



CTS - SAT 2022

CTS ACADEMY SCHOLARSHIP – CUM – ADMISSION TEST

MOCK TEST PAPER (Chemistry)

Time: 60 Minutes

Class: 11th Moving to 12th

Max. Marks: 160

INSTRUCTIONS

➤ **PLEASE READ THE INSTRUCTIONS CAREFULLY :**

A. General:

1. This Booklet is your Question Paper. Answers have to be marked on a separate sheet. Write your **NAME, ROLL NO.** and **CONTACT NUMBER** clearly on the Answer Sheet.
2. **Darken** the appropriate bubbles with **Blue/Black Ball Point only**. Use of Pencil is strictly prohibited.
3. No additional sheets will be provided for rough work.
4. Blank paper, Clipboards, Calculators, Cellular Phones and Electronic Gadgets in any form are not allowed.
5. Do not tamper/spoil the test sheet.

B. Question Paper Format & Marking Scheme:

1. The Question Paper consists of total **40 questions.**
2. Each question carries **4 marks.**
3. There will be **negative marking** of one mark.

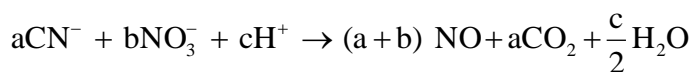
COMPETE TO SUCCEED

Best of Luck !!!



- Q.1. Which of the following is the correct ground state electronic configuration of element belonging to transition series?
(a) $1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^2$
(b) $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^2, 4s^2$
(c) $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^2$
(d) $1s^2 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^1$
- Q.2. Which of the following is the correct order of radii?
(a) $N < Be < B$
(b) $F^- < O^{2-} < N^{3-}$
(c) $Na < Li < K$
(d) $Fe^{3+} < Fe^{2+} < Fe^{4+}$
- Q.3. Which of the following represents the correct order of first ionization energy is:
(a) $K > Na > Li$
(b) $Be > Mg > Ca$
(c) $B > C > N$
(d) $Ge > Si > C$
- Q.4. Calculate the number of lone pair of electron present on Se in SeO_3^{2-} ?
(a) 0
(b) 1
(c) 2
(d) 3
- Q.5. Which one of the following molecules are formed by p-p overlapping?
(a) Cl_2
(b) HCl
(c) H_2O
(d) NH_3
- Q.6. The hybridization of terminal carbon in C_3O_2 , is:
(a) sp
(b) sp^2
(c) sp^3
(d) dsp³
- Q.7. Which reaction forms a product with a trigonal planar geometry?
(a) $N_2 + 3H_2 \rightarrow$
(b) $2CO + O_2 \rightarrow$
(c) $PCl_3 + Cl_2 \rightarrow$
(d) $2SO_2 + O_2 \rightarrow$
- Q.8. A triple bond is found in which of the following species?
(P) CO
(Q) C_2H_2
(R) CN^-
(a) P only
(b) Q only
(c) P and Q only
(d) P, Q and R
- Q.9. Which of the following hydride is/are "electron-precise" type?
(a) HF
(b) H_2O
(c) SiH_4
(d) PH_3
- Q.10. Permanent hardness in water cannot be treated by:
(a) treatment with washing soda
(b) calgon's method
(c) boiling
(d) ion exchange method
- Q.11. In aqueous solution, the largest ion is:
(a) $Na^+(aq)$
(b) $Cs^+(aq)$
(c) $Rb^+(aq)$
(d) $Li^+(aq)$
- Q.12. Find the value of oxidation state of Co in $Ag[Co(CO)_4]$:
(a) 1
(b) -1
(c) Zero
(d) None of these
- Q.13. Which statement is wrong?
(a) Oxidation number of oxygen is -1 in peroxides
(b) Oxidation number of oxygen is +2 in oxygen difluoride
(c) Oxidation number of oxygen is $+\frac{1}{2}$ in superoxides
(d) Oxidation number of oxygen is (-2) in most of its compounds
- Q.14. Consider the salt $K_xH_y(C_2O_4)_z \cdot 2H_2O$.
The relationship between x, y and z is:
(a) $x + y - z = 0$
(b) $x + y = 2z$
(c) $x + y + z = 0$
(d) none of these

