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**JIPMER MBBS**  
**CHEMISTRY**  
**Model Paper**

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1.  $10^{-6}$  M NaOH is diluted 100 times. The pH of the diluted base is

- 1) Between 7 and 8
- 2) Between 5 and 6
- 3) **Between 6 and 7**
- 4) Between 10 and 11

2. A  $sp^3$  hybrid orbital contains

- 1)  $\frac{1}{4}$  s-character
- 2)  $\frac{1}{2}$  s-character
- 3)  **$\frac{2}{3}$  s-character**
- 4)  $\frac{3}{4}$  s-character

3. Leaching is a process of

- 1) Reduction
- 2) Concentration
- 3) **Refining**
- 4) Oxidation

4. Electrolysis of fused NaCl will give

- 1) Na
- 2) NaOH
- 3) NaClO
- 4) **NaClO<sub>3</sub>**

5. Which of the following fluorides does not exist?

- 1) **NF<sub>5</sub>**
- 2) PF<sub>5</sub>
- 3) AsF<sub>5</sub>
- 4) SbF<sub>5</sub>

6. Red lead is

- 1) PbO
- 2) PbO<sub>2</sub>
- 3) Pb<sub>3</sub>O<sub>4</sub>
- 4) **Pb<sub>3</sub>O<sub>2</sub>**

7. Hybridisation states of C in CH<sub>3</sub><sup>+</sup> and CH<sub>3</sub><sup>-</sup>

- 1) Sp<sup>2</sup>, sp<sup>3</sup>
- 2) Sp<sup>3</sup>, sp<sup>2</sup>
- 3) Sp<sup>2</sup>, sp<sup>2</sup>
- 4) **Sp<sup>2</sup>, sp**

8. Which one of the following complexes is outer orbital complex?

- 1) [Co(NH<sub>3</sub>)<sub>6</sub>]<sup>3+</sup>
- 2) **[Mn(CN)<sub>6</sub>]<sup>4-</sup>**
- 3) [Fe(CN)<sub>6</sub>]<sup>4-</sup>
- 4) [Ni(NH<sub>3</sub>)<sub>6</sub>]<sup>2+</sup>

9. A solution made by dissolving 40g NaOH in 1000 g of H<sub>2</sub>O is

- 1) 1 molar
- 2) 1 normal
- 3) 1 molal
- 4) **None of these**

10. 0.1mol HCl is equal to

- 1) 3.65g
- 2) 36.5g
- 3) 18g
- 4) **1.8g**

11. Which will liberate bromine from a solution of potassium bromide?

- 1) **Cl<sub>2</sub>**
- 2) SO<sub>2</sub>
- 3) SO<sub>2</sub>
- 4) HI

12. Which of the following has the maximum number of unpaired electrons?

- 1) V<sup>3+</sup>
- 2) **Fe<sup>2+</sup>**
- 3) Mn<sup>2+</sup>
- 4) Cu<sup>+</sup>

13. The geometry of XeF<sub>6</sub> is

- 1) Planar hexagon
- 2) Regular octahedron
- 3) **Distorted octahedron**

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4) Square bipyramid

14.2g of a radioactive sample having half-life of 15days was synthesized on 1<sup>st</sup> Jan 2009. The amount of the sample left behind on 1<sup>st</sup> March, 2009 is

- 1) 0g
- 2) **0.125g**
- 3) 1g
- 4) 0.5g

15. The rate equation for a reaction,  $A \rightarrow B$  is  $r = k[A]^0$ . If the initial concentration of the reactant is  $a \text{ mol dm}^{-3}$ , the half life period of the reaction is

- 1)  **$a/2k$**
- 2)  $k/a$
- 3)  $a/k$
- 4)  $2a/k$

16. In electrophilic aromatic substitution reaction, the nitro group is meta directing because it

- 1) **Decreases electron density at ortho and para positions**
- 2) Decreases electron density at Meta position
- 3) Increases electron density at Meta position
- 4) Increases electron density at ortho and para positions

17. The best method for the conversion of an alcohol into an alkyl chloride is by treating the alcohol with

- 1)  $\text{PCl}_3$
- 2)  $\text{PCl}_5$
- 3)  **$\text{SOCl}_2$  in presence of pyridine**
- 4) Dry HCl in the presence of anhydrous  $\text{ZnCl}_2$

18. The compound which is not formed during the dry distillation of a mixture of calcium formate and calcium acetate is

- 1) Methanal
- 2) **Propanal**
- 3) Propanone
- 4) Ethanal

19. The compound which forms acetaldehyde when heated with dilute NaOH, is

- 1) **1, 1-dichloroethane**
- 2) 1, 1, 1-trichloroethane
- 3) 1-chloroethane
- 4) 1, 2-dichloroethane

