

## PRACTICE PAPERS CHEMISTRY OLYMPIADS

STAGE – 1

Paper – 16

TIME: 1HR 30MIN

MAX MARKS: 180

- Attempt all the Questions.
- All questions carry +3 for right answer and -1 for wrong answer.
- Use of Calculator is allowed.

### PERIODIC TABLE OF THE ELEMENTS

1 1A	2 2A											13 3A	14 4A	15 5A	16 6A	17 7A	18 8A	
1 H 1.008																		2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18	
11 Na 22.99	12 Mg 24.31	3 3B	4 4B	5 5B	6 6B	7 7B	8 8B	9 8B	10 8B	11 1B	12 2B	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95	
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.97	35 Br 79.90	36 Kr 83.80	
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.95	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3	
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)	
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 Ds (281)	111 Rg (272)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (289)	116 Lv (293)	117 Ts (294)	118 Og (294)	

58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

Name: .....

Correct Questions = .....

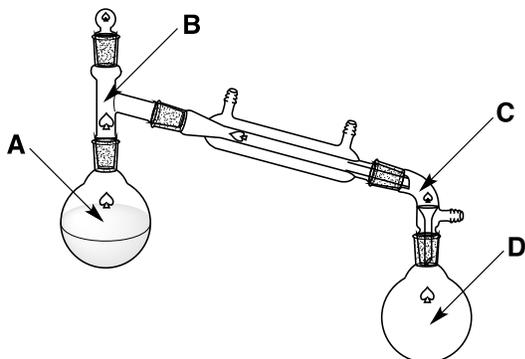
Wrong Questions = .....

Unattempt Questions = .....

Marks = .....

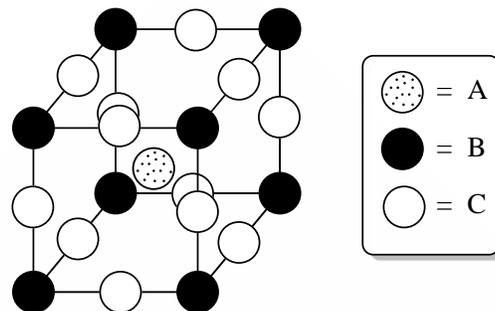
1. Benzene,  $C_6H_6$ , reacts with oxygen,  $O_2$ , to form  $CO_2$  and  $H_2O$ . How much  $O_2$  is required for the complete combustion of 1.0 mol  $C_6H_6$ ?
- (A) 6.0 mol                      (B) 7.5 mol  
(C) 9.0 mol                      (D) 12 mol
2. A 10.00 g sample of a soluble barium salt is treated with an excess of sodium sulfate to precipitate 11.21 g  $BaSO_4$  ( $M = 233.4$ ). Which barium salt is it?
- (A)  $BaCl_2$  ( $M = 208.2$ )  
(B)  $Ba(O_2CH)_2$  ( $M = 227.3$ )  
(C)  $Ba(NO_3)_2$  ( $M = 261.3$ )  
(D)  $BaBr_2$  ( $M = 297.1$ )
3. What is the concentration of nitrate ion in a 425 mL solution containing 32.0 g of  $Mg(NO_3)_2$  ( $M = 148.3$ )?
- (A) 0.216 M                      (B) 0.432 M  
(C) 0.508 M                      (D) 1.02 M
4. The formula for terbium phosphate is  $TbPO_4$ . The formula for terbium sulfate is
- (A)  $Tb_2SO_4$                       (B)  $TbSO_4$   
(C)  $Tb_2(SO_4)_3$                       (D)  $Tb(SO_4)_2$
5. A 25.0 mL sample of 0.15 M silver nitrate,  $AgNO_3$ , is reacted with a 3.58 g sample of calcium chloride,  $CaCl_2$  ( $M = 111.0$ ). Which of the following statements is true?
- (A) Silver nitrate is the limiting reactant and calcium nitrate precipitates.  
(B) Silver nitrate is the limiting reactant and silver chloride precipitates.  
(C) Calcium chloride is the limiting reactant and calcium nitrate precipitates.  
(D) Calcium chloride is the limiting reactant and silver chloride precipitates.
6. Which aqueous solution exhibits the largest freezing point depression?
- (A) 1.0 *m* KBr                      (B) 0.75 *m*  $C_6H_{12}O_6$   
(C) 0.5 *m*  $MgCl_2$                       (D) 0.25 *m*  $Ga_2(SO_4)_3$
7. Which calcium compound is not appreciably more soluble in 0.1 M hydrochloric acid than it is in pure water?
- (A) Limestone,  $CaCO_3$   
(B) Slaked lime,  $Ca(OH)_2$   
(C) Gypsum,  $CaSO_4 \cdot 2 H_2O$   
(D) Hydroxyapatite,  $Ca_5(OH)(PO_4)_3$
8. Which metal reacts most vigorously with water at 25 °C?
- (A) Na                      (B) Mg                      (C) K                      (D) Ca
9. Each of the following forms a colored aqueous solution EXCEPT
- (A)  $Cr(NO_3)_3$                       (B)  $Co(NO_3)_2$   
(C)  $Cu(NO_3)_2$                       (D)  $Zn(NO_3)_2$
10. A student wishes to measure 37 mL of a liquid. Which apparatus would be most suitable?
- (A) 50 mL graduated cylinder  
(B) 50 mL volumetric pipet  
(C) 50 mL beaker  
(D) 50 mL Erlenmeyer flask
11. A 2.0 mL sample of a colorless solution, when treated with a few drops of 2 M hydrochloric acid, forms a white precipitate which dissolves when the solution is heated to boiling. The original solution could have contained which of the following cations?
- I. 0.1 M  $Ag^+$                       II. 0.1 M  $Pb^{2+}$
- (A) I only                      (B) II only  
(C) Either I or II                      (D) Neither I nor II
12. Which compound has the lowest normal boiling point?
- (A) HF                      (B) HCl                      (C) HBr                      (D) HI
13. Which of the following would lead to an increase in the vapor pressure of a liquid?
- I. Increasing the temperature    II. Adding a nonvolatile solute
- (A) I only                      (B) II only  
(C) Both I and II                      (D) Neither I nor II

