SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

CHEMISTRY

MHT - CET - Chemistry

Time Allowed: 1 hour **Maximum Marks: 50**

1. SI unit of amount of a substance is ________. **[1]**

a) metre
b) candela
c) mole
d) ampere

2. Among the elements from atomic number 1 to 30, the number of elements which have an unpaired electron in their s-subshell is ________. **[1]**

a) 5
b) 6
c) 3
d) 4

3. Shape of XeF_4 molecule is ________. **[1]**

a) linear
b) pyramidal
c) tetrahedral
d) square planar

4. If a metal ion M^{2+} loses 3 electrons, its oxidation number will become ________. **[1]**

a) +5
b) +3
c) -3
d) 0

5. Which of the following reactions indicates oxidizing action of hydrogen peroxide? **[1]**

a) $2MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 8H_2O + 5O_2$
b) $2Fe^{2+} + 2H^+ + H_2O_2 \rightarrow 2Fe^{3+} + 2H_2O$
c) $Cl_2 + H_2O_2 \rightarrow 2HCl + O_2$
d) $H_2O_2 + PbO_2 \rightarrow PbO + H_2O + O_2$

6. ICI shows ________ interaction as a predominant force of attraction. **[1]**

a) dipole-induced dipole
b) ion-dipole
c) dispersion force
d) dipole-dipole

7. Which of the following statements is INCORRECT? **[1]**

A. Heterogeneous catalyst does not dissolve in the reacting mixture.
B. Homogenous catalyst cannot be easily separated from the products of reaction.
C. Homogeneous catalyst is generally a solid and the reactants may either be gases or liquids.
D. Heterogeneously catalysed reactions occur on the surface of the solid catalyst.

a) Option (D)
b) Option (A)
c) Option (C)
d) Option (B)

8. Which of the following gas is used for welding? **[1]**

a) Acetylene
b) Ethene
c) Methane
d) Ethane

9. The least stable free radical among the following is ________. **[1]**

a) $\dot{C}H_2CH_3$
b) $\dot{C}(CH_3)_3$
c) $\dot{C}H_3$
d) $\dot{C}H(CH_3)_2$

10. A metallic element crystallizes in a simple cubic lattice. Each edge length of the unit cell is 3 $\overset{o}{A}$. The density of the element is 8 g cm^{-3}. The number of unit cells in 108 g of the metal is ________. (Molar mass of the metal = 108 g/mol.) **[1]**

a) 2.7×10^{22}
b) 1.33×10^{20}
c) 5×10^{23}
d) 2×10^{24}

11. Which among the following solids is a non-polar solid? **[1]**

a) Carbon dioxide
b) Sulphur dioxide
c) Hydrogen chloride
d) Water

12. Body-centered cubic lattice has a coordination number of ________. **[1]**

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

13. If the elevation in the boiling point of a solution of 50 g of solute (molar mass = 100) in 500 g of water is ΔT_b. The ebullioscopic constant K_b of water is equal to ________. **[1]**

a) 100 ΔT_b
b) ΔT_b
c) $\frac{\Delta T_b}{50}$
d) 10 ΔT_b

14. Which of the following is an example of a solution of gas in liquid? **[1]**

a) Hydrogen in palladium
b) Gasoline
c) Carbonated water
d) Chloroform in nitrogen

15. Henry's law is applicable at ________. **[1]**

a) constant temperature
b) constant pressure
c) constant concentration
d) constant volume

16. Thermodynamics is concerned with ________. **[1]**

a) mechanism of a chemical reaction
b) mass changes in nuclear reactions
c) energy changes in a system
d) rate of a chemical change

17. The reaction in which ΔH > ΔU is ________. **[1]**

a) $CaCO_{3(s)} \rightarrow CaO_{(s)} + CO_{2(g)}$
b) $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$
c) $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)}$
d) $N_{2(g)} + O_{2(g)} \rightarrow 2NO_{(g)}$

18. Which of the following statements is CORRECT for the spontaneous adsorption of a gas? **[1]**

a. ΔS is negative and therefore, ΔH should be highly positive.

b. ΔS is negative and therefore, ΔH should be highly negative.
c. ΔS is positive and therefore, ΔH should be negative.
d. ΔS is positive and therefore, ΔH should also be highly positive.

a) option (a)
b) option (b)
c) option (c)
d) option (d)

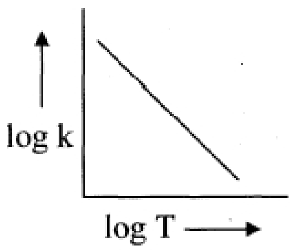
19. Choose the CORRECT relation among the following. **[1]**

