CET (UG) – 2018

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. 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.
5. 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.**
6. 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.
7. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
8. **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.**
9. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
10. For rough work only the blank sheet at the end of the Question Booklet be used.
11. 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.**
12. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
13. 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.
14. 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.
15. **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.**
16. The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

1. Which of the following statements contradicts Dalton's atomic theory?

   A) A chemical change involves rearrangement of atoms.
   B) Atoms form ions by gaining or loosing electrons.
   C) The number of atoms may change when a substance changes from solid state to gaseous state.
   D) The total number of atoms during a chemical change remains unaltered.

2. Which of the following compounds of elements in group IV is expected to be most ionic?

   A) $PbCl_2$ B) $PbCl_4$ C) CCl_4 D) $SiCl_4$

3. Among the following isostructural compounds, identify the compound, which has the highest lattice energy:

   A) LiF   B) LiCl   C) NaCl   D) MgO

4. To which of the following species octet rule is applicable:

   A) BrF_5 B) SF_6 C) IF_7 D) CO

5. The species which the central atom uses sp^2 hybrid orbitals in its bonding is:

   A) PH_3 B) NH_3 C) CH_3^+ D) SbH_3

6. Which of the following molecular species has unpaired electron(s)?

   A) N_2 B) F_2 C) O_2^- D) O_2^{2-}

7. The correct set of quantum numbers for the unpaired electron of chlorine atom is:

   n / m

   A) 2 1 0   B) 2 1 1   C) 3 1 1   D) 3 0 0

8. The radius of which of the following orbit is same as that of the first Bohr's orbit of hydrogen atom:

   A) $He^+ (n=2)$ B) $Li^{2+} (n=2)$ C) $Li^{2+} (n=3)$ D) $Be^{3+} (n=2)$

9. Which of the following species have bond order of 3?

   1. N_2 2. NO^- 3. NO^+ 4. C_2^{2-}

   A) 1 and 2   B) 1,2, and 3   C) 1,2 and 4   D) 1,3 and 4

10. The correct arrangement of NH_3, N_2H_4, NH_2OH and CH_3NH_2 in the order of increasing base strength is:

    A) $NH_3 < N_2H_4 < NH_2OH < CH_3NH_2$ B) $NH_2OH < N_2H_4 < NH_3 < CH_3NH_2$
    C) $CH_3NH_2 < NH_3 < N_2H_4 < NH_2OH$ D) $N_2H_4 < NH_2OH < CH_3NH_2 < NH_3$

11. The number of unpaired electron in $NiCl_4^{2-}$ (tetrahedral) are:

    A) Two   B) Zero   C) One   D) Four

12. Which of the following bond angles is not correct for the molecule?

   A) BF_3 is $120°$ B) IF_5 are $120°,90°$ C) SF_6 is $90°$ D) NH_3 is $109.5°$

13. Among the following which one of the following has the highest paramagnetism:

   A) $[Cr(H_2O)_6]^{3+}$ B) $[Fe(H_2O)_6]^{2+}$ C) $[Cu(H_2O)_6]^{2+}$ D) $[Zn(H_2O)_6]^{2+}$

14. Which of the following FCC structure contains cations in alternate tetrahedral voids?

   A) NaCl   B) ZnS   C) Na_2O D) CaF_2

15. In a solid "AB" having NaCl structure "A" atoms occupy the corners of the cubic unit cell. If all the face-centred atoms along one of the axes are removed, then the resultant stoichiometry of the solid is:

   A) AB_2 B) A_2B C) A_4B_3 D) A_3B_4

16. Which has maximum number of atoms of oxygen?

   A) 10 ml H_2O (*l*)   B) 0.1 mole of V_2O_5
   C) 12 gm O_3 (g)   D) 12.044×10^{22} molecules of CO_2

17. Vitamin B_{12} is the coordination compound of:
   A) Mg   B) Fe   C) Co   D) Zn

18. In which of the following reactions, nitrogen is not reduced?

   A) $NO_2 \rightarrow NO_2^-$ B) $NO_3^- \rightarrow NO$ C) $NO_3^- \rightarrow NH_4^+$ D) $NH_4^+ \rightarrow N_2$

19. Borax is used in preparing:

   A) Soda glass   B) Pyrex glass   C) Opal glass   D) Portland cement

20. The expected spin only magnetic moment for $[Fe(CN)_6]^{4-}$ and $[FeF_6]^{3-}$ respectively are:

   A) 1.73 and 1.73 B.M.   B) 1.73 and 5.92 B.M.
   C) 0.0 and 1.73 B.M.   D) 0.0 and 5.92 B.M.