14. A student is separating  $\text{CHCl}_3$  (bp =  $61^\circ\text{C}$ ) from  $\text{CHCl}_2\text{CHCl}_2$  (bp =  $146^\circ\text{C}$ ) by distillation. She has just begun to collect the first distillate in the receiving flask. At what position in the apparatus will the temperature be  $61^\circ\text{C}$ ?



- (A) A      (B) B      (C) C      (D) D
15. How is the enthalpy of vaporization of a substance related to its enthalpy of fusion?
- (A) The enthalpy of vaporization is greater than the enthalpy of fusion.  
 (B) The enthalpy of vaporization is equal to the enthalpy of fusion.  
 (C) The enthalpy of vaporization is less than the enthalpy of fusion.  
 (D) There is no general relationship between a substance's enthalpy of vaporization and enthalpy of fusion.
16. A 3.0 L sample of helium gas is stored in a rigid, sealed container at  $25^\circ\text{C}$  and 1.0 atm pressure. The temperature is increased to  $125^\circ\text{C}$ . What is the new pressure of the gas?
- (A) 0.20 atm      (B) 0.75 atm  
 (C) 1.3 atm      (D) 5.0 atm
17. Diamond is an example of what kind of solid?
- (A) Ionic      (B) Metallic  
 (C) Molecular      (D) Network covalent
18. Which of the following is a mathematical statement of the first law of thermodynamics?
- (A)  $\Delta V = (nR/P)\Delta T$       (B)  $\Delta E = q + w$   
 (C)  $\Delta H = \Delta E + P\Delta V$       (D)  $\Delta G = \Delta H - T\Delta S$

19. The cubic unit cell of a perovskite structure containing atoms of types A, B, and C is illustrated below. What is the empirical formula of this substance?