20. The one which has least iodine value is

- 1) Sunflower oil
- 2) Ginger oil
- 3) **Ghee**
- 4) Groundnut oil

21. IUPAC name of  $(\text{CH}_3)_3\text{CCl}$  is

- 1) N-butyl chloride
- 2) 3-chloro butane
- 3) **2-chloro-2-methylpropane**
- 4) T-butyl chloride

22. The condensation polymer among the following is

- 1) Rubber
- 2) **Protein**
- 3) PVC
- 4) Polythene

23. In which of the following,  $\text{NH}_3$  is not used?

- 1) Tollen's reagent
- 2) **Nessler's reagent**
- 3) Group reagent for the analysis of IV group basic radicals
- 4) Group reagent for the analysis of III group basic radicals

24. Argon is used

- 1) In filling airships
- 2) To obtain low temperature
- 3) **In high temperature welding**
- 4) In radiotherapy for treatment of cancer

25. Hyperconjugation is most useful for stabilising which of the following carbocations?

- 1) Neo-pentyl
- 2) **Tert-butyl**
- 3) Iso-propyl
- 4) Ethyl

26. The isomerism that arises due to restricted bond rotation is

- 1) Metamerism
  - 2) Optical isomerism
  - 3) Position isomerism
  - 4) **Geometrical isomerism**
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27. Amine that cannot be prepared by Gabriel phthalimide synthesis is

- 1) Aniline
- 2) Benzylamine
- 3) Methylamine
- 4) Iso-butylamine

28. Lactose is made of

- 1) D-glucose only
- 2) D- Glucose and -D- glucose
- 3) D- Galactose and -D- glucose
- 4) D- Galactose and -D- glucose

29. Cetyltrimethyl ammonium bromide is a popular

- 1) Anionic detergent
- 2) Cationic detergent
- 3) Non-ionic detergent
- 4) Sweetener

30. 56 g of nitrogen and 96 g of oxygen are mixed isothermally and at a total pressure of 10 atm. The partial pressures of oxygen and nitrogen are respectively

- 1) 4, 6
- 2) 5, 5
- 3) 2, 8
- 4) 6, 4

31. Which of the following undergoes reduction with hydrogen peroxide in alkaline medium?

- 1)  $Mn^{2+}$
- 2)  $Mn^{2+}$
- 3)  $pb$
- 4)  $Fe^{2+}$

32. The metal that produces red-violet colour in the non-luminous flame is

- 1) Ba
- 2) Ag
- 3) Rb
- 4) Pb

33. According to the first law of thermodynamics which of the following quantities represents the change in a state function?

- 1)  $Q_{rev}$

$$Q - W$$

- 2)  $Q_{rev} / W_{rev}$
- 3)  $Q_{rev} + W_{rev}$
- 4)  $Q_{rev} - W_{rev}$

34. The maximum oxidation state exhibited by actinide ions is

- 1) +5
- 2) +4
- 3) +7
- 4) +8

35. The dispersed phase and dispersion medium in soap lather are respectively

- 1) Gas and liquid
- 2) Liquid and gas
- 3) Solid and gas
- 4) Solid and liquid

36. Which one of the following sets of quantum numbers represents the highest energy level in an atom?

- 1)  $N=4, l=0, m=0, s=+1/2$
- 2)  $N=3, l=1, m=1, s=+1/2$
- 3)  $N=3, l=2, m=-2, s=+1/2$
- 4)  $N=3, l=0, m=0, s=+1/2$

37. Acetic anhydride is prepared in the laboratory by heating sodium acetate with

- 1) Ethyl chloride
- 2) Acetyl chloride
- 3) Conc.  $H_2SO_4$
- 4) Zinc dust

38. For the homogeneous reaction,  $4NH_3 + 5O_2 \rightleftharpoons 4NO + 6H_2O$  the

the equilibrium constant K has units

- 1)  $Conc^{+10}$
- 2)  $Conc^{+1}$
- 3)  $Conc^{-1}$
- 4) It is dimensionless

39. For the reaction,  $NH_3 + OCl^- \rightarrow N_2H_4 + Cl^-$  occurring in basic medium, the coefficient of  $N_2H_4$  in the balanced equation will be

- 1) 1
- 2) 2
- 3) 3
- 4) 4

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40. Which one of the following has a coordinate bond?

