CET(UG)-2016

Sr. No. : 130987

Booklet Series Code : A

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

Roll No. *In Figures* *In Words*

O.M.R. Answer Sheet Serial No.

Signature of the Candidate :

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 Question Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Subject and Series Code of Question Booklet 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. To open the Question Booklet remove the Paper Seal gently when asked to do so.
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 answers (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 Sheet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the questions 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 sheets marked "Rough Work" 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. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistance or found giving or receiving assistance 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.
16. **Telecommunication equipment such as pager, cellular phone, wireless, scanner, etc., is not permitted inside the examination hall. Use of calculators is not allowed.**

1. **Under conditions of fixed temperature and amount of gas, Boyle's law requires that :**

   I. $P_1V_1 = P_2V_2$

   II. PV = constant

   III. $P_1/P_2 = V_2/V_1$

   (A) I, II, and III (B) II only

   (C) III only (D) I only

2. **The type of hybridization of each carbon in CH_3CN :**

   (A) sp^2, sp^3 (B) sp^3, sp

   (C) sp^3, sp^2 (D) sp, sp^3

3. **The correct order for ACIDITY values among the following is :**

   (A) $CH_3CH_2COOH < CH_3COOH < C_6H_5CH_2COOH < C_6H_5COOH$

   (B) $CH_3CH_2COOH < CH_3COOH < C_6H_5COOH < C_6H_5CH_2COOH$

   (C) $C_6H_5COOH < C_6H_5CH_2COOH < CH_3CH_2COOH < CH_3COOH$

   (D) $C_6H_5COOH < C_6H_5CH_2COOH < CH_3COOH < CH_3CH_2COOH$

4. **The relative ease of dehydration of alcohols follows the order :**

   (A) Tertiary > Primary > Secondary (B) Tertiary > Secondary > Primary

   (C) Secondary > Primary > Tertiary (D) Secondary > Tertiary > Primary

5. **The product formed when ethanol is treated with sulphuric acid at 413 K :**

   (A) Ethoxyethane (B) Ethene

   (C) Methoxyethane (D) Ethanoic acid

6. **The conversion of nitriles to primary amines can be achieved with the help of following reagent :**

   (A) Cu/HCl (B) Br_2/NaOH

   (C) Br_2/P (D) Na(Hg) C_2H_5OH

7. **Which of the following is NOT a monosaccharide ?**

   (A) Glucose (B) Sucrose

   (C) Ribose (D) Fructose

8. **The polymer obtained by interaction of caprolactum with water is :**

(A) Nylon 6 (B) Bakelite

(C) Dacron (D) Glyptal

9. **Heroin is an example of :**

(A) Antiseptics (B) Tranquilizers

(C) Analgesics (D) Antibiotics

10. **The reaction between toluene and halogen proceeds in the presence of Lewis acid to furnish halotoluenes. This is an example of :**

(A) Electrophilic substitution (B) Electrophilic addition

(C) Nucleophilic addition (D) Free radical substitution

11. **The correct IUPAC name of the given chemical compound is :**

(A) 3,4 Dibromo-5-phenyl pentane (B) 2,3 Dibromo-1-phenyl pentane

(C) 3,4 Dibromo-1-phenyl pentane (D) 3,4 Dibromo-6-phenyl pentane

12. **During the estimation of halogen in Carius method, 0.8g of an organic compound gave 0.188 g of AgBr. The percentage of bromine in the compound is :**

(A) 0.1 (B) 1.0

(C) 10 (D) 100

13. **The number of pi (π) and sigma (σ) bonds in 1,3,5,7 octatetraene are :**

(A) $\pi = 4 ; \sigma = 17$ (B) $\pi = 8 ; \sigma = 8$

(C) $\pi = 17 ; \sigma = 4$ (D) $\pi = 8 ; \sigma = 17$

14. **The maximum prescribed concentration (ppm) of iron in drinking water is :**

(A) 0.002 (B) 0.02

(C) 0.2 (D) 2

15. **Ozone is present in :**

(A) Exosphere (B) Stratosphere

(C) Troposphere (D) Thermosphere

16. **Sodium salt of which acid will be needed for the preparation of propane ?**
(A) Proponic acid
(B) Butanoic acid
(C) Hexanoic acid
(D) Pentanoic acid

17. **HBr added to propene gives :**
(A) 1 - Bromopropane
(B) 2-Bromopropane
(C) 1,1-dibromopropane
(D) 1,3-dibromopropane

18. **Which of the following substituent groups give - R effect ?**
(A) OH
(B) NH_2
(C) COOH
(D) NHR

19. **The oxidation number of carbon in C_3O_2 is :**
(A) 2
(B) 4/3
(C) 3/4
(D) 4