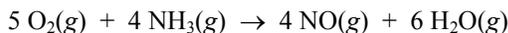
- (A) ABC      (B)  $\text{ABC}_3$       (C)  $\text{AB}_4\text{C}_6$       (D)  $\text{AB}_8\text{C}_{12}$
20. The enthalpy change under standard conditions for which of the reactions below would be equal to the  $\Delta H^\circ_f$  of  $\text{NaOH}(s)$ ?
- (A)  $\text{Na}(s) + \text{H}_2\text{O}(l) \rightarrow \text{NaOH}(s) + \frac{1}{2} \text{H}_2(g)$   
 (B)  $\text{Na}(s) + \frac{1}{2} \text{O}_2(g) + \frac{1}{2} \text{H}_2(g) \rightarrow \text{NaOH}(s)$   
 (C)  $\text{Na}(s) + \frac{1}{2} \text{H}_2\text{O}_2(l) \rightarrow \text{NaOH}(s)$   
 (D)  $\text{Na}^+(aq) + \text{OH}^-(aq) \rightarrow \text{NaOH}(s)$
21. A 37.5 g piece of gold at  $83.0^\circ\text{C}$  is added to 100. g  $\text{H}_2\text{O}$  at  $22.0^\circ\text{C}$  in a well-insulated cup. What is the temperature after the system comes to equilibrium? (The specific heat capacity of Au is  $0.129 \text{ J}\cdot\text{g}^{-1}\cdot\text{K}^{-1}$ )
- (A)  $22.7^\circ\text{C}$       (B)  $23.0^\circ\text{C}$   
 (C)  $25.0^\circ\text{C}$       (D)  $52.5^\circ\text{C}$
22. Which of these reactions has  $\Delta S^\circ > 0$ ?
- (A)  $\text{S}_8(l) \rightarrow \text{S}_8(s, \text{monoclinic})$   
 (B)  $\text{H}_2(g) + \text{O}_2(g) \rightarrow \text{H}_2\text{O}_2(aq)$   
 (C)  $\text{H}_2(g) + 2 \text{Ag}^+(aq) \rightarrow 2 \text{H}^+(aq) + 2 \text{Ag}(s)$   
 (D)  $\text{PCl}_5(g) \rightarrow \text{PCl}_3(g) + \text{Cl}_2(g)$
23. Given the enthalpy changes:
- $\text{A} + \text{B} \rightarrow \text{C} \quad \Delta H = -35 \text{ kJ}\cdot\text{mol}^{-1}$   
 $\text{A} + \text{D} \rightarrow \text{E} + \text{F} \quad \Delta H = +20 \text{ kJ}\cdot\text{mol}^{-1}$   
 $\text{F} \rightarrow \text{C} + \text{E} \quad \Delta H = +15 \text{ kJ}\cdot\text{mol}^{-1}$
- What is  $\Delta H$  for the reaction  $2\text{A} + \text{B} + \text{D} \rightarrow 2\text{F}$ ?
- (A)  $0 \text{ kJ}\cdot\text{mol}^{-1}$       (B)  $-30 \text{ kJ}\cdot\text{mol}^{-1}$   
 (C)  $-40 \text{ kJ}\cdot\text{mol}^{-1}$       (D)  $-70 \text{ kJ}\cdot\text{mol}^{-1}$

24. The  $K_a$  of phosphoric acid,  $\text{H}_3\text{PO}_4$ , is  $7.6 \times 10^{-3}$  at  $25^\circ\text{C}$ . For the reaction



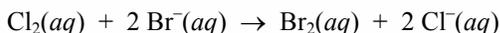
$\Delta H^\circ = -14.2 \text{ kJ/mol}$ . What is the  $K_a$  of  $\text{H}_3\text{PO}_4$  at  $60^\circ\text{C}$ ?

- (A)  $4.2 \times 10^{-3}$  (B)  $6.8 \times 10^{-3}$   
 (C)  $8.5 \times 10^{-3}$  (D)  $1.8 \times 10^{-2}$
25. For the reaction



if  $\text{NH}_3$  is being consumed at a rate of  $0.50 \text{ M}\cdot\text{s}^{-1}$ , at what rate is  $\text{H}_2\text{O}$  being formed?

- (A)  $0.33 \text{ M}\cdot\text{s}^{-1}$  (B)  $0.50 \text{ M}\cdot\text{s}^{-1}$   
 (C)  $0.75 \text{ M}\cdot\text{s}^{-1}$  (D)  $3.0 \text{ M}\cdot\text{s}^{-1}$
26. The rate of decomposition of hydrogen peroxide is first order in  $\text{H}_2\text{O}_2$ . At  $[\text{H}_2\text{O}_2] = 0.150 \text{ M}$ , the decomposition rate was measured to be  $4.83 \times 10^{-6} \text{ M}\cdot\text{s}^{-1}$ . What is the rate constant for the reaction?
- (A)  $2.15 \times 10^{-4} \text{ s}^{-1}$  (B)  $3.22 \times 10^{-5} \text{ s}^{-1}$   
 (C)  $4.83 \times 10^{-6} \text{ s}^{-1}$  (D)  $7.25 \times 10^{-7} \text{ s}^{-1}$
27. In the reaction  $\text{A} \rightarrow \text{B}$ , a plot of  $1/[\text{A}]$  vs.  $t$  is found to be linear. What is the reaction order in A?
- (A) Zeroth order (B) First order  
 (C) Second order (D) Third order
28. The half-life of iodine-131 is 8.02 days. How long will it take for 80.% of the sample to decay?
- (A) 2.6 days (B) 13 days  
 (C) 19 days (D) 32 days
29. For the reaction



which of the following could be used to monitor the rate?

I. pH meter II. Spectrophotometer

- (A) I only (B) II only  
 (C) Either I or II (D) Neither I nor II
30. For a reversible exothermic reaction, what is the effect of increasing temperature on the equilibrium constant ( $K_{\text{eq}}$ ) and on the forward rate constant ( $k_f$ )?
- (A)  $K_{\text{eq}}$  and  $k_f$  both increase  
 (B)  $K_{\text{eq}}$  and  $k_f$  both decrease  
 (C)  $K_{\text{eq}}$  increases and  $k_f$  decreases  
 (D)  $K_{\text{eq}}$  decreases and  $k_f$  increases

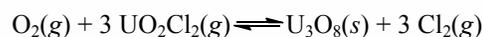
31. When 0.10 M solutions of ammonium acetate, barium acetate, and sodium acetate are ranked from least basic to most basic, what is the correct ordering?

