Chemistry (red)

1. A first order reaction is 60% complete in 20 minutes. How long will the reaction take to be				
84% complete?				
a. 54'		c. 68'		
b. 40'		d. 76'		
2. Which one of the following has a magnetic moment of 1.75 BM?				
a. Ti^{3+} b. V^{3+}	c. Cr ³⁺	d. Fe ³⁺		
3. 2 moles of $N_2O\left(g\right)$ is kept in a closed container at 298K and under 1 atm pressure. It is heated				
to 596K when 20% by mass of N ₂ O (g) decomposes to NO ₂ . The resulting pressure is				
a. 2.4 atm b. 1.	2 atm	c. 4.8 atm	d. 2.8 atm	
4. During the adsorption of a gas on the surface of a solid, which of the following is true?				
a. ΔG <0, ΔH >0, ΔS <0				
b. $\Delta G > 0$, $\Delta H < 0$, $\Delta S < 0$				
c. ΔG <0, ΔH <0, ΔS <0				
d. ΔG <0, ΔH <0, ΔS >0				
5. Which of the following statements is true?				
a. The total entropy of the universe remains constant.				
b. The total entropy of the universe is continuously decreasing.				
c. The total energy of the universe is continuously decreasing.				
d. The total energy of the universe remains constant.				
6. The number of optical isomers of the compound, CH ₃ -CHBr-CHBr-COOH is				
a. 0 b. 1	c. 3	d. 4		

- 7. Excess of PCl₅ reacts with concentrated H₂SO₄ giving
- a. Chlorosulphuric acid
- b. Sulphurous acid
- c. Sulphuryl chloride
- d. Thionyl chloride.
- 8. Hybridised states of C in graphite and diamond are respectively,
- a. sp^3 , sp^3

c. sp^2 , sp^2

b. sp^3 , sp^2

- $d. sp^2, sp^3$
- 9. Oils are liquids at room temperature since they contain higher percentage of
- a. Oleates

c. Stearates

b. Palmitates

- d. Myristates
- 10. Adsorption theory is applicable for
- a. Homogenous catalysis
- b. Heterogenous catalysis
- c. Auto- catalysis
- d. Induced Catalysis

11.
$$H + CH_3MgBr \xrightarrow{Ether} A \xrightarrow{H_3O^+} B$$

The IUPAC name of B is

a. 3-methylbutan-2-ol

c. 2-methylbutan-2-ol

b. 2-methylbutan-3-ol

- d. Pentan-2-ol
- 12. A plot of 1/T v/s K for a reaction gives the slope -1×10^4 K. The energy of activation for the reaction is:
- a. 8314 J mol⁻¹

c. 12.02 J mol⁻¹

b. 1.202 kJ mol⁻¹

d. 83.14 kJ mol⁻¹

13. Conductivity of a saturated solution of a sparingly soluble salt AB at 298 K is 1.85×10^{-5} S m⁻¹. Solubility product of the salt AB at 298 K is: (Given: $\Delta_{\rm m}^{\circ}$ (AB) = 140×10⁻⁴ Sm² mol⁻¹) a. 5.7×10^{-12} b. 1.32×10^{-12} c. 7.5×10^{-12} d. 1.74×10^{-12} 14. The correct arrangement of the species in the decreasing order of the bond length between carbon and oxygen in them is a. CO, CO₂, HCO₂-, CO₃²b. CO₂, HCO₂-, CO, CO₃²c. CO₃²⁻, HCO₂-, CO₂, CO d. CO, CO₃²⁻, CO₂, HCO₂⁻ 15. In which one of the pairs of ion given, there is an ion that forms a coordination compound with both aqueous sodium hydroxide and ammonia and another ion that forms coordination compound only with aqueous sodium hydroxide? b. Zn²⁺, Al³⁺ a. Pb²⁺, Cu²⁺ c. Cu²⁺, Zn²⁺ d. Al³⁺, Cu²⁺ 16. One of the following is an essential amino acid a. Cysteine b. Serine c. Tyrosine d. Isoleucine 17. One of the following amides will not undergo Hoffmann bromoamide reaction

c. CH₃CONH₂

d. C₆H₅CONH₂

a. CH₃CONHCH₃

b. CH₃CH₂CONH₂

- 18. Which of the following colloids cannot be easily coagulated?a. Multi molecular colloids
- b. Irreversible colloids
- c. lyophobic colloids
- d. Macromolecular colloids
- 19. Which of the following compound of xenon has pyramidal geometry?
- a. XeF₂
- b. XeF₄
- c. XeOF₄
- d. XeO₃
- 20. Identify 'Q' in the following sequence of reactions:

