Stream:

General Instructions :

Read the following instructions carefully :

1. There are 33 questions in this question paper with internal choice.
2. SECTION A consists of 16 questions carrying 1 mark each.
3. SECTION B consists of 5 short questions carrying 2 marks each.
4. SECTION C consists of 7 short answer questions carrying 3 marks each.
5. SECTION D consists of 2 Case study based questions carrying 4 marks each.
6. SECTION E consists of 3 long answer questions carrying 5 marks each.
7. All questions are compulsory.

SECTION A

1. If the concentration of glucose($C_6H_{12}O_6$) in blood is 0.9g/L molarity of glucose in blood will
(a) 5M (b) 50M (c) 0.005M (d) 0.5M
2. Which of the following contains the same number of carbon atoms as are in 6.0g of carbon(C-12) :
(a) 6.0g Ethane (b) 8.0g Methane (c) 21.0g Propane (d) 28.0g CO
3. The number of angular nodes for 4d orbital is:
(a) 4 (b) 3 (c) 2 (d) 1
4. For which of the following sets of quantum numbers, an electron will have the highest energy
(a) 3, 2, +1, +1/2 (b) 4, 2, -1, +1/2
(c) 4, 1, 0, -1/2 (d) 5, 0, 0, +1/2
5. In hydrogen atom, energy of first excited state is -3.4eV. Then KE of same orbit of hydrogen atom:
(a) -13.6eV (b) 6.8eV (c) +13.6eV (d) 3.4eV
6. The correct order of increasing values of second ionization potential of C, N, O and F is :
(a) C > N > F > O (b) C < F < N < O
(c) C < O < F < N (d) C < N < F < O
7. The increasing order of electron affinity values of O, S and Se is :
(a) O < S < Se (b) S < O < Se (c) Se < S < O (d) O < Se < S
8. Amongst H_2O , H_2Se and H_2Te the one with the highest boiling point is :
(a) H_2O because of hydrogen bonding. (b) H_2Te because of higher molecular weight.
(c) H_2S because of hydrogen bonding. (d) H_2Se because of lower molecular weight.
9. Atomic orbitals of Carbon in Carbon dioxide are :
(a) sp hybridised (b) sp^3d hybridised
(c) sp^2 hybridised (d) sp^3 hybridised
10. Which of the following has Zero dipole moment :
(a) ClF (b) PCl_3 (c) SiF_4 (d) Cl_3CF
11. The oxidation number of Cl in Cl_2O_7 is :
(a) +7 (b) +5 (c) +3 (d) -7
12. Values of standard electrode potential of three metals X, Y and Z are -1.2V, +0.5V and -3.0V respectively. The reducing power of these metals will be in order:
(a) $X > Y > Z$ (b) $Y > Z > X$ (c) $Y > X > Z$ (d) $Z > X > Y$

Directions :- Question no 13 to 16 contain two statements, Assertion and Reason, each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c), (d) given below :-

- (a) Assertion is correct, reason is correct, reason is a correct explanation for assertion.
- (b) Assertion is correct, reason is correct, reason is not a correct explanation for assertion.
- (c) Assertion is correct, reason is incorrect.
- (d) Assertion is incorrect, reason is correct.

13. Assertion :- The position of an electron can be determined exactly With the help of an electron microscope.

Reason :- The product of uncertainty in the measurement and the uncertainty in the measurement of the position cannot be less than a finite limit.

14. Assertion :- Atomic Size increases along a period.

Reason :- Effective nuclear charge increases as the atomic number increases resulting in the increased attraction of electrons to the nucleus.

15. Assertion :- In a redox reaction, the oxidation number of oxidant decreases while that of reductant increases.

Reason :- Oxidant gains electrons and reductant loses electrons.

16. Assertion :- HClO_4 is a stronger acid than HClO_3 .

Reason :- Oxidation state of Cl in HClO_4 is +VII and in HClO_3 is +V.

SECTION B

17. State and Explain law of Multiple proportions?

18. An atom of an element contains 29 electrons and 35 neutrons. Deduce

- (i) the number of protons and
- (ii) the electronic configuration of the element ?