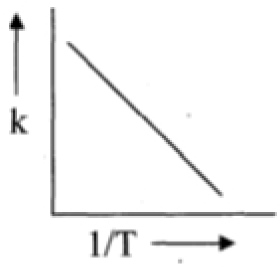
a) $\Delta G = \Delta H + T\Delta S$
b) $\Delta U = \Delta H + P\Delta V$
c) $W = \Delta n_g RT$
d) $Q_P = \Delta U + P_{ext\ \Delta}V$

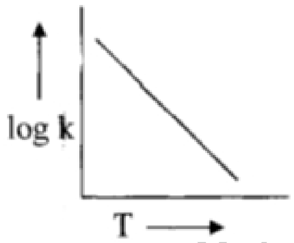
20. Activation energy of any reaction is ________ to lead to a chemical reaction. **[1]**

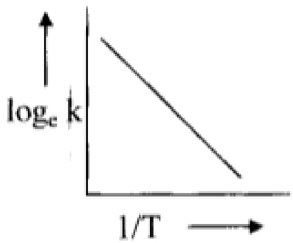
a) the maximum kinetic energy that the colliding reactant molecules must possess
b) the minimum kinetic energy that the product molecules must possess
c) the minimum kinetic energy that the colliding reactant molecules must possess
d) the number of successful collisions per unit time required

21. Which of the following plot is in accordance with the Arrhenius equation? **[1]**

a)


b)


c)


d)


22. Considering thermal stability, the halide which is most stable is ________. **[1]**

a) HCl
b) HI
c) HBr
d) HF

23. In which of the following oxoacids **Cl** exhibit +3 oxidation state? **[1]**

a) $HOClO_2$
b) HOCl
c) HOCIO
d) $HOClO_3$

24. What is the geometry of a molecule of bromine pentafluoride? **[1]**

a) Trigonal bipyramidal
b) Square pyramidal
c) Square planar
d) Octahedral

25. d-block metals belong to ________ periods of the periodic table. **[1]**

a) 3 - 6
b) 4 - 7

c) 2 - 6

d) 3 - 7

26. The ore chromite is ________. **[1]**

a) $FeCr_2O_3$

b) $FeCr_2O_4$

c) $CoCr_2CO_3$

d) $CrFe_2O_4$

27. The common oxidation state of f-block elements is III. the other stable oxidation states of ^{63}Eu and ^{65}Tb are respectively ________. **[1]**

a) II, V

b) II, IV

c) IV, II

d) V, II

28. Which of the following pair has a similar magnetic moment? **[1]**

a) Fe^{2+}, Mn^{2+}

b) Ni^{2+}, Co^{2+}

c) Cr^{3+}, Mn^{3+}

d) Fe^{3+}, Mn^{2+}

29. Which isomer of $CrCl_3.6H_2O$ is dark green in color and forms one mole of AgCl with an excess of $AgNO_3$ solution? **[1]**

a) $[Cr(H_2O)_3Cl_3].3H_2O$

b) $[Cr(H_2O)_4Cl_2]Cl.2H_2O$

c) $[Cr(H_2O)_6]Cl_3$

d) $[Cr(H_2O)_5Cl]Cl_2.H_2O$

30. Deduce the value of x if the central metal atom obeys the EAN rule in $[Fe(CO)_x]$ **[1]**

a) 5

b) 4

c) 8

d) 6

31. Both geometrical and optical isomerism are exhibited by ________. **[1]**

a) Dichlorobis(ethylenediamine)cobalt (III) ion

b) Pentaamminechlorocobalt (III) ion

c) Tetraamminedichlorocobalt (III) ion

d) Triamminotrichlorocobalt (III) ion

32. In SCN^- ligand, if N is attached to the central atom, the name of the ligand is ________. **[1]**

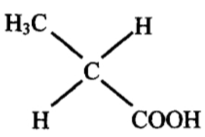
a) triocyanato

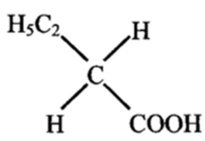
b) thiocyanato

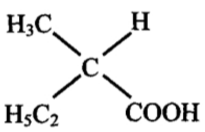
c) isothiocyanato

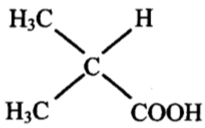
d) cyanato-N

33. Which of the following compound can occur in enantiomeric forms? **[1]**

a) 

b) 

c) 

d) 

