Question Booklet Series: **A** ***Question Booklet Serial No.:*** **111778**

CET (UG) – 2021

Important: *Please consult your Admit Card/Roll No. slip before filling your Roll Number on the Test Booklet and Answer Sheet.*

Roll No. ***(In Figure)*** ***(In Words)***

O.M.R. Answer Sheet Serial No.

Signature of Candidate: _____ *Signature of Invigilator:* _____

SUBJECT: CHEMISTRY

Time: 70 Minutes **Number of Questions: 60** **Maximum Marks: 120**

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO.

INSTRUCTIONS:

1. Write your Roll No. on the Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Question Booklet Serial No. on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point/Black Gel Pen**.
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. The medium of examination shall be **English** only.
5. Please check that this Question Booklet contains **60** Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
6. Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point/Black Gel Pen.**
7. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
9. **Negative marking will be adopted for evaluation i.e. 1/4th of the marks of the question will be deducted for each wrong answer. A wrong answer means incorrect answer or wrong filling of bubble.**
10. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
11. For rough work only the blank sheet at the end of the Question Booklet be used.
12. The Answer Sheet is designed for computer evaluation. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e. not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
15. **20 minutes** extra should be given to the visually handicapped/Person with Disability (PwD) for each paper.
16. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
17. Tele-communication equipment such as Cellular phones, pager, wireless, scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. **Use of calculators is not allowed**.
18. The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

(CHM-A)

1. The correct IUPAC name of the compound given below is:

(A) 2-Methyl-4- pentyn- 2- ol (B) 4-Methyl-1- pentyn- 4- ol
(C) 4-Hydroxy- 4- methyl- 1- pentyne (D) 4-Hydroxy-4-dimethyl-1-butyne

2. The increasing order of following carbanionsare (least stable first)

$\bar{C}H_3$ (I) $(CH_3)_2\bar{C}H$ (II) $\bar{C}H2NO_2$ (III) $(CH_3)_3\bar{C}$ (IV)

(A) II < III < IV < I (B) I< III < IV < II
(C) III < I < II < IV (D) IV < II < I < III

3. How many structural isomers are possible for pentane?
(A) Two (B) Five (C) Three (D) Four

4. Which of the following alkene will give only acetone and acetaldehyde on ozonolysis?
(A) 2-Methyl-2-butene (B) 2-Methyl-1-butene
(C) 2-Pentene (D) 3-Pentene

5. The best reagent for conversion of 2-butyne to trans-2 butene is
(A) H_2 / Raney Ni (B) H_2 / PtO_2
(C) H_2 / Lindler catalyst (D) Li / Liq. NH_3

6. The major product of reaction of benzene with propene in presence of conc. H_2SO_4 is
(A) *n*- Propylbenzene (B) Ethyl benzene
(C) I*so*- Propyl benzene (D) Styrene

7. Which of the following compound is least reactive towards nucleophilic substitution S_N1 or S_N2 mechanism?
(A) CH_3CH_2Br (B) CH_2=CHBr
(C) $(CH_3)_3CBr$ (D) $(CH_3)_2CHBr$

8. Hydroboration oxidation of 1-butene give
(A) 1-Butanol (B) Butanone
(C) 2-Butanol (D) Butanal

9. Which of the following ether cannot be prepared by Williamson's ether synthesis?
(A) Methoxy benzene zcid (B) Diethyl ether
(C) iso-Propyl methyl ether (D) Di-tert-butyl ether

10. In reaction of phenol with $CHCl_3$ and KOH at 70°C the attacking species on the benzene ring is:
(A) $\overset{\ominus}{C}Cl_3$ (B) $:CCl_2$ (C) $\overset{\oplus}{C}HCl_2$ (D) $COCl_2$

11. Which of the following compound will not respond to Cannizzaro's reaction?
(A) Benzaldehyde (B) Acetaldehyde
(C) Formaldehyde (D) Trimethyl acetaldehyde

12. Which of the following carbonyl compound will respond to iodoform test?
(A) Benzaldehyde (B) Acetophenone
(C) Formaldehyde (D) Trimethyl acetaldehyde

13. Benzoic acid can be prepared by the hydrolysis of
(A) Benzyl chloride (B) Benzyl chlorite
(C) Benzonitrile (D) Chlorobenzene

14. Primary, secondary and tertiary amine can be distinguished by use of
(A) Baeyer's reagent (B) Fehling Solution
(C) Hinsberg reagent (D) Tollen's reagent

15. Which one of the following is the weakest base?
(A) Methyl amine (B) Trimethyl amine
(C) Aniline (D) Dimethyl amine

16. Iodobenzene (C_6H_5I) can be synthesized in the laboratory by
(A) Reaction of bromobenzene with sodium iodide in dry acetone.
(B) Reaction of phenol with hydroiodic acid.
(C) Direct iodination of benzene.
(D) Reaction of benzenediazonium chloride with potassium iodide.