- 1) **NH<sub>4</sub>Cl**
- 2) AlCl<sub>3</sub>
- 3) NaCl
- 4) Cl<sub>2</sub>

41. Which of the following would exert maximum osmotic pressure?

- 1) **Decinormal aluminium sulphate**
- 2) Decinormal barium chloride
- 3) Decinormal sodium chloride
- 4) A solution obtained by mixing equal volumes of (b) and (c) and filtering

42. Cow milk, an example of natural emulsion, is stabilized by

- 1) Fat
- 2) Water
- 3) **Casein**
- 4) Mg<sup>2+</sup> ions

43. For a zero order reaction

- 1) **T<sub>1/2</sub> ∝ R<sub>0</sub>**
- 2) T<sub>1/2</sub> ∝ 1/R<sub>0</sub>
- 3) T<sub>1/2</sub> ∝ R<sub>0</sub><sup>2</sup>
- 4) T<sub>1/2</sub> ∝ 1/R<sub>0</sub><sup>2</sup>

44. The extraction of which of the following metals involves bessemerisation?

- 1) Fe
- 2) Ag
- 3) Al
- 4) **Cu**

45. The correct order of decreasing first ionization energy is

- 1) C > B > Be > Li
- 2) **C > Be > B > Li**
- 3) B > C > Be > Li
- 4) Be > Li > B > C

46. An example of natural biopolymer is

- 1) Teflon

- 2) Nylon-66
- 3) Rubber
- 4) **DNA**

47. Which of the following is known as invert soap?

- 1) Pentaerythritol monostearate
- 2) Sodium stearyl sulphate
- 3) **Trimethyl stearyl ammonium bromide**
- 4) Ethoxylated nonyphenol

48. Le-blanc process is employed in the manufacture of

- 1) Baking soda
- 2) Washing soda
- 3) **Potash**
- 4) Plaster of paris

49. Which one of these is not true for benzene?

- 1) It forms only one type of monosubstituted product
- 2) **There are three carbon-carbon single bonds and three carbon-carbon double bonds**
- 3) Heat of hydrogenation of benzene is less than its theoretical value
- 4) The bond angle between carbon-carbon bonds is 120°

50. The IUPAC name of acrylaldehyde is

- 1) **Prop-2-en-1-al**
- 2) Propenylaldehyde
- 3) But-2-en-1-al
- 4) Propenal

51. Petrol for aviation purpose must contain

- 1) Straight chain hydrocarbons
- 2) Aromatic hydrocarbons
- 3) Olefinic hydrocarbons
- 4) **Highly branched chain paraffins**

52. The number of atoms contained in a fcc unit cell of a monatomic substance is

- 1) 1
- 2) 2
- 3) **4**
- 4) 6

53. The most basic element is

- 1) Fluorine
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- 2) Iodine
- 3) Chlorine
- 4) Bromine

54. Propyne on passing through red hot copper tube forms

- 1) Benzene
- 2) Toluene
- 3) Mesitylene
- 4) None of these

55. Which one of the following is mainly responsible for depletion of ozone layer?

- 1) Methane
- 2) Carbon dioxide
- 3) Water
- 4) Chloroflorocarbons

56. on warning with silver powder, chloroform is converted into

- 1) Acetylene
- 2) Hexachloroethane
- 3) 1,1, 2,2-tetrachloroethane
- 4) Ethylene

57. Ammonia is a Lewis base and it forms complexes with many cations. Which one of the following cations does not form a complex with ammonia?

- 1)  $\text{Ag}^+$
- 2)  $\text{Cu}^{2+}$
- 3)  $\text{Cd}^{2+}$
- 4)  $\text{Pb}^{2+}$

58. Argol, a brown crust, formed during the fermentation of grape juice contains

- 1)  $\text{CO}_2$
- 2) Fused oil
- 3) Potassium hydrogen tartarate
- 4) Lye

59. The pH value of 0.001 M aqueous solution of NaCl is

- 1) 7
- 2) 4
- 3) 11
- 4) Unpredictable

60. Hydrogen molecule differs from chlorine molecule in the following respect.

- 1) Hydrogen molecule is non-polar but chlorine molecule is polar
- 2) Hydrogen molecule is polar while chlorine molecule is non-polar
- 3) Hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not
- 4) Hydrogen molecule cannot participate in coordinate bond formation but chlorine molecule can

61. The ratio of the difference in energy between the first and the second Bohr orbit to that between the second and the third Bohr orbit is

- 1) 1/2
- 2) 1/3
- 3) 4/9
- 4) 27/5

62. Graphite is a

- 1) Molecular solid
- 2) Covalent solid
- 3) Ionic solid
- 4) Metallic solid

63. Which one of the following acts as a nucleophile?

- 1)  $\text{CH}_3^-$
- 2)  $\text{BF}_3$
- 3)  $\text{NO}_2$
- 4)  $\text{CH}_3-\text{C}=\text{O}$

64. During estimation of nitrogen in the organic compound by Kjeldahl's method, the ammonia evolved from 0.5 g of the compound in Kjeldahl's estimation of nitrogen, neutralized 10mL of  $\text{H}_2\text{SO}_4$ . Find out the percentage of nitrogen in the compound.