20. **The correct order for decreasing reducing strength among the following is :**
(A) $Li > Na > Ag > Cl^- > I^-$
(B) $I^- > Cl^- > Na > Ag > Li$
(C) $I^- > Na > Ag > Cl^- > Li$
(D) $Li > Na > I^- > Ag > Cl^-$

21. **Dihydrogen is reduced by sodium to form :**
(A) NaH_2
(B) Na_2H
(C) NaH
(D) Na_2H_2

22. **The strength of 100 volume solution of hydrogen peroxide is :**
(A) 3%
(B) 30%
(C) 300%
(D) 0.3%

23. **The energy released per mole (in kJ) on combustion would be highest for :**
(A) LPG
(B) Dihydrogen
(C) CH_4
(D) Octane

24. **The radioactive isotope of water is :**
(A) Deuterium
(B) Protium
(C) Tritium
(D) Deutrium and Protium

25. **The correct order for decrease in ionic sizes among the following is :**

(A) $Li^+ > Na^+ > K^+ > Rb^+ > Cs^+$ (B) $Cs^+ > Rb^+ > K^+ > Na^+ > Li^+$

(C) $Li^+ > K^+ > Rb^+ > Na^+ > Cs^+$ (D) $Cs^+ > K^+ > Rb^+ > Na^+ > Li^+$

26. **In group 14, the most acidic dioxide is formed by :**

(A) Lead (B) Silicon

(C) Carbon (D) Germanium

27. **The correct order of catenation is :**

(A) $C >> Si > Ge \approx Sn$ (B) $C >> Si > Ge > Sn$

(C) $Si > Ge \approx Sn >> C$ (D) $Ge \approx Sn >> C > Si$

28. **$B(OH)_3$ is :**

(A) Tetra basic acid (B) Tribasic acid

(C) Dibasic acid (D) Monobasic acid

29. **In the transitions of the electron in hydrogen atom, Lyman series belong to which spectral region ?**

(A) Infra red (B) Visible

(C) Ultra violet (D) Far infra red

30. **The mass of photon of 3.6 Å wavelength is :**

(A) 6.315×10^{-29} kg (B) 3.157×10^{-29} kg

(C) 6.315×10^{-29} g (D) 3.157×10^{-29} gm

31. **The uncertainty principle was given by :**

(A) Bohr (B) E. Schrodinger

(C) W. Heinsenberg (D) Rutherford

32. **Which of the following is correct ?**

(A) $n=0, \ell=0, m_l=0, m_s=+\frac{1}{2}$ (B) $n=1, \ell=0, m_l=0, m_s=-\frac{1}{2}$

(C) $n=1, \ell=1, m_l=0, m_s=+\frac{1}{2}$ (D) $n=3, \ell=3, m_l=-3, m_s=+\frac{1}{2}$

33. **Which of the following oxidation states is most common for all lanthanides ?**

(A) +4 (B) +3

(C) +2 (D) +1

34. **The most negative electron gain enthalpy among the following is of :**

(A) P (B) S

(C) Cl (D) F

35. **The covalency of Al in $[AlCl(H_2O)_5]^{2+}$ is :**

(A) 5 (B) 2

(C) 6 (D) 3

36. **The correct geometry for BF_3 is :**

(A) Trigonal pyramidal (B) Trigonal planar

(C) Tetrahedral (D) Bent

37. **The correct hybridization of SF_6 is :**

(A) sp (B) sp^3d^1

(C) sp^3d^3 (D) sp^3d^2

38. **The bond order of C_2 is :**

(A) 1 (B) 2

(C) 3 (D) 4

39. **Which of the following is paramagnetic ?**

(A) H_2 (B) C_2

(C) Li_2 (D) O_2

40. **The enthalpies of all elements in their standard states are :**

(A) Unity (B) < 0

(C) Different for each element (D) Zero

41. **The value of K_c for the reaction: $2A \rightleftharpoons B + C$ is 2×10^{-3}. At a given time the concentration of reaction mixture is $[A] = [B] = [C] = 3 \times 10^{-4}$ M. In which direction the reaction will proceed ?**

(A) Forward direction (B) Reverse direction

(C) Steady state (D) Static equilibrium

42. **A Bronsted-Lowry base is defined as a substance that :**

(A) acts as a proton donor (B) increases [H+] when placed in water

(C) acts as a proton acceptor (D) decreases [H+] when placed in water

43. **The pH of a 1.0×10^{-8} M solution of HCl :**

(A) 8
(B) 6
(C) 6.98
(D) 7.02

44. **The packing efficiency in *Cubic Close Packing* structure is :**

(A) 74%
(B) 68%
(C) 52.4%
(D) 45.2%

45. **Raoult's Law describes :**

(A) How the partial pressure of a solvent vapor varies with solute molecular mass
(B) How the partial pressure of solvent vapor varies with solute concentration
(C) How the partial pressure of a gas varies with temperature
(D) How the solubility of a gas varies with pressure

