# Government of Puducherry
## Directorate of School Education
### Competitive Examination for Empanelment of Guest Lecturers-2019

## QUESTION BOOKLET

**ROLL NO:** .............................

**SUBJECT: CHEMISTRY**

**Time: 2:00 Hours**

**Total Marks: 90**

## INSTRUCTIONS TO CANDIDATES

1) Write Roll Number in the space provided in this Question Booklet above.

2) The Candidate should check the question paper that question paper consists of all the pages and that it is not torn.

3) Please write the Roll No. etc., on the OMR sheet using Black Ball point pen only.

4) The candidate shall use only **"BLACK BALL POINT PEN"** for marking the answers.

5) There are **90 questions**. For every correct answer 1 (One) mark will be awarded and for each wrong answer 0.25 mark will be deducted.

6) Use of eraser/ whitener/ correction fluid is prohibited on OMR answer sheets.

7) Use of calculators, cell phones, logarithmic table, electronic gadgets etc., is strictly prohibited.

8) For any rough work, use the rough page given at the end of the Question Booklet.

9) The candidate has to deposit the original copy of OMR sheet along with the Hall Ticket after the completion of examination and may carry the duplicate OMR (impression) sheet for reference.

10) No candidate is allowed to leave the examination centre premises till the completion of the entire examination process.

11) Please avoid marking of answers on Question Booklet.

12) The questions in English version alone will be taken as authentic though questions are given in other languages for the convenience of the candidates.

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## CHEMISTRY

1. Correct order of stability I- $CH_3^-$, II- $CH_2=CH^-$, III- $CH_2=CH-CH_2^-$, IV- $C_2H_5-\overset{\ominus}{CH}-C_2H_5$

   (a) I > II > III > IV   (b) III > II > IV > I   (c) III > I > IV > II   (d) I > IV > II > III

2. Arrange in the order of acid strength given $PK_a$ values I. $1\times10^{-5}$, II. $1\times10^{-4}$, III. $1\times10^{-6}$,   IV. $10^{-3}$
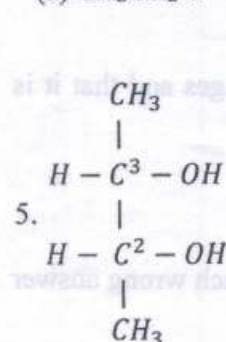
   (a) III > I > II > IV   (b) IV > II > I > III   (c) III > II > I > IV   (d) IV > III > II > I

3. Which is the weakest acid

   (a) $CF_3COOH$   (b) $C_6H_5COOH$ (c) o-nitrobenzoic acid   (d) p-toluic acid

4. $E_1$ is followed in

   (a) $CH_3CH_2Cl$   (b) $CH_3CH_2Cl$   (c) $CH_3\overset{|}{\underset{Cl}{CH}}-CH_3$   (d) $(CH_3)_3CCl$

5.
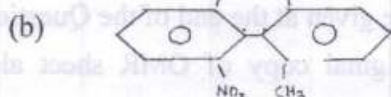$$H-\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle H-\overset{\overset{|}{C^2}-OH}{\underset{|}{CH_3}}}{|}}{C^3}}-OH$$
   (a) 2(R) 3(R)   (b) 2(S) 3(S)   (c) 2 (R) 3(S)   (d) 2(S) 3(R)

6. Number of geometrical isomers for $CH_3-CH=CH-CH=CH-CH-CH_3$

   (a) 8 (b) 6   (c) 4   (d) 12

7. Which is optically active

   (a) $CH_3CHOHCOOH$   (b)