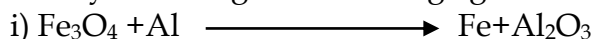
19. Which one is more volatile O-nitrophenol or P-nitrophenol explain?

20. What is Dipole moment ? Write its SI unit ?

OR

Which out of NH_3 and NF_3 has higher dipole moment and why?

21. Identify oxidizing and reducing agent in the following reaction :-



SECTION C

22. A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96g what are its empirical and molecular formulas ?

23. Calculate the concentration of nitric acid in moles per litre in a sample which has a density, 1.41g/ml and the mass percent of nitric acid in it being 69%? What is limiting reagent? (2+1)

OR

Calculate the amount of carbon dioxide that could be produced when:-

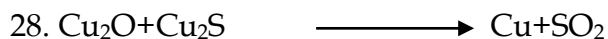
- (a) 1 mole of carbon is burnt in air.
- (b) 1 mole of carbon is burnt in 16g of dioxygen.
- (c) 2 moles of carbon are burnt in 16g of dioxygen.

24. State and explain Heisenberg's uncertainty Principle ? Write electronic configuration of Co? (2+1)

25. Define electron gain enthalpy ? Compare electron gain enthalpy of O and F ? (1+2)

26. Draw the geometry and shape of ClF_3 molecule ? Following molecules are not exist explain by MOT. (i) He (ii) Be

27. What is H-bond? What is octate rule? Give example of molecule where octate rule is not obeyed ?



Explain that the above reaction is a redox ? Calculate oxidation number of underlined atom :-



SECTION D

29. Orbitals are regions or spaces where there is a maximum probability of finding electrons. Qualitatively, these orbitals can be distinguished by their size, shape and orientation. An orbital of small size means there is more chance of finding the electron near the nucleus. Atomic orbitals can be distinguished by quantum numbers. Each orbital is designated by three quantum numbers n, l and m_l . spin quantum number (m_s) determines the spin of electrons.

(i) Describe the orbitals represented by (a) $n=2, l=1$ (b) $n=4, l=0$? (1+1)

(ii) What is the total number of orbitals associated with the principal quantum number $n=3$? (1)

(iii) How many electrons in an atom may have the following quantum numbers :-

(a) $n=3, l=0$? (1)

30. Kossel and Lewis in 1916 developed an important theory of chemical combination between atoms known as electronic theory of chemical bonding. According to this atoms can combine either by transfer of valence electrons from one atom to another (gaining or losing) or by sharing of valence electrons in order to have an octet in their valence shells. The formation of multiple bonds envisages sharing of more than one electron pair between two atoms. The Lewis dot structures provide a picture of bonding in molecules and ions in terms of the shared pairs of electrons and the octet rule.

(i) Draw the lewis dot structure of (a) CO_3^{2-} (b) SO_4^{2-} ? (2)

(ii) Mention one limitation of octet rule? (1)

(iii) Give one example of molecule where three electron pairs share for chemical bonding ? (1)

SECTION E

31. What is the percentage of C, H, O in ethanol ? How many moles of methane are required to produce 22g CO_2 (g) after combustion ? Calculate the number of atoms in 52g of He ? (2+2+1)

OR

Calculate the molarity of NaOH in the solution prepared by dissolving its 4g in enough water to form 250ml of the solution? Define molecular mass and formula unit mass ? What is amu ? (2+2+1)

32. Give example of :-

(a) Inner transition elements and

(b) Representative elements? B forms $[\text{BF}_4]^-$ but Al forms $[\text{AlF}_6]^{3-}$ explain? What do you mean by diagonal relationship? (2+2+1)

33. Give an example of redox reaction Which is also a

(i) Decomposition reaction and

(ii) Disproportionation reaction? Write the net ionic equation for the reaction of potassium dichromate(VI), $\text{K}_2\text{Cr}_2\text{O}_7$ With sodium sulphite, Na_2SO_3 in an acid Solution to give chromium

(iii) ion and the sulphate ion and balance the equation? (2+3)