21. The IUPAC name for the formula given below is:
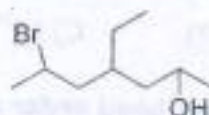
   A) 6-Bromo-4-ethyl-2-heptanol   B) 2-Bromo-4-ethyl-6-heptanol
   C) 4-Ethyl-2-bromo-2-heptanol   D) 4-Ethyl-6-bromo-2-heptanol

22. Which of the following species is not a nucleophilic reagent?

   A) BF_3 B) NH_3 C) CH_3OH D) CH_3SH

23. How many monochloro product are possible in photochemical chlorination of 2, 2 – dimethyl propane?

   A) 1   B) 3   C) 2   D) 4

24. Which of the following alkenes react with HBr in the presence of peroxide to give anti Markovinkov's product?

A) 3-Hexene B) 1-Butene C) 2-Butene D) 2,3-Dimethyl-2-butene

25. Reaction of 1-butene with hypochlorous acid results in formation of:

A) 1-Chloro-2-butanol B) 2-Chloro-1-butanol
C) 2,2-Dichloro-1- butanol D) 1-Chloro-3-butanol

26. Hydration of 1-butyne in presence of H_2SO_4 & $HgSO_4$ results in formation of:

A) 2-Butanone B) 2-Butanol C) Butane-1,2-diol D) Butanal

27. Major product of bromination of n- propylbenzene in presence of light is:

A) B) C) D)
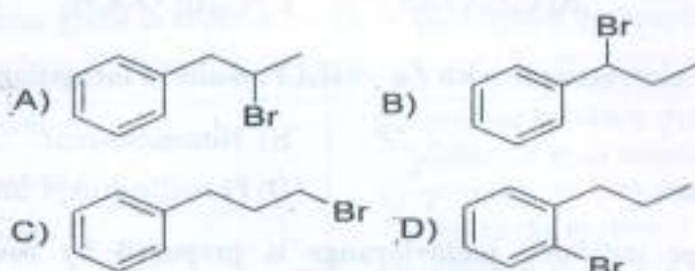
28. The major product formed by the reaction of benzene with propene in presence of Conc. sulphuric acid gives:

A) n-Propyl benzene B) *iso*-Propyl benzene
C) Ethyl benzene D) o-Xylene

29. Which of the following compound gives chloroform on heating with bleaching powder?

A) Ethyl alcohol B) Methyl alcohol C) n-Propyl alcohol D) tert.-Butyl alcohol

30. Which of the following reagent can be used to distinguish between chlorobenzene and benzyl chloride?

A) Br_2 / CCl_4 B) $KMnO_4$ C) Alcoholic $AgNO_3$ D) Alcoholic KCN

31. The best reagent to achieve the following transformation is:

A) BH_3 / H_2O_2 / $\overset{\ominus}{OH}$ B) I. $Hg(OAc)_2$ H_2O-THF / $NaBH_4$

C) H_2O / $\overset{\oplus}{H}$ D) $KMnO_4$

(3)

32. Which of the following ether cannot be prepared by Williamson's ether synthesis?

A) Methyl phenyl ether   B) Diethyl ether

C) tert.-Butylmethyl ether   D) Diphenyl ether

33. Reaction of phenol with phthalic anhydride in presence of conc. H_2SO_4 results in formation of:

A) Phenylsalicylate   B) Diphenyl ether   C) Phenolphthalein   D) Salicylic acid

34. The reagent with which both acetaldehyde and acetone reacts is:

A) Fehling's reagent   B) Tollen's reagent   C) Hinsberg reagent   D) I_2 / NaOH

35. Which of the following compound does not give benzoic acid on hydrolysis?

A) C_6H_5CN B) C_6H_5COCl C) $C_6H_5COOCH_3$ D) $C_6H_5CH_2Cl$

36. Reduction of nitrobenzene with $Zn -NH_4Cl$ results in formation of:

A) Aniline   B) Nitrosobenzene

C) Azobenzene   D) Phenylhydroxyl amine

37. The acid-base indicator methylorange is prepared by coupling of diazotized sulphanilic acid with:

A) 2-Naphthol   B) N-Methyaniline

C) N,N-Dimethyl aniline   D) Aniline

38. The hormone which regulates the metabolism of glucose is:

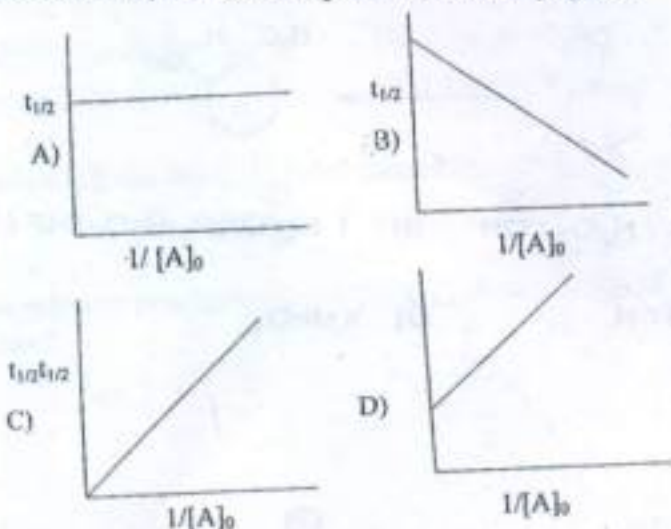A) Cartisone   B) Insulin   C) Progesterone   D) Oxytocine

39. Natural rubber is a polymer of:

A) Ethylene   B) Styrene   C) Isoprene   D) Vinyl chloride

40. 2-Acetoxy benzoic acid is used as:

A) Antiseptic   B) Antipyretic   C) Antidepressent   D) Antimalerial

41. For a second order reaction, the correct plot of $t_{1/2}$ vs $1/ [A]_0$ is :

(4)

42. Sodium metal crystallizes in body centred cubic lattice with cell edge a = 4.29 Å. What is radius of the sodium atom(in Å)?