   (c)   (d) all

8. Favourable conditions for $SN^1$

   (a) polar solvent   (b) non polar solvent   (c) 1° halide   (d) none

9. $C_2H_5Br$ on heating with $CH_3Br$ with Na gives

   (a) $C_3H_8$   (b) $C_2H_6$   (c) $C_4H_{10}$   (d) all these

10. Which is the least stable

    (a) $CH_2=CH_2$   (b) $CR_2=CR_2$ (c) $RCH=CHR$   (d) $R_2C=CH_2$

11. Lewisite is

    (a) 1, 1'dichloro diethyl ether   (b) 2,2'-dichloro diethyl ether
    (c) 2-chlorovinyl dichloro arsine   (d) 2,3-dimercapto1-propanol
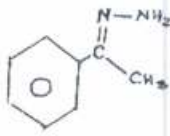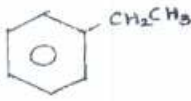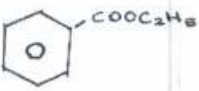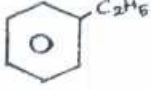
12. Which is used as war gas as well as insecticide

    (a) DDT   (b) BHC   (c) chloropicrin   (d) chloretone

13. $CH_3-CH=CH-CHO \xrightarrow{LiAlH_4}$

    (a) $CH_3-CH_2-CH_2-CHOH$ (b) $CH_3-CH_2-CH_2-CHO$   (c) $CH_3-CH=CH-CH_2OH$   (d) $CH_3CH_2CH_2CH_3$

14. Which undergoes easy dehydration

(a) $(CH_3)_3COH$    (b) benzylalcohol    (c) n-butanol    (d) isopropyl

15. Which is a better choice to get t-butyl methyl ether

(a) t-butyl alcohol and $CH_3OH$    (b) t-butyl bromide + $CH_3ONa$    (c) sodium t-butoxide and methyl bromide    (d) sodium t-butoxide and $CH_3OH$

16. Product of acid hydrolysis of $CH_2 = C\langle^{OCOCH_3}_{CH_3}$ and $CH_3\text{-}CH\text{=}CH\text{-}OCOCH_3$ can be distinguished by

(a) lucas reagent    (b) 2, 4 DNP    (c) Schiff's reagent    (d) HCN

17. A compound A. $C_7H_6O_2$ with liq. $NH_3$ gives $B.C_7H_7ON$. B on warming with $Br_2/KOH$ gives C. it is

(a) $C_6H_5CONH_2$    (b) $C_6H_5CONHBr$    (c) $C_6H_5NH_2$    (d) $C_6H_5NO_2$

18. Kolbe's electrolysis on sodium propanoate gives

(a) propane    (b) ethane    (c) butane    (d) hexane

19. Reactivity order towards hydrolysis I. $(CH_3CO)_2O$, II. $CH_3COOC_2H_5$, III. $CH_3COCl$, IV. $CH_3CONH_2$

(a) I >III >IV >II    (b) I > IV >III > II    (c) III > I > II > IV    (d) III > II > I > IV

20. Acetophenone with hydrazine in sodium ethoxide gives

(a)

(b)

(c)

(d)

21. Electrolytic reduction on nitrobenzene gives

(a) aniline    (b) phenyl hydroxylamine    (c) azobenzene    (d) p-amino phenol

22. Benzene diazonium chloride is converted to phenyl hydrazine only by

(a) Sn/HCl    (b) $H_3PO_{2\ (aq)}$    (c) $Na/C_2H_5OH$    (d) $SnCl_2/HCl$

23. α D(+) glucopyranose and β D(+) glucopyranose are

(a) epimers    (b) enantiomers    (c) anomers    (d) position isomers

24. Natural amino acids except glycine is

(a)D(+)    (b) D(-)    (c) L(+)    (d) L(-)

25. Myoglobin is

(a) fibrous protein    (b) conjugate protein    (c) globular protein    (d) none of this

26. Vit B3 causes deficiency disease

(a) beri beri    (b) chalosis    (c) convulsion    (d) pellagra

27. Adenine is

(a) 4-aminopurine    (b) 4- amino pyrimidine    (c) 6-aminopurine    (d) 6- amino pyrimidine