- a) (
- b) C
- c) (
- d)
- 21. In the sequence of following reactions:

$$P \xrightarrow{\text{(i) Br}_2} Q \xrightarrow{\text{NaNO}_2/\text{HCI, 273-278 K}} R \xrightarrow{\text{KMnO}_4} Br$$

The starting compound 'P' is:

a. m-Nitrotoluene

c. o-nitrotoluene

b. p-Nitrotoluene

- d. o-bromotoluene
- 22. In presence of HCl, H₂S results the precipitation of group-2 elements but not group-4 elements during qualitative analysis. It is due to
- a. Higher concentration of H⁺
- b. Lower concentration of H⁺
- c. Higher concentration of S²-
- d. Lower concentration of S²-

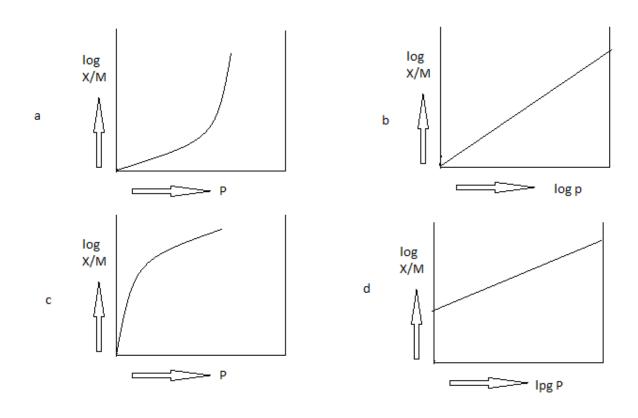
23. In the given set of reactions,

2-Bromopropane
$$\xrightarrow{\text{Alc. AgCN}}$$
 X $\xrightarrow{\text{LiAlH}_4}$ Y

The IUPAC name of product Y is

- a. N-isopropyl methanamine
- b. N-methyl propan-2-amine
- c. N-methyl propanamine
- d. Butan-2-amine

24. Which of the following curves is in accordance with Freundlich adsorption isotherm?



25.
$$\longrightarrow$$
 Br + Mg $\xrightarrow{\text{Dry ether}}$ A $\xrightarrow{\text{H}_2\text{O}}$ B

The product is

a)
$$MgBr$$
 b) OH c) OH d)

26. An organic compound P has 76.6% C and 6.38% H. Its vapor density is 47. It gives a characteristic color with aq. FeCl₃. P when treated with CO₂ and NaOH at 140°C under pressure gives Q which on acidification gives R. R reacts with acetyl chloride to gives S which is

a)
$$OCOCH_3$$
 b) $OCOCH_3$

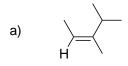
c) OH OCOCH
$$_3$$

27. If one strand of DNA has the sequence ATGCTTGA, the sequence in the complimentary strand would be

- a. TACGAACT c. TACGTACT
- b. TCCGAACT d. TACGTAGT

28. What is the major product of the following reaction?

$$\begin{array}{c} \text{OH} \\ \hline \\ \text{H}_2\text{SO}_4 \\ \hline \\ \text{Heat} \end{array}$$



29. Which of the following compounds is not correctly named?

1,2- Epoxypropane

Propane-1,3 diamine

3,4-bis (N-methylamino) biphenyl

N-phenyl dimethyl amine

30. The following two reactions of HNO₃ with Zn are given as (equations are not balanced)

$$Zn + conc. HNO_3 \longrightarrow Zn(NO_3)_2 + X + H_2O$$

$$7n(N\Omega_2)_2 + X + H_2\Omega$$

(1)

$$7n + dil HNO2$$

$$Zn + dil. HNO_3 \longrightarrow Zn(NO_3)_2 + Y + H_2O$$

(2)