- 1) 14%
- 2) 28%
- 3) 56%
- 4) 68%

65. The correct order of increasing acidic strength is

- 1) Phenol < ethanol < chloroacetic acid < acetic acid
- 2) Ethanol < phenol < chloroacetic acid < acetic acid
- 3) Ethanol < phenol < acetic acid < chloroacetic acid

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4) Chloroacetic acid < acetic acid < phenol < ethanol

66. KF has ccp structure. How many F<sup>-</sup> ions and octahedral voids are there in this unit cell respectively?

- 1) 4 and 4
- 2) 4 and 8
- 3) **8 and 4**
- 4) 6 and 6

67. At equilibrium, the rate of dissolution of a solid solute in a volatile liquid solvent is

- 1) Less than the rate of crystallization
- 2) Greater than the rate of crystallization
- 3) **Equal to the rate of crystallisation**
- 4) Zero

68. A chelating agent has two or more than two donor atoms to bind a single metal ion. Which of the following is not a chelating agent?

- 1) **Thiosulphato**
- 2) Glycinato
- 3) Oxalato
- 4) Ethane-1, 2 -diamante

69. on addition of small amount of KMnO<sub>4</sub> to conc. H<sub>2</sub>SO<sub>4</sub> a green oily compound is obtained which is highly explosive in nature. Identify the compound from the following.

- Mn O**
- 1)  $\begin{matrix} 2 & 7 \\ \text{MnO} & \end{matrix}$
  - 2)  $\begin{matrix} 2 \\ \text{MnO} \end{matrix}$
  - 3)  $\begin{matrix} \text{MnSO}_4 \\ \text{Mn O} \end{matrix}$
  - 4)  $\begin{matrix} 2 & 3 \\ \text{Mn O} & \end{matrix}$

70. the magnetic nature of elements depends on the presence of transition element, which shows highest magnetic moment.

- 1) 3d<sup>7</sup>
- 2) **3d<sup>5</sup>**
- 3) 3d<sup>8</sup>
- 4) 3d<sup>2</sup>

71. Which of the following elements can be involved in p-d bonding?

- 1) Carbon
- 2) Nitrogen

3) **Phosphorous**

4) Boron

72. Affinity for hydrogen decreases in the group from fluorine to iodine. Which of the halogen acids should have highest bond dissociation enthalpy?

- 1) **HF**
- 2) HCl
- 3) HBr
- 4) HI

73. Which of the following statement is not correct about an inert electrode in a cell?

- 1) It does not participate in the cell reaction.
- 2) It provides surface either for oxidation or for reduction reaction.
- 3) It provides surface for conduction of electrons.
- 4) **It provides surface for redox reaction**

74. which of the following statement is correct?

- 1) Ecell and ΔrG of cell reaction both are extensive properties.
- 2) Ecell and ΔrG of cell reaction both are intensive properties
- 3) **Ecell is the intensive property while ΔrG of cell reaction is an extensive property.**
- 4) Ecell is an extensive property while ΔrG of cell reaction is an intensive property

75. A number of elements available in earth's crust but most abundant elements are

- 1) **Al and Fe**
- 2) Al and Cu
- 3) Fe and Cu
- 4) Cu and Ag

76. The element which forms oxides in all oxidation states +1 to +5 is

- 1) **Nitrogen**
- 2) Phosphorous
- 3) Arsenic
- 4) Antimony

77. In the presence of a catalyst, the heat evolved or absorbed during the reaction

- 1) Increases
  - 2) Decreases
  - 3) **Remains unchanged**
  - 4) May increase or decrease
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78. The rate of a gaseous is given by the expression  $k[A][B]$ . If the volume of the reaction vessel is suddenly reduced to  $\frac{1}{4}$  th of the initial volume, the reaction rate relating to original rate will be

- 1) 1/10
- 2) 1/8
- 3) 8
- 4) 16

79. Which of the following is 3° amine?

- 1) 1-Methylclohexylamine
- 2) Triethyl amine
- 3) Tert-butylamine
- 4) N- methy aniline

80. Which of the following enhances lathering property of soap?

- 1) Sodium carbonate
- 2) Sodium rosinate
- 3) Sodium stearate
- 4) Trisodium phosphate