46. **200 cm^3 of an aqueous solution of a protein contains 1.26 g of the protein. The osmotic pressure of such a solution at 27°C is found to be 2.57×10^{-3} bar. The molar mass of the protein is :**

(A) 1,22,078 $g\ mol^{-1}$
(B) 1,00,786 $g\ mol^{-1}$
(C) 86,437 $g\ mol^{-1}$
(D) 61,022 $g\ mol^{-1}$

47. **The units of specific conductance are :**

(A) ohm^{-1}
(B) $ohm^{-1}\ cm^{-1}$
(C) $ohm^{-1}\ cm^3 mol^{-1}$
(D) $ohm^{-1}\ cm^2\ (g\ eq.)^{-1}$

48. **The standard electrode potential for Daniell cell is 1.1 V. The standard Gibbs energy for the reaction following is :**

$$Zn(s) + Cu^{+2}(aq) \rightarrow Zn^{-2}(aq) + Cu(s)$$

(A) $-212.27\ kJ\ mol^{-1}$
(B) $-313.17\ kJ\ mol^{-1}$
(C) $-142.54\ kJ\ mol^{-1}$
(D) $-116.22\ kJ\ mol^{-1}$

49. **If the molar conductance at infinite dilution of NaCl, HCl and CH_3COONa are 126.4, 425.9 and 91.0 S $cm^2\ mol^{-1}$ respectively. The molar conductance at infinite dilution for Acetic acid is :**

(A) 390.5 S $cm^2\ mol^{-1}$
(B) 300.9 S $cm^2\ mol^{-1}$
(C) 290.5 S $cm^2\ mol^{-1}$
(D) 200.9 S $cm^2\ mol^{-1}$

50. **The half-life of a first order reaction is found 1.26×10^{13} sec. The rate constant of the reaction is :**

(A) $k = 1.5 \times 10^{-15}$ sec^{-1}
(B) $k = 5.5 \times 10^{-14}$ sec^{-1}
(C) $k = 5.1 \times 10^{-15}$ sec^{-1}
(D) $k = 1.5 \times 10^{-13}$ sec^{-1}

51. **The rate of a chemical reaction doubles for every 10°C rise of temperature. If the temperature is raised by 50°C, the rate of the reaction increases by about :**

(A) 10 times
(B) 24 times
(C) 32 times
(D) 64 times

52. **The rate constant of a first order reaction depends on the :**

(A) Time
(B) Concentration of the product
(C) Concentration of the reactant
(D) Temperature

53. **The rate constant of a reaction at 500 K and 700 K are 0.02 s^{-1} and 0.07 s^{-1} respectively. The energy of activation is:**

(A) 18.231 kJ
(B) 24.342 kJ
(C) 28.321 kJ
(D) 31.801 kJ

54. **In Freundlich Adsorption isotherm, the value of 1/n is :**

(A) Between 2 and 4 in all cases
(B) Between 0 and 1 in all cases
(C) 1 in case of chemisorption
(D) 1 in case of physical adsorption

55. **Which one of the following is an example for homogenous catalysis ?**

(A) Hydrogenation of oil
(B) Manufacture of ammonia by Haber's process
(C) Manufacture of sulphuric acid by Contact process
(D) Hydrolysis of sucrose in presence of dilute hydrochloric acid

56. **Which one of the following forms micelles in aqueous solution above certain concentration ?**

(A) Sodium Chloride
(B) Glucose
(C) Dodecyl trimethyl ammonium chloride
(D) Urea

57. **Hypochlorous acid is :**

(A) HOCl
(B) HOClO
(C) $HOClO_2$
(D) $HOClO_3$

58. **Which one of the following has an optical isomer ? (en = ethylenediamine)**

(A) $[Zn(en)(NH_3)_2]^{2+}$

(B) $[Co(H_2O)_4(en)]^{3+}$

(C) $[Co(en)_3]^{3+}$

(D) $[Zn(en)_2]^{2+}$

59. **Magnetite is :**

(A) Fe_2O_3

(B) Fe_3O_4

(C) $CuFeS_2$

(D) $CuCO_3.Cu(OH)_2$

60. **P_4O_{10} is the anhydride of :**

(A) H_3PO_2

(B) H_3PO_3

(C) H_3PO_4

(D) $H_4P_2O_7$