In reactions (1) and (2), the compounds X and Y respectively are

a. NO₂ and NO

c. NO and NO₂

b. NO₂ and NO₂

d. NO₂ and NH₄NO₃

31.

$$\begin{array}{c|c} O & (i) \ HC = C \ Na^+, NH_3 \\ \hline \\ \hline \\ (ii) \ H_3O^+ \end{array} \qquad X \xrightarrow{(i) \ Dil. \ H_2SO_4, \ Hg^{2+}} Y \longrightarrow \quad Z$$

Here, Z is



- 32. Which of the following ores are concentrated by froth-floatation method?
- a. cuprite b. sphalerite
 - c. siderite
- d. hematite
- 33. Which of the following cannot be prepared by Williamson's synthesis?
- a. Methoxybenzene

- b. Benzyl-p-nitrophenyl ether
- c. Methyl tert-butyl ether
- d. Di-tert-butyl ether
- 34. Highly pure dilute solution of sodium in liquid ammonia:
- a. shows blue color

- b. exhibits electrical conductivity
- c. produces sodium amide
- d. produces hydrogen gas

35.
$$H_3$$
CHC=HC \longrightarrow OH \longrightarrow Z

In above reaction Z is

(a)
$$H_3CHCBrH_2C$$
———OH

- 36. Which of the following will react with water?
- a. CHCl₃

c. CCl₄

b. Cl₃CCHO

d. ClCH₂CH₂Cl

37. The pH of 0.1M solution of the following salts increases in the order:

a. NaCl< NH₄Cl< NaCN< HCl

b. HCl< NH₄Cl< NaCl< NaCN

c. NaCN< NH₄Cl< NaCl< HCl

d. HCl< NaCl< NaCN< NH₄Cl

38. In the dichromate dianion

a. 4 Cr-O bonds are equivalent

b. 6 Cr-O bonds are equivalent

c. all Cr-O bonds are equivalent

d. all Cr-O bonds are non-equivalent

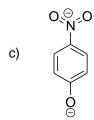
39. The enol form of acetone, after treatment with D₂O, gives

(a)
$$H_3C-C=CH_2$$

OH
(c)
$$H_2C = C - CH_2D$$

(d)
$$D_2C = C - CD_3$$

40. The most unlikely representation of resonance structure of p-nitrophenoxide ion is:



41. The electronic configuration of an element is $1s^22s^22p^63s^23p^63d^54s^1$. This represents its

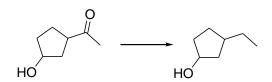
a. Excited state

c. cationic form

b. ground state

d. anionic form

42. The appropriate reagent for the following transformation



a. Zn(Hg), HCl

c. H₂/Ni

b. NH₂NH₂, OH⁻

- d. NaBH₄
- 43. Ammonia can be dried by:
- a. conc. H₂SO₄

c. CaO

b. P₄O₁₀

- d. Anhydrous CaCl₂
- 44. Which one of the following will not readily be dehydrated in acidic condition?
- (a) O OH
- (b)
- (c) OH
- d) Other
- 45. The rate constant for the reaction $2N_2O_5 \longrightarrow 4NO_2 + O_2$ is 3.0×10^{-5} s⁻¹. If the rate is 2.40
- $\times\,10^{\text{-}5}$ mol $L^{\text{-}1}S^{\text{-}1},$ then the concentration of N_2O_5 (in mol $L^{\text{-}1})$ is:
- a. 1.4

c. 0.04

b. 1.2

- d. 0.8
- 46. The wavelength associated with a golf ball weighing 200g and moving at a speed of 5m/h is of the order
- a. 10⁻¹⁰ m

c. 10⁻³⁰ m

b. 10⁻²⁰ m

- d. 10⁻⁴⁰ m
- 47. The correct order of basicities of the following compounds is:

(b)
$$H_3C-CH_2-NH_2$$

(c)
$$H_3C$$
NH

(d)
$$H_3C-C-NH_2$$

48. At constant temperature, the equilibrium constant (K_p) for the decomposition reaction

 N_2O_4 \longrightarrow 2NO₂ is expressed by Kp= $(4x^2P)/(1-x^2)$, where P= pressure, x= extent of decomposition. Which one of the following statements is true?