A) 1.85   B) 18.6   C) 1.5   D) equal to cell edge length

43. The molar conductivity at infinite dilution of $Al_2(SO_4)_3$ is 858 S cm^2 mol^{-1}. Calculate molar ionic conductivity of Al^{3+} ion give that $\lambda^0(SO_4^{2-}) = 160$ S cm^2 mol^{-1}:

A) 160 S cm^2 mol^{-1} B) 189 S cm^2 mol^{-1} C) 698 S cm^2 mol^{-1} D) 1018 S cm^2 mol^{-1}

44. Which of the following given pair of units of a and b (van der Waals constant) is correct in Van der Waals equations?

A) atm L^2 mol^{-2} and L mol^{-1}
B) atm L mol^{-2} and L
C) atm L^2 mol^{-2} and L^{-2} mol
D) atmL^{-2} mol^2 and L

45. Match the process given in column I with its description in column II:

Column I	Column II
1. Isobaric process	p) process in which driving force is very different than opposing force
2. Isothermal process	q) process in which no heat enters or leaves the system
3. Adibatic process	r) process in which temperature of the system remain constant
4. Irreversible process	s) A process in which pressure of the system is kept constant

Correct match is:

A) 1- p, 2-q, 3-r, 4- s
B) 1-r, 2-s, 3-q, 4-p
C) 1-s, 2-r, 3-q, 4-p
D) 1- s, 2-p 3-r, 4-q

46. Which of the following has highest pH?

A) 0.1 M NaOH   B) 0.01 M NaOH   C) 0.1 M HCl   D) 0.1 M CH$_3$COOH

47. 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

48. In a galvanic cell, which one of the following statements is not correct:

A) Anode is negatively charged
B) Cathode is positively charged
C) Reduction takes place at anode
D) Reduction takes place at cathode

49. For a first order reaction A→ B, the reaction rate at reactant concentration of 0.01 M is found to be 2 x 10^{-5} mol L^{-1}s^{-1}. The half-life period of the reaction is (in seconds):

A) 34.5   B) 2   C) 300   D) 346.5

50. Arrhenius equation is:

A) $k = A e^{-Ea/RT}$ 　　B) $k = e^{-Ea/RT}$ 　　C) $k = A e^{Ea/RT}$ 　　D) $k = e^{Ea/RT}$

51. Isotonic solution have equal:

A) Vapour pressure 　B) Osmotic pressure 　C) Boiling point 　　D) Freezing point

52. The unit cell with dimensions $\alpha = \beta = \gamma = 90^0$, $a = b \neq c$ is:

A) Cubic 　　　　B) Triclinic 　　　　C) Hexagonal 　　　D) Tetragonal

53. Soap essentially form a colloidal solution in water and remove the greasy matter by:

A) Coagulation 　　B) Emulsification 　　C) Adsorption 　　D) Absorption

54. Cassiterite is an ore of:

A) Pb 　　　　　B) Zn 　　　　　C) Sn 　　　　　D) Mn

55. The presence of electric charge on the colloidal particle is indicated by the experiment:

A) Osmosis 　　　B) Electrolysis 　　　C) Dialysis 　　　D) Electrophoresis

56. Which of the following is not extensive property?

A) Surface tension 　B) Heat capacity 　　C) Internal energy 　D) Entropy

57. Free energy change is related to enthalpy and entropy changes as:

A) $\Delta G + T\Delta S = \Delta H$ 　　　　　　　B) $\Delta G = T\Delta S - \Delta H$

C) $\Delta G = \Delta S - T\Delta H$ 　　　　　　　D) $\Delta G + \Delta H = -T\Delta S$

58. A system absorbs 701 J of heat and does work equivalent to 394 J on its surroundings. Calculate the change in internal energy for the process:

A) 307 J 　　　　B) 1095 J 　　　　C) 0 　　　　　D) 394

59. A, B and C are ideal gases. Their molecular masses are 2, 4 and 28 respectively. The rate of diffusion of these gases follow the order:

A) $C > A > B$ 　　B) $C > B > A$ 　　C) $C = A = B$ 　　D) $A > B > C$

60. In AgBr, there can occur:

A) Only Schottky defect 　　　　　　B) Only Frenkel defect

C) Both Schottky and Frenkel defect 　　D) Metal deficient only

x-x-x

(6)