28. AMP is

(a) energy carrier    (b) coenzyme    (c) chemical messenger    (d) all these

29. Polyurethane and ammonium perchlorate are

(a) solid propellant    (b) liquid propellant    (c) composite propellant    (d) none of these

30. Conversion of phenol to salicylaldehyde with CO + HCl is

(a) Reimer Tiemann reaction    (b) Gatterman reaction
(c) Gatterman Kosch reaction    (d) Schottern Bawmann reaction

31. When electron jumps from n=7 to 2, spectral lines will be

(a) 25    (b) 16    (c) 15    (d) 14

32. Correct set of quantum number for valence electron in element with atomic number 37 is

(a) 5, 1, 0, ½    (b) 5, 0, 0, ½  (c) 5, 1, 1, ½  (d) 5, 0, 1, ½

33. $t_{1/2}$ of radium is 1600 y. After what time 1/16 will remain
   (a) 4800 y  (b) 6400 y    (c) 3200 y    (d) 8000y

34. After emission of 3α, 1β daughter nucleus from $_{88}M^{228}$
   (a) $_{82}Pb^{216}$  (b) $_{82}Pb^{217}$  (c) $_{82}Pb^{218}$    (d) $_{83}Bi^{216}$

35. Ratio of $C_p$ to $C_v$ for oxygen
   (a) 1.22    (b) 1.33      (c) 1.4 (d) 1.66

36. If $a$ is 6 atm $L^2 mol^{-2}$ and b is 0.025 L $mol^{-1}$. Calculate $T_c$
   (a) 500 K   (b) 888 K      (c) 1020 K    (d) 78 K

37. For lithium (BCC) edge length is 350 pm. Atomic radius is
   (a) 175 pm  (b) 152 pm     (c) 87.5 pm    (d) 304 pm

38. Elements of symmetry possessed by cubic crystal
   (a) 19        (b) 23  (c) 13  (d) 37

39. Calculate $K_f$ of solvent having freezing point 17°C and latent heat of fusion 180.75 $Jg^{-1}$
   (a) 2.66      (b) 3.86        (c) 4.26        (d) 1.82

40. Highest boiling point is for
   (a) 0.1 M sodium sulphate              (b) 0.01 M potassium nitrate
   (c) 0.015 M glucose                    (d) 0.08 M potassium ferrocyanide

41. Congruent melting point is for
   (a) Mg-Zn  (b) salt + $H_2O$ (c) $CuSO_4+H_2O$        (d) sulphur system

42. Enthalpy of combustion of C, $H_2$ and glucose are -394, -286 and -2816. Enthalpy of formation of glucose
   (a) +1264 KJ      (b) -1264 KJ   (c) -2136 KJ   (d) -6896 KJ

43. 0.04 mole of an ideal gas expands reversibly from 50 to 375 ml at 37°C with (log7.5=0.875) absorption of 208J. q and w are
   (a) 208, -208        (b) -208, -208          (c) 208, 208    (d) -208, 208

44. $2C_{(s)}+H_{2\ (g)} \rightarrow C_2H_2$ ΔH= 225 KJ, $2C_{(s)} \rightarrow 2C_{(g)}$ ΔH=1410 KJ, $H_{2(g)} \rightarrow 2H_{(g)}$, ΔH=330 KJ
   If C-H bond energy is 350 KJ calculate $C \equiv C$ bond energy
   (a) 815 $mol^{-1}$        (b) 865 $mol^{-1}$  (c) 837 $mol^{-1}$  (d) 1165 $mol^{-1}$

45. Which has $K_p > K_c$
   (a) Haber's process of manufacture of ammonia  (b) contact process of manufacture of $SO_3$
   (c) decomposition of $PCl_5$                   (d) formation of NO in air

46. pH of 0.001 $NH_4OH$ whose $K_b$ is $4 \times 10^{-3}$
   (a) 11.3      (b) 9.7 (c) 2.7 (d) 8.6

