

1. Which is amphoteric oxide?  
A.  $\text{Na}_2\text{O}$                       B.  $\text{MgO}$                       C.  $\text{Al}_2\text{O}_3$                       D.  $\text{SO}_3$
- 
2. The correct order of acidic nature of the oxide is :  
A.  $\text{NO} < \text{N}_2\text{O} < \text{N}_2\text{O}_3 < \text{NO}_2 < \text{N}_2\text{O}_5$                       B.  $\text{N}_2\text{O} < \text{NO} < \text{N}_2\text{O}_3 < \text{NO}_2 < \text{N}_2\text{O}_5$   
C.  $\text{N}_2\text{O}_3 < \text{NO} < \text{N}_2\text{O} < \text{NO}_2 < \text{N}_2\text{O}_5$                       D.  $\text{NO} < \text{N}_2\text{O} < \text{NO}_2 < \text{N}_2\text{O}_5 < \text{N}_2\text{O}_3$
- 
3. Which of the following can form both high and low spin complexes?  
A.  $\text{CO}$                       B.  $\text{F}^-$                       C.  $\text{NH}_3$                       D.  $\text{CN}^-$
- 
4. Which one has the highest bond energy?  
A.  $\text{O-O}$                       B.  $\text{S-S}$                       C.  $\text{Se-Se}$                       D.  $\text{Te-Te}$
- 
5. In a crystalline compound, A atoms are in ccp arrangement, B atoms are at the tetrahedral positions, the compound is :  
A.  $\text{A}_2\text{B}$                       B.  $\text{AB}_2$                       C.  $\text{A}_2\text{B}_2$                       D.  $\text{A}_3\text{B}_2$
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6. Gadolinium belongs to 4f series. It's atomic number is 64. Which of the following is correct electronic configuration of gadolinium?  
A.  $[\text{Xe}] 4f^7 5d^1 6s^2$                       B.  $[\text{Xe}] 4f^6 5d^2 6s^2$                       C.  $[\text{Xe}] 4f^8 6d^2$                       D.  $[\text{Xe}] 4f^9 5s^1$
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7. Which one of the following pairs of solution is not an acidic buffer?  
A.  $\text{H}_2\text{CO}_3$  and  $\text{Na}_2\text{CO}_3$                       B.  $\text{H}_3\text{PO}_4$  and  $\text{Na}_3\text{PO}_4$   
C.  $\text{HClO}_4$  and  $\text{NaClO}_4$                       D.  $\text{CH}_3\text{COOH}$  and  $\text{CH}_3\text{COONa}$
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8. Strong reducing behavior of  $\text{H}_3\text{PO}_2$  is due to :  
A. High oxidation state of phosphorus  
B. Presence of two  $-\text{OH}$  groups and one P-H bond  
C. Presence of one  $-\text{OH}$  group and two P-H bonds  
D. High electron gain enthalpy of phosphorus

9. The vacant space in bcc lattice unit cell is :  
A. 23%                      B. 32%                      C. 26%                      D. 48%
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10. Which one of the following is present as an active ingredient in bleaching powder for bleaching action?  
A.  $\text{CaCl}_2$                       B.  $\text{CaOCl}_2$                       C.  $\text{Ca}(\text{OCl})_2$                       D.  $\text{CaO}_2\text{Cl}$
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11. The complexes  $[\text{Co}(\text{NH}_3)_6]$   $[\text{Cr}(\text{CN})_6]$  and  $[\text{Cr}(\text{NH}_3)_6]$   $[\text{Co}(\text{CN})_6]$  are the examples of which type of isomerism?  
A. Geometrical isomerism                      B. Linkage isomerism  
C. Ionization isomerism                      D. Coordination isomerism
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12. Which of the following complexes is used to be as an anticancer agent?  
A. cis -  $\text{K}_2[\text{PtCl}_2\text{Br}_2]$                       B.  $\text{Na}_2\text{CoCl}_4$   
C. mer -  $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$                       D. cis -  $[\text{PtCl}_2(\text{NH}_3)_2]$
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13. The Lewis acid strength of  $\text{BBr}_3$ ,  $\text{BCl}_3$  and  $\text{BF}_3$  is in the order  
A.  $\text{BBr}_3 < \text{BCl}_3 < \text{BF}_3$                       B.  $\text{BCl}_3 < \text{BF}_3 < \text{BBr}_3$   
C.  $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3$                       D.  $\text{BBr}_3 < \text{BF}_3 < \text{BCl}_3$
- 
14.  $\text{O}^{2-}$  is isoelectronic with:  
A.  $\text{Zn}^{2+}$                       B.  $\text{Mg}^{2+}$                       C.  $\text{K}^+$                       D.  $\text{Ni}^{2+}$
- 
15. The most abundant transition metal in human body is :  
A. Copper                      B. Iron                      C. Zinc                      D. Manganese
- 
16. Two possible stereo structures of  $\text{CH}_3\text{CHOH.COOH}$ , which are optically active, are called  
A. Enantiomers                      B. Mesomers                      C. Diastereomers                      D. Teflon