34. Alkaline hydrolysis of which among the following compounds leads to the formation of a racemate? **[1]**

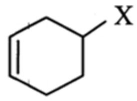
a) 1-Chloropropane

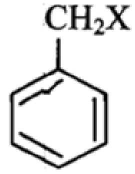
b) Bromoethane

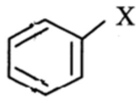
c) 1-Chloro-3-methylbutane

d) 1-Bromo-1-phenylethane

35. Which of the following contains sp^2 hybridized carbon bonded to X? **[1]**

a) 

b) 

c) 

d) $CH_2 = CH - CH_2 - X$

36. CH_2ClCH_2OH is stronger acid than CH_3CH_2OH because ________. **[1]**

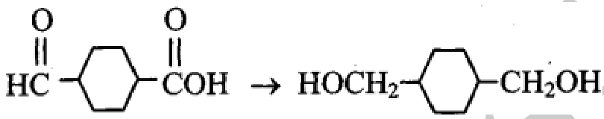
a. + I effect of Cl disperses - ve charge on O atom to produce more stable anion
b. - I effect of Cl disperses - ve charge on O atom to produce more stable anion
c. - I effect of Cl increases - ve charge on O atom of alcohol
d. + I effect of Cl increases - ve charge on O atom of alcohol

a) Option (b)
b) Option (c)
c) Option (a)
d) Option (d)

37. IUPAC's name of vinyl alcohol is ________. **[1]**

a) ethanol
b) but-1-en-1-ol
c) propen-1-ol
d) ethenol

38. **[1]**



The above reaction can be achieved by using ________.

a) $LiAlH_4$
b) Cone. H_2SO_4
c) NaOH
d) All of these

39. The common name of C_6H_5-O-CH_3 is ________. **[1]**

a) ethyl phenyl ether
b) methyl phenyl ether
c) hexyl methyl ether
d) benzyl ethyl ether

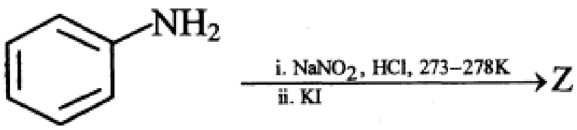
40. Which of the following is most reactive towards nucleophilic addition reactions? **[1]**

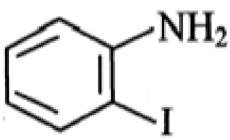
a) Acetaldehyde
b) Benzaldehyde
c) Formaldehyde
d) Acetone

41. Among the following acids which has the lowest pK_a value? **[1]**

a) H - COOH
b) $CH_3 - CH_2 - COOH$
c) $CH_3 - COOH$
d) $(CH_3)_2CH - COOH$

42. Identify Z in the following reaction: **[1]**



a) 

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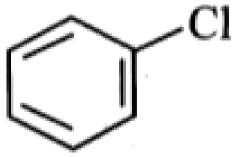
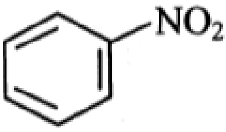
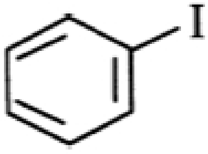
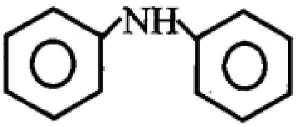


c) 

d) 

43. Match the following. **[1]**

	Column I		**Column II**
i.		a.	2° Aliphatic amine
ii.	$(CH_3)_3C\text{-}NH_2$	b.	3° Aliphatic amine
iii.	$(CH_3)_3N$	c.	1° Aliphatic amine
iv.	$C_6H_5\text{-}NH_2$	d.	2° Aromatic amine
		e.	10 Aromatic amine

a) i - c, ii - a, iii - b, iv - e
b) i - d, ii - c, iii - b, iv - e
c) i - e, ii - d, iii - b, iv - a
d) i - e, ii - b, iii - d, iv - a

44. The IUPAC name for $(CH_3)_2NC(CH_3)_3$ is ________. **[1]**

a) N,N-dimethylbutan-2-amine
b) N,N-dimethyl-2-methylpropan-1 -amine
c) N,N-dimethyl-2-methylpropan-2-amine
d) N,N-dimethylpropanamine

45. The foul smelling product of carbylamine reaction contains which of the following group? **[1]**

a) -O-N = O
b) -CN
c) -NC
d) $-N_2^+X^-$

46. Glucose has ________ functional group(s). **[1]**

a) alcoholic
b) aldehydic
c) ketonic and alcoholic
d) aldehydic and alcoholic

47. Ketohexoses do NOT contain ________. **[1]**

a) $>C=O$ group
b) -OH group
c) -CHO group
d) $-CH_2OH$ group

48. Which of the following is NOT a homopolymer? **[1]**

a) Dacron
b) Orion
c) PVC
d) Polyethylene

49. Nylon 6,6 is a/an ________. **[1]**

a) polyester polymer
b) condensation polymer

c) semisynthetic polymer

d) addition polymer

50. 12 principles of green chemistry aim **[1]**

I. to minimize the problems of the energy crisis

II. to reduce the impact of pollution

III. to save natural resources

a) I, II and III

b) I and III

c) II and III

d) I and II