17. Which carbohydrate is essential constitution no plant cell
(A) Cellulose (B) Starch (C) Glucosee (D) Maltose

18. The bond which is responsible for the secondary structure of protein is
(A) Ionic bond (B) Co-ordinate bond
(C) Covalent bond (D) Hydrogen bond

19. Natural rubber is a polymer of
(A) Ethylene (B) Styrene (C) Isoprene (D) Vinyl chloride

20. Oils and fats are esters formed by the reaction of glycerol with
(A) Amino acids (B) Sulphonic acids
(C) Aromatic acids (D) Long chain aliphatic acids

21. Which of the following has least number of atoms?
(A) 1 g of Ag (B) 1 g of Na (C) 1 g of K (D) 1 g of Br_2

22. Calculate the normality of 0.5 M H_3PO_3 acid.
(A) 1.5 N (B) 1.0 N (C) 41 N (D) 13.66

23. Calculate the maximum number of emission lines when the excited electron of hydrogen atom falls from n=6 to ground state.
(A) 21 (B) 18 (C) 15 (D) 13

24. Which of the following is isotone of $^{16}_{8}O$?
(A) $^{18}_{8}O$ (B) $^{14}_{6}C$ (C) $^{14}_{7}N$ (D) $^{14}_{8}O$

25. Which of the following is most acidic?
(A) P_2O_5 (B) As_2O_3 (C) Sb_2O_3 (D) Bi_2O_3

26. Which of following has maximum bond length?
(A) ClO_4^- (B) SO_4^{2-} (C) PO_4^{3-} (D) SiO_4^{4-}

27. Out of O_2, NO, NO^+, and O_2^{2-}, which is/are paramagnetic species?
(A) O_2 (B) O_2 and NO (C) NO (D) O_2^{2-} and NO^+

28. Predict the oxidizing agent in the titration of H_2O_2 and $KMnO_4$ in the presence of H_2SO_4,
(A) $KMnO_4$ (B) H_2O_2
(C) H_2SO_4 (D) Both H_2SO_4 and H_2O_2

29. Choose the correct order of stability of following.
(A) $CsO_2 > RbO_2 > KO_2$ (B) $RbO_2 > CsO_2 > KO_2$
(C) $KO_2 > RbO_2 > CsO_2$ (D) $CsO_2 > KO_2 > RbO_2$

30. What is number of moles of OH^- ions formed when one mole sodium carbonate is hydrolyzed?
(A) 1 (B) 2 (C) 3 (D) 4

31. Which of the following is not a protonic acid?
(A) H_3BO_3 (B) H_3PO_4 (C) H_2SO_4 (D) H_3PO_3

32. Which of the following does not exist?
(A) $GeCl_6^{2-}$ (B) $SiCl_6^{2-}$ (C) CCl_6^{2-} (D) $SnCl_6^{2-}$

33. Which of the following is a metaphosphoric acid?
(A) $H_3P_3O_9$ (B) H_3PO_3 (C) $H_9P_2O_7$ (D) H_3PO_4

34. Which of the following is a chalcogen?
(A) Na (B) Ba (C) Se (D) Si

35. What is the shape of XeO_3?
(A) T-shaped (B) Triangular planar
(C) Bent (D) Trigonal pyramidal

36. Which of the following ore is concentrated by electromagnetic separation?
(A) Bauxite (B) Cassiterite (C) Zinc blende (D) Cinnabar

37. Which of the following exists as a pair of enantiomers?
(A) $[Co(NH_3)_5Cl]Cl_2$ (B) trans-$[Co(en)_2Cl_2]^+$
(C) $[Co(NH_3)_4Cl_2]^+$ (D) $[Cr(en)_3]^{3+}$

38. Which of the following product is formed when silver chloride is dissolved in methylamine?
(A) $Ag(OH)_2$ (B) $[Ag(CH_3NH_2)_2]Cl$
(C) AgOH (D) $[Ag(H_2O)_6]^+$

39. Which of the following has magnetic moment of 4.89 BM?
(A) Cr^{2+} (B) Mn^{2+} (C) Co^{2+} (D) Ni^{2+}

40. Which of the following group elements are generally used to make super-conductors?
(A) p-block elements (B) d-block elements
(C) Actinides (D) Lanthanides