17. The correct order of increasing basicity among the following is
- A. piperidine < pyrrole < pyridine      B. pyridine < pyrrole < piperidine  
C. pyrrole < pyridine < piperidine      D. pyridine < piperidine < pyrrole
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18. In the most favourable conformation of 1,3-dimethylcyclohexane, the methyl groups will occupy
- A. Axial, axial      B. Axial, equatorial  
C. Equatorial, equatorial      D. All the above
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19. The product formed when 1-butyne is heated with  $\text{HgSO}_4$  and  $\text{H}_2\text{SO}_4$  is
- A. Butanal      B. 1-butene      C. 2-butene-1-ol      D. 2-butanone
- 

20. Which among the following will undergo solvolysis by  $\text{SN}^2$  reaction faster?
- A. 1-chlorobutane      B. 2-chlorobutane  
C. 3-chloro-2,2-dimethylpentane      D. 1-chlorocyclohexane
- 

21. Among the following the most stable carbocation is :
- A. Phenyl      B. Vinyl      C. Methyl      D. Benzyl
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22. The most acidic proton in the following compound is attached to carbon —
- ${}^4\text{CH}_3\text{-}{}^3\text{CH}_2\text{-CO-}{}^2\text{CH}_2\text{-CO-}{}^1\text{CH}_3$
- A. 1      B. 2      C. 3      D. 4
- 

23. Conversion of an amide to a primary amine by treating with  $\text{Br}_2/\text{NaOH}$  is known as ----- rearrangement.
- A. Hoffman      B. Fries      C. Beckmann      D. Pinacol-Pinacolone
- 

24. The electrophile that attack the aromatic system in Riemer-Tiemann reaction is :
- A.  ${}^+\text{CHO}$       B.  ${}^-\text{CHO}$       C.  $:\text{CCl}_2$       D.  ${}^+\text{CH}_2\text{Cl}$
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25. — is a purine base present in RNA.

- A. Histamine      B. Cytosine      C. Uracil      D. Guanine
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26. Nitrobenzene on reaction with conc.  $\text{HNO}_3/\text{H}_2\text{SO}_4$  at  $80-100^\circ\text{C}$  forms which one of the following products?

- A. 1, 2-Dinitrobenzene      B. 1, 3-Dinitrobenzene  
C. 1, 4-Dinitrobenzene      D. 1, 2, 4-Trinitrobenzene
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27. Green Chemistry means such reactions which:

- A. Study the reactions in plants      B. Produce colour during reactions  
C. Reduce the use and production of hazardous chemicals  
D. Related to the depletion of ozone layer
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28. Which of the following will not react with sodium hydrogen carbonate?

- A. o-Nitrophenol      B. Benzenesulphonic acid  
C. 2, 4, 6 - trinitrophenol      D. Benzoic acid
- 

29. Which of the following will be most stable diazonium salt  $\text{RN}_2^+\text{X}^-$  ?

- A.  $\text{CH}_3\text{CH}_2\text{N}_2^+\text{X}^-$       B.  $\text{C}_6\text{H}_5\text{CH}_2\text{N}_2^+\text{X}^-$       C.  $\text{CH}_3\text{N}_2^+\text{X}^-$       D.  $\text{C}_6\text{H}_5\text{N}_2^+\text{X}^-$
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30. The number of structural isomers possible from the molecular formula  $\text{C}_3\text{H}_9\text{N}$  is :

- A. 2      B. 3      C. 4      D. 5
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31. Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces which one of the following functional group?

- A.  $-\text{CHCl}_2$       B.  $-\text{CHO}$       C.  $-\text{CH}_2\text{Cl}$       D.  $-\text{COOH}$
- 