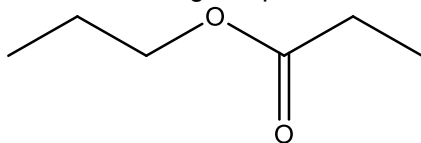
Q.15. CN^- is oxidized by NO_3^- in presence of acid:



What are the values of a, b, c in that order:

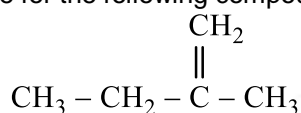
- (a) 3, 7, 7 (b) 3, 10, 7 (c) 3, 10, 10 (d) 3, 7, 10

Q.16. The IUPAC name of the following compound is:



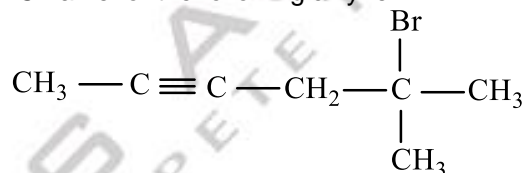
- (a) n-propyl ethanoate (b) ethyl propanoate
(c) pentanoic anhydride (d) n-propyl propanoate

Q.17. What is the IUPAC name for the following compound?



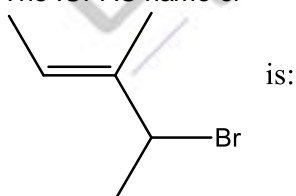
- (a) 2-methyl-1-butene
(b) isopentene
(c) 2-methylbutene
(d) 2-ethylpropene

Q.18. What is the IUPAC name for the following alkyne?



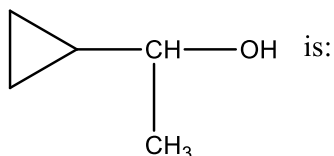
- (a) 5-bromo-2-heptyne (b) 3-bromo-5-heptyne
(c) 2-bromo-2-methyl-4-hexyne (d) 5-bromo-5-methyl-2-hexyne

Q.19. The IUPAC name of



- (a) 2-bromo-3-methylbut-3-ene
(b) 4-bromo-3-methylpent-2-ene
(c) 2-bromo-3-methylpent-3-ene
(d) 4-bromo-2,3-dimethylbut-2-ene

Q.20. The IUPAC name of



- (a) 1-hydroxy-1-cyclopropylethane (b) 1-hydroxyethylcyclopropane
(c) 2-cyclopropylethanol (d) 1-cyclopropylethanol

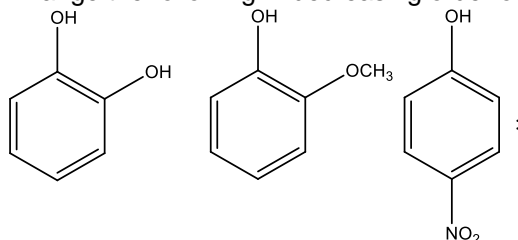
Q.21. Which of the following carbocation is most stable?

- (a) $\text{CH}_3 - \overset{+}{\text{C}}\text{O}$ (b) $\text{CH}_3 - \overset{\oplus}{\text{C}}\text{H}_2$ (c) $\text{CH}_3 - \text{CH}_2 \overset{\oplus}{\text{C}}\text{H}_2$ (d) $\text{CH}_2 = \overset{+}{\text{C}}\text{H}$

Q.22. Which of the following alkene is least stable?

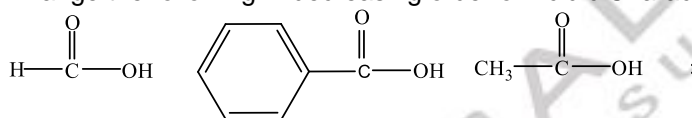
- (a) Ethylene (b) Cis-2-butene
(c) Trans-2-butene (d) 2,3-Dimethyl-2-butene

Q.23. Arrange the following in decreasing order of Acidic Character



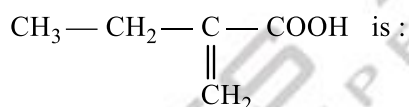
- (P) (Q) (R)
- (a) $P > Q > R$ (b) $R > Q > P$ (c) $Q > P > R$ (d) $P > R > Q$