47. Solubility of AgCl is 0.01435 $gL^{-1}$ calculate solubility product
   (a) 1.96 $\times 10^{-6}$        (b) $10^{-8}$(c) $10^{-16}$        (d) 1.96x$10^{-4}$

48. Addition of helium at const pressure in $N_2+3H_2 \rightleftharpoons 2NH_3$
   (a) has no effect    (b) favours forward    (c) favours backward (d) unpredictable

49. Which is Ostwald's dilution law
   (a) $\alpha \propto \sqrt{c}$ (b) $\alpha \propto c$    (c) $\alpha \propto \frac{1}{\sqrt{c}}$    (d) $\alpha \propto \frac{1}{c}$

50. For every 10° rise in temperature rate of reaction increases 2 times. At 30°C γ is $2 \times 10^{-5}$. What will be at 60°
   (a) $4 \times 10^{-5}$  (b) $32 \times 10^{-5}$    (c) $16 \times 10^{-5}$    (d) $2 \times 10^{-5}$

51. 90% first order reaction is completed in 70m. Rate constant is
   (a) 0.0329 $m^{-1}$        (b) 0.329 $m^{-1}$  (c) 3.29 $m^{-1}$  (d) 32.9 $m^{-1}$

52. In second order reaction $t_{1/2}$ is directly proportional to
   (a) initial concentration $(a)$        (b) $\frac{1}{a^2}$          (c) $\frac{1}{a}$        (d) $a^2$

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53. Automobile catalytic converter uses

    (a) Ni/NiO  (b) $Pt/PtO_2$    (c) Pt/NiO    (d) Fe/ZnO

54. Which gas is easily adsorbed

    (a) CO    (b) $SO_2$    (c) $NH_3$    (d) $N_2$

55. In fuel cell if 44.8 L of $O_2$ at STP reacts in 10 m what is the average current produced

    (a) 643 A   (b) 3212.5 A   (c) 1286 A    (d) 2472 A

56. Which of the following graph illustrates strong acid weak base titration conductometrically (conductance S, Vol. of base $V_b$

    (a) S    (b) S    (c) S    (d) S    ($V_b$)
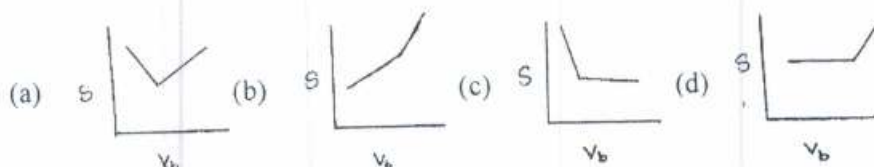
57. Find E of $Ag^+/Ag$ if $E_0$ is 0.80 and concentration 0.1M

    (a) 0.86 V  (b) 0,74V    (c) 0.83V    (d) 0.77V

58. Molality of solution having 12 g of urea in 500 ml of solution having density 1.2 g/cc

    (a) 0.4    (b) 0.34    (c) 0.17    (d) 0.68

59. Which has the highest ionization energy

    (a) Mg    (b) $Na^+$    (c) $F^-$    (d) K

60. Ortho and para hydrogen differ in

    (a) atomic mass   (b) molar mass    (c) spin of nucleus    (d) number of protons in nucleus

61. Hydrogen bonding occurs in

    (a) HF   (b) o-nitrophenol    (c) cellulose  (d) all

62. Which metal is extracted electolytically

    (a) Al    (b) Au    (c) Cu    (d) Fe

63. Which conducts by metallic and electrolytic conductor

    (a) W    (b) NaCl    (c) $K/liq.NH_3$  (d) none

64. Strongest base of the following

    (a) LiOH   (b) $Ca(OH)_2$  (c) KOH    (d) $Ba(OH)_2$

65. Temporary hardness of water is due to

    (a) LiCl   (b) $KNO_3$    (c) $Ca(HCO_3)_2$    (d) $MgCO_3$

66. Oxidation state of magnesium in chlorophyll

    (a) 0    (b) +1    (c) +2    (d)+4

67. Geometry of $PF_5$ is

    (a) square pyramidal    (b) pentagonal planar (c) trigonal bipyramidal    (d) octahedral