41. How much of NaOH is required to neutralise 1500 cm^3 of 0.1 N HCl? (Na = 23)
(A) 40 g (B) 4 g (C) 6 g (D) 60 g

42. If n = 6, the correct sequence of filling of electrons will be
(A) $ns \rightarrow np \rightarrow (n-1)d \rightarrow (n-2)f$ (B) $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$
(C) $ns \rightarrow (n-1)d \rightarrow (n-2)f \rightarrow np$ (D) $ns \rightarrow (n-2)f \rightarrow np \rightarrow (n-1)d$

43. The correct order of decreasing second ionization enthalpy of Ti (22), V (23), Cr (24) and Mn (25) is
(A) Mn> Cr > Ti > V (B) Ti > V > Cr >Mn
(C) Cr >Mn> V > Ti (D) V >Mn> Cr > Ti

44. If two gases X and Y have their molecules travelling at the average velocities in the ratio of 3:1, the ratio of their molecular masses M_X/M_Y will be
(A) 1/9 (B) 9 (C) 3 (D) 1/3

45. If volume of gas is very large, then the second virial coefficient B in virial equation is
(A) b + (a/RT) (B) b - (a/RT) (C) b + (a/RTV) (D) b - (a/RTV)

46. Slope of the plot between PV and P at constant temperature is
(A) Zero (B) 1 (C) ½ (D) $1/\sqrt{2}$

47. Enthalpy of the reaction is given as
(A) $H = U + pV$ (B) $H = U - pV$
(C) $\Delta H = \Delta U + p\Delta V$ (D) $\Delta H = \Delta U - p\Delta V$

48. If $\Delta_f G^\circ$ for NH_3 (g) is -16.4 kJ mol^{-1}, then ΔG° for the reaction: $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ is
(A) 32.8 $kJmol^{-1}$ (B) 16.4 $kJmol^{-1}$
(C) -16.4 $kJmol^{-1}$ (D) -32.8 $kJmol^{-1}$

49. For the reaction C_3H_8 (g) + 5 $O_2(g) \rightarrow 3CO_2$ (g) + $4H_2O$ (l) at constant temperature, $\Delta H - \Delta U$ is
(A) +RT (B) -3RT (C) +3RT (D) -RT

50. The number of hydroxyl ions in 100 ml of a solution having pH 10 is
(A) 1×10^4 (B) 3.012×10^4 (C) 6.02×10^{18} (D) 6.02×10^{19}

51. In which of the following acid-base titration, pH is greater than 8 at the equivalence point?
(A) Acetic acid versus ammonia
(B) Acetic acid versus sodium hydroxide
(C) Hydrochloric acid versus ammonia
(D) Hydrochloric acid versus sodium hydroxide

52. Which defect brings in decrease in density of the crystal?
(A) Schottky (B) Frenkel (C) F-centre (D) Interstitial

53. The coordination number of Ca^{2+} ion in fluorite crystal is
(A) 2 (B) 8 (C) 6 (D) 4

54. Lowering in vapour pressure is the highest for
(A) 0.2 m urea (B) 0.1 m glucose
(C) 0.1 m $MgSO_4$ (D) 0.1 m $BaCl_2$

55. A 0.5 molal aqueous solution of a weak acid (HX) is 20% ionized. The lowering of freezing point of this solution is: (Given K_f= 1.86 K/m for water)
(A) 0.56 K (B) -0.56 K (C) 1.12 K (D) -1.12 K

56. The electrode potential of an electrode dipped in 0.1 M solution of its own ions is: (Given standard reduction potential = -2.36 V)
(A) -2.41 V (B) +2.41 V (C) -4.82 V (D) None of these

57. The cell Zn/Zn^{2+} (1 M) // Cu^{2+}/Cu (1 M); E°cell = 1.10 V was allowed to be completely discharged at 298 K. The ratio of $[Zn^{2+}]/[Cu^{2+}]$ at this stage is:
(A) 9.65×10^4 (B) antilog (24.08) (C) 37.3 (D) $10^{37.3}$

58. In a first order reaction, the a/(a-x) was found to be 8 after 10 minute. The rate constant is:
(A) (2.303×3log2)/10 (B) (2.303×2log3)/10
(C) 10×2.303×2log3 (D) 10× 2.303 × 3log2

59. In a reaction 2A+B→Product, when concentration of B alone was doubled, the half-life did not change. When the concentration of A alone was doubled, the rate increases by two times. The unit of rate constant of the reaction is:
(A) s^{-1} (B) L mol^{-1} s^{-1} (C) mol L^{-1} s^{-1} (D) no units

60. On adding 1 ml solution of 10% NaCl to 10 ml gold solution in the presence of 0.25 mg of starch, the coagulation is just prevented. Starch has gold number equal to:
(A) 2.5 (B) 0.25 (C) 250 (D) 0.025

x-x-x