32. Mole fraction of the solute in a 1.00 molal aqueous solution is:

- A. 1.7700      B. 0.1770      C. 0.0177      D. 0.0344

33. A buffer solution is prepared in which the concentration of  $\text{NH}_3$  is 0.30 M and the concentration of  $\text{NH}_4^+$  is 0.20 M. If the equilibrium constant,  $K_b$  for  $\text{NH}_3$  equals  $1.8 \times 10^{-5}$ , what is the pH of this solution?
- A. 8.73                      B. 9.08                      C. 9.44                      D. 11.72
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34. Standard electrode potential for  $\text{Sn}^{4+} / \text{Sn}^{2+}$  couple is +0.15 V and that for the  $\text{Cr}^{3+} / \text{Cr}$  couple is 6 0.74 V. These two couples in their standard state are connected to make a cell. The cell potential will be :
- A. + 1.83 V                      B. +1.19 V                      C. +0.89 V                      D. +0.18 V
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35. The freezing point depression constant for water is 6  $1.86^\circ \text{C} \cdot \text{m}^{-1}$ . If 5.00 g  $\text{Na}_2\text{SO}_4$  is dissolved in 45.0 g  $\text{H}_2\text{O}$ , the freezing point is changed by 6  $3.82^\circ \text{C}$ . The van't Hoff factor for  $\text{Na}_2\text{SO}_4$  is :
- A. 0.381                      B. 2.63                      C. 2.05                      D. 3.11
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36. Which one of the following statements for the order of a reaction is incorrect?
- A. Order of reaction is always whole number
- B. Order can be determined only experimentally
- C. Order is not influenced by stoichiometric coefficient of the reactants
- D. Order of reaction is sum of power to the concentration terms of reactants to express the rate of reaction
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37. Which of the following has the minimum bond length?
- A.  $\text{O}_2$                       B.  $\text{O}_2^+$                       C.  $\text{O}_2^-$                       D.  $\text{O}_2^{2-}$
- 
38. The rate constant of the reaction  $\text{A} \rightarrow \text{B}$  is  $0.6 \times 10^{-3}$  mole per second. If the concentration of A is 5 M, then concentration of B after 20 minutes is :
- A. 0.36 M                      B. 0.72 M                      C. 1.08 M                      D. 3.60 M

39. For the reversible reaction :



The equilibrium shifts in forward direction:

- A. by decreasing the concentration of  $\text{N}_2(g)$  and  $\text{H}_2(g)$
- B. by increasing pressure and decreasing temperature
- C. by increasing the concentration of  $\text{NH}_3(g)$
- D. by decreasing pressure

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40. Which of the following salts will give highest pH in water?

- A.  $\text{Na}_2\text{CO}_3$                       B.  $\text{CuSO}_4$                       C.  $\text{KCl}$                       D.  $\text{NaCl}$

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41. Which of the following molecules has the maximum dipole moment?

- A.  $\text{NF}_3$                       B.  $\text{NH}_3$                       C.  $\text{CO}_2$                       D.  $\text{CH}_4$

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42. For a given exothermic reaction,  $K_p$  and  $K_p^1$  are the equilibrium constants at temperatures  $T_1$  and  $T_2$ , respectively. Assuming that heat of reaction is constant in temperature range between  $T_1$  and  $T_2$ , it is readily observed that:

- A.  $K_p = K_p^1$                       B.  $K_p = 1/K_p^1$                       C.  $K_p > K_p^1$                       D.  $K_p < K_p^1$

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43.  $\text{Be}^{2+}$  is isoelectronic with which of the following ions

- A.  $\text{Na}^+$                       B.  $\text{Mg}^{2+}$                       C.  $\text{H}^+$                       D.  $\text{Li}^+$

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44. What is the maximum number of orbitals that can be identified with the following quantum numbers?  $n = 3, l = 1, m = 0$

- A. 3                      B. 4                      C. 1                      D. 2

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45. Which of the following statements is not correct?

- A. For spontaneous process,  $\Delta G$  must be negative
- B. Enthalpy, entropy, free energy etc. are state variables
- C. A spontaneous process is reversible in nature
- D. Total of all possible kinds of energy of a system is called its internal energy

46. Caprolactum is used for the manufacture of:

- A. Terylene                      B. Nylon - 6, 6                      C. Nylon - 6                      D. Teflon
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47. The imperfect crystalline regions made from bundles/aggregates of ordered chain are called:

- A. Spherulites                      B. Crystallites                      C. Single crystals                      D. Dendrites
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48. Starch, cellulose, glycogen are all the polymers of:

- A. Sucrose                      B. Glucose                      C. Glucose + Fructose                      D. Fructose
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49. The Tg of the polymers behaving like rubber should be :

- A. Higher than room temperature                      B. Equal to room temperature  
C. Less than room temperature                      D. None of the above
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50. Which of the following organic compounds polymerizes to form the polyester Dacron?

- A. Terephthalic acid and ethylene glycol                      B. Benzoic acid and para HO-(C<sub>6</sub>H<sub>4</sub>)-OH  
C. Propylene and para HO-(C<sub>6</sub>H<sub>4</sub>)-OH                      D. Benzoic acid and ethanol
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