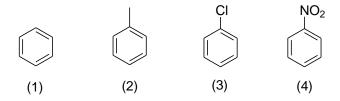
- a. Kp increases with increase of P.
- b. a. Kp increases with increase of x.
- c. a. Kp increases with decrease of x.
- d. a. Kp remains constant with change in p&x.
- 49. The set with correct order of acidity is:
- a. HClO<HClO₂<HClO₃<HClO₄
- b. HClO₄< HClO₃< HClO₂< HClO
- c. HClO<HClO₄<HClO₃<HClO₂
- d. HClO₄< HClO₂< HClO₃< HClO
- 50. The chemical composition of 'slag' formed during the smelting process in the extraction of copper is:
- a. Cu₂O+FeS
- b. FeSiO₃
- c. CuFeS₂
- d. Cu₂S+FeO
- 51. When the temperature is increased, surface tension of water
- a. increases

b. decreases

c. remains constant

- d. shows irregular behavior
- 52. Specify the coordination geometry around and hybridization of N and B atoms in a 1:1 complex of BF₃ and NH₃.

- a. N: tetrahedral, sp³; B: tetrahedral, sp³
- b. N: pyramidal, sp³; B: pyramidal, sp³
- c. N: pyramidal, sp³; B: planar, sp²
- d. N: pyramidal, sp³; B: tetrahedral, sp³
- 53. Identify the correct order of reactivity in electrophilic substitution reactions of the following compounds:



a. 1>2>3>4

c. 2>1>3>4

b. 4>3>2>1

- d. 2>3>1>4
- 54. Which of the following acids has the smallest dissociation constant?
- a. CH₃CHFCOOH

c. BrCH₂CH₂COOH

b. FCH₂CH₂COOH

- d. CH₃CHBrCOOH
- 55. Polyphosphates are used as water softening agents because they
- a. form soluble complexes with anionic species
- b. precipitate anionic species
- c. form soluble complexes with cationic species
- d. precipitate cationic species
- 56. Identify the correct order of solubility of Na₂S, CuS and ZnS in aqueous medium.
- a. CuS>ZnS>Na₂S
- b. ZnS>Na₂S>CuS
- c. Na₂S>CuS>ZnS
- d. Na₂S> ZnS> CuS
- 57. Among the following the molecule with the highest dipole moment is:

a. CH₃Cl c. CHCl₃

b. CH₂Cl₂ d. CCl₄

58. When MnO₂ is fused with KOH, a colored compound is formed. The product and its color is:

- a. K₂MnO₄, purple green b. KMnO₄, purple
- c. Mn₂O₃, brown d. Mn₃O₄, black
- 59. The product of acid hydrolysis of P and Q can be distinguished by:

$$P = H_2C \xrightarrow{OCOCH_3} Q = Q = OCOCH_3$$

- a. Lucas Reagent b. 2,4-DNP
- c. Fehling's solution d. NaHSO₃
- 60. In the electrolyte cell, flow of electrons is from
- a. cathode to anode in solution
- b. cathode to anode through external supply
- c. cathode to anode through internal supply
- d. anode to cathode through internal supply.

RED Answers

1	c
2	a
	a
4	c
5	d
3 4 5 6 7	d
7	c
8	d
9	a
10	b
11	a
12	None
13	d
14	c
15	b
16	d
17	a
18	d
19	d
20	d
21	b
22	d
23	b
24	d
25	d
26	d
27	a
28	d
29	d
30	d

31 32 33 34 35 36 37 38 39 40	c b d (a) (b) b b b c
41	b
42	b
43	c
44	a
45	d
46	c
47	b
48	d
49	a
50	b
51	b
52	a
53	c
54	c
55	c
56	d
57	a
58	a
59	c
60	c