81. The deficiency of vitamin C causes

- 1) Scrvy
- 2) Rickets
- 3) Pyroheia
- 4) Pernicious anaemia

82. Excess fluoride (over 10 ppm) in drinking water can cause

- 1) Harmful effect of bones and teeth
- 2) MethemogoLobinemia
- 3) Kidney damage
- 4) Laxative effect

83. The relative reactivities of acyl compounds towards nucleophilic substitution are in the order of

- 1) Acyl chlorine > acid anhydride > ester > amide
- 2) Ester > acyl chloride > amide > acid anhydride
- 3) Acid anhydride > amide > ester > acyl chloride
- 4) acyl chloride > ester > Acid anhydride > amide

84. in Dumas method of estimation of nitrogen, 0.35 g of an organic compound gave 55mL of nitrogen collected at 300K temperature and 715 mm pressure. The percentage composition of nitrogen in the compound would be

- 1) 16.45
- 2) 17.45

3) 14.45

4) 15.45

85. Which one of the following is aromatic?

- 1) Cyclopentadienyl cation
- 2) Cyclooctatetraene
- 3) Cycloheptatriene
- 4) cycloheptatrienylication

86. A solution with negative deviation among the following is

- 1) Ethanol-acetone
- 2) Chlorobenzene-bromoene
- 3) Chloroform-acetone
- 4) Benzene-toluene

87. Which one of the following is employed as antihistamine?

- 1) Diphenyl hydramine
- 2) Norethindrane
- 3) Omeprazole
- 4) chloramphenical

88. If  $x$  is amount of adsorbante and  $m$  is amount of adsorbent, which of the following relations is not related to adsorption process?

- 1)  $X/m=f(T)$  at constant  $p$
- 2)  $p=f(T)$  t constant  $(x/m)$
- 3)  $X/m=p \cdot T$
- 4)  $X/m=f(p)$  at constant  $T$

89. Standard electrode potential of three metals X,Y and Z are -1.2V, +0.5V and -3.0 V respectively. The reducing power of these metals wil be

- 1)  $y > x > z$
- 2)  $z > x > y$
- 3)  $x > y > z$
- 4)  $y > z > x$

90. Which of the following does not undergo iodoform reaction?

- 1) Secondary butyl alcohol
- 2) Iso-propyl alcohol
- 3) Diethyl ketone
- 4) Ethyl alcohol

91. Percentage of free space in a body center cubic unit cell is

- 1) 30%
  - 2) 32%
-



- 3) 34%
- 4) 28%

- 1)  $2/\lambda$ .
- 2)  $2\lambda$ .
- 3)  $4\lambda$ .
- 4)  $4/\lambda$ .

92. If a gas expands at constant temperature indicates that

- 1) Kinetic energy of molecules decreases
- 2) Pressure of the gas increases
- 3) **Kinetic energy of molecules remains as same**
- 4) Number of the molecules of gas increase

97. Green chemistry means such reactions which

- 1) Produce colour during reactions
- 2) **Reduce the use and production of hazardous chemicals**
- 3) Are related to the depletion of ozone layer
- 4) Study the reactions in plants

93. in DNA, the complimentary bases are

- 1) **Adenine and thymine; guanine and cytosine.**
- 2) Adenine and thymine; guanine and uracil
- 3) Adenine and guanine; thymine and cytosine
- 4) Uracil and adenine; cytosine and guanine

98. Which of the following pair of metals is purified by VAN-Arkel method?

- 1) **Zr and Ti**
- 2) Ag and Au
- 3) Ni and Fe
- 4) Ga and In

94. Which one of the following is 'd'-block element?

- 1) Gd
- 2) **Hs**
- 3) Es
- 4) Cs

99. Sodium sulphite is used in preserving squashes and other mildly acidic foods due to

- 1) Potassium salt has preservation action
- 2) Potassium metabisulphite prevents oxidation
- 3) Potassium metabisulphite is not influenced by acid
- 4) **Sulphur dioxide and sulphurous acid formed kill bacteria and germs**

95. The angular shape of ozone molecule consists of

- 1) 1 sigma and 2 pi bonds
- 2) 2 sigma and 2 pi bonds
- 3) 1 sigma and 1 pi bonds
- 4) **2 sigma and 1 pi bonds**

100. The number average molar mass and mass average molar mass of a polymer are respectively 30,000 and 40,000. The polydispersity index of the polymer is

- 1) -1
- 2) 0
- 3) **>1**
- 4) <1

96. An electron is moving in Bohr's fourth orbit. Its de-broglie wave length is  $\lambda$ . What is the circumference of the fourth orbit?