68. Which carbide gives methane with water

    (a) $CaC_2$  (b) WC    (c) $Al_4C_3$    (d) ThC

69. Diagonal relationship of boron and silicon is due to

    (a) similar size   (b) similar radius of $B^{3+}$ and $Si^{4+}$    (c) non metallic character    (d) allotropy

70. Number of 3 atoms 2 electron bond in diborane

    (a) 4    (b) 6    (c) 2    (d) 0

71. Example for sheet silicate

    (a) Talc  (b) beryl   (c) quartz    (d) spodumene

72. Which is the weakest acid

    (a) ortho phosphoric acid  (b) nitrous acid    (c) hydrazoic acid    (d) sulphurous acid

73. Best phosphatic fertilizer is
(a) phosphorite     (b) triammonium phosphate (c) super phosphate of lime     (d) triple superphosphate

74. Strongest acid is
(a) dithionic acid     (b) thiosulphuric acid (c) perodxy di sulphuric acid  (d) hydrogen peroxide

75. Which is possible
(a) $HF_2^-$     (b) $HCl_2^-$     (c) $HBr_2^-$     (d) $HI_2^-$

76. Which does not exist
(a) $XeF_4$     (b) $XeOF_4$     (c) $XeO_3F$     (d) $XeO$

77. $XeO_3$ is
(a) triangular planar     (b) linear     (c) tetrahedral     (d) pyramidal

78. Ferromagnetic is
(a) iron     (b) cobalt     (c) nickel     (d) all these

79. Most stable compound is
(a) $FeCl_2$     (b) $MnCl_2$     (c) $NiCl_2$     (d) $CuCl_2$

80. Constantan is an alloy of
(a) W, Fe, Cr     (b) Cu, Ni     (c) Ni, steel     (d) Cu, Zn

81. Oxidation state of platinum is chloroplatinic acid is
(a) +2     (b) +4     (c) +6     (d) +8

82. Number of 5f electrons in $U^{4+}$ (at.no.92) is
(a) 4     (b) 1     (c) 2     (d) 3

83. Ore of thorium is
(a) pitch blende     (b) monazite   (c) wolfenite   (d) cerite

84. Type of isomerism in $[Co(NH_3)_5NO]Cl_2$ and $[Co(NH_3)_5(ONO)] Cl_2$ is
(a) coordination isomerism (b) ionization isomerism     (c) functional isomerism     (d) linkage isomerims

85. Spin magnetic moment of $Na_3[CoF_6]$ is
(a) 3.8 BM (b) 4.9 BM     (c) 5.8 BM (d) 2.5 BM

86. CFSE for $d^7$ configuration in tetrahedral complexes
(a) 6 Dq     (b) 12 Dq     (c) 4 Dq     (d) 0 Dq

87. Which is metalloenzyme
(a) cytochrome     (b) tyrosinase  (c) nitrogenase     (d) all

88. $\lambda_{max (EtOH)}$ of
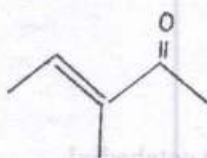
is
(a) 215 nm     (b) 237 nm
(c) 247 nm     (d) 252 nm

89. In Infra red spectroscopy O-H of COOH stretching frequency
(a) 3200 cm$^{-1}$     (b) 1710 cm$^{-1}$  (c) 900 cm$^{-1}$     (d) 1120 cm$^{-1}$

90. Normal range of fasting blood sugar will be
(a) 60-80 mg     (b) 80-110 mg     (c) 110-120 mg     (d) 140 mg

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