Q.24. Arrange the following in decreasing order of Acidic Character



- (P) (Q) (R)
- (a) $R > Q > P$ (b) $Q > P > R$
(c) $P > Q > R$ (d) $Q > R > P$

Q.25. The correct IUPAC name of



- (a) 2-Methyl butanoic acid (b) 2-Ethylprop-2-enoic acid
(c) 2-Carboxy-1-butene (d) None of these

Q.26. If CO_2 gas approximately occupies 0.06% of air, then the no. of molecules which are present in 500ml of air at NTP will be equal to

- (a) 1.8×10^{20} (b) 4×10^{18}
(c) 6×10^{20} (d) 8×10^{18}

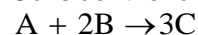
Q.27. You are given 1.568 g of Mohr's salt. What will be the number of atoms of oxygen present in it.

- (a) 3.36×10^{22} (b) 1.68×10^{22} (c) 4×10^{23} (d) 2.4×10^{21}

Q.28. You are given 3.6L of carbon monoxide present at NTP. What will be the volume of oxygen required for its completed combustion at STP.

- (a) 3.6 L (b) 7.2 L (c) 1.8 L (d) 0.5 L

Q.29. Consider the following reaction



If you are given 3 moles of A and 5 moles of B then no. of moles of 'C' produced will be

- (a) 9 moles (b) 6 moles (c) 7.5 moles (d) 8 moles

Q.30. What quantity of hydrogen sulphide will be required for precipitation of 15.875 g Cu^{2+} .

(Molar Mass of $\text{Cu} = 63.5 \text{ g mol}^{-1}$)

- (a) 34 g (b) 17 g (c) 8.5 g (d) 4.25 g



- Q.31. Calculate molecular weight of a compound if 100 ml of a 2 M solution contains 11.7 g that compound.
(a) 20 (b) 58.5 (c) 23.4 g (d) 46.8 g
- Q.32. What volume of H₂ gas is liberated at STP if for dissolving 16.8 g of a metal exactly 14.7 g H₂SO₄ is required.
(a) 11.2 L (b) 5.6 L (c) 4.48 L (d) 3.36 L
- Q.33. Bohr's model was based on hydrogen atom. If the ionisation potential of the ground state of hydrogen atom is 2.17×10^{-11} erg per atom then calculate the wavelength (in angstrom) of the photon that is emitted when an electron in Bohr orbit $n = 2$ returns to the orbit $n = 1$ in the hydrogen atom..
(a) 1220 (b) 610 (c) 2440 (d) 305
- Q.34. According to Heisenberg uncertainty principle it is not possible to exactly calculate the exact position and exact momentum simultaneously. If a particle of mass 1.1×10^{-27} kg has uncertainty in its position 3×10^{-10} cm, then calculate the minimum uncertainty in velocity
(a) 1.6×10^3 m/s (b) 1.6×10^4 m/s (c) 1.6×10^5 m/s (d) 1.6×10^6 m/s
- Q.35. Find the total mass of neutrons in 7 mg of ¹⁴C. (Assume the mass of a neutron = mass of a hydrogen atom)
(a) 4 mg (b) 4 μ g (c) 4 g (d) 4 kg
- Q.36. Assume that 10^{-17} J of light energy is needed by the interior of the human eye to see an object. How many photons of green light ($\lambda = 495$ nm) are needed to generate this minimum energy?
(a) 2.5 (b) 25 (c) 1.5 (d) 15
- Q.37. If the shortest λ of hydrogen atom in Lyman series is x, the longest λ in Balmer series of He⁺ is
(a) $\frac{x}{4}$ (b) $\frac{9x}{5}$ (c) $\frac{6x}{5}$ (d) $\frac{36x}{5}$
- Q.38. For which of the following species, Bohr's theory does not apply?
(a) H (b) H⁺ (c) He⁺ (d) Li²⁺
- Q.39. The energy of the second Bohr orbit in the hydrogen atom is -3.41 eV. The energy of the second Bohr orbit of He⁺ ion would be
(a) -0.85 eV (b) -13.64 eV
(c) -1.70 eV (d) -6.82
- Q.40. The orbital angular momentum of an electron in 2s orbital is
(a) $+\frac{1}{2} \cdot \frac{h}{2\pi}$ (b) zero (c) $\frac{h}{2\pi}$ (d) $\sqrt{2} \frac{h}{2\pi}$