- (A)  $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2 < \text{NaC}_2\text{H}_3\text{O}_2 < \text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$   
 (B)  $\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2 < \text{NH}_4\text{C}_2\text{H}_3\text{O}_2 < \text{NaC}_2\text{H}_3\text{O}_2$   
 (C)  $\text{NaC}_2\text{H}_3\text{O}_2 < \text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2 < \text{NH}_4\text{C}_2\text{H}_3\text{O}_2$   
 (D)  $\text{NaC}_2\text{H}_3\text{O}_2 < \text{NH}_4\text{C}_2\text{H}_3\text{O}_2 < \text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$

32. What is the solubility of  $\text{MgF}_2$  ( $K_{\text{sp}} = 6.8 \times 10^{-9}$ ) in pure water?

- (A)  $6.8 \times 10^{-9} \text{ mol}\cdot\text{L}^{-1}$  (B)  $5.8 \times 10^{-5} \text{ mol}\cdot\text{L}^{-1}$   
 (C)  $8.2 \times 10^{-5} \text{ mol}\cdot\text{L}^{-1}$  (D)  $1.2 \times 10^{-3} \text{ mol}\cdot\text{L}^{-1}$

33. What is the ratio  $K_c/K_p$  for the following reaction at  $723^\circ\text{C}$ ?

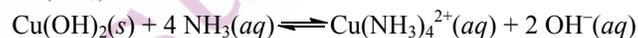


- (A) 0.0122 (B) 1.00 (C) 59.4 (D) 81.8

34. What is  $[\text{H}_3\text{O}^+]$  in a solution formed by dissolving 1.00 g  $\text{NH}_4\text{Cl}$  ( $M = 53.5$ ) in 30.0 mL of 3.00 M  $\text{NH}_3$  ( $K_b = 1.8 \times 10^{-5}$ )?

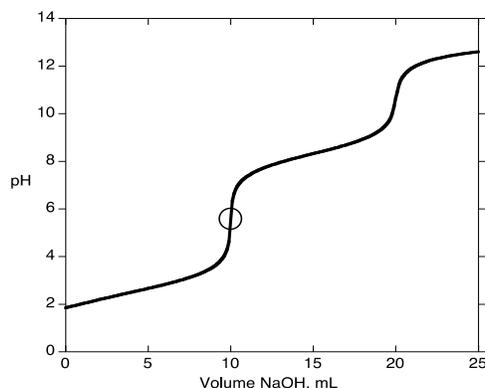
- (A)  $2.7 \times 10^{-9} \text{ M}$  (B)  $5.5 \times 10^{-10} \text{ M}$   
 (C)  $1.2 \times 10^{-10} \text{ M}$  (D)  $1.4 \times 10^{-12} \text{ M}$

35. Copper(II) hydroxide,  $\text{Cu}(\text{OH})_2$ , has  $K_{\text{sp}} = 2.2 \times 10^{-20}$ . For the reaction below,  $K_{\text{eq}} = 4.0 \times 10^{-7}$ . What is  $K_f$  for  $\text{Cu}(\text{NH}_3)_4^{2+}$ ?



- (A)  $8.8 \times 10^{-27}$  (B)  $5.5 \times 10^{-14}$   
 (C)  $1.8 \times 10^{13}$  (D)  $1.1 \times 10^{26}$

36. A 0.100 M aqueous solution of  $\text{H}_2\text{SeO}_3$  is titrated with 1.000 M  $\text{NaOH}$  solution. At the point marked with a circle on the titration curve, which species represent at least 10% of the total selenium in solution?



- (A)  $\text{H}_2\text{SeO}_3$  only (B) Both  $\text{H}_2\text{SeO}_3$  and  $\text{HSeO}_3^-$   
 (C)  $\text{HSeO}_3^-$  only (D) Both  $\text{HSeO}_3^-$  and  $\text{SeO}_3^{2-}$

37. What is the oxidation number of C in formaldehyde,  $\text{CH}_2\text{O}$ ?  
 (A) -2 (B) 0 (C) +2 (D) +4
38. In a galvanic cell in which the following spontaneous reaction takes place, what process occurs at the cathode?  
 $3 \text{Ce}^{4+}(\text{aq}) + \text{Cr}(\text{s}) \rightarrow 3 \text{Ce}^{3+}(\text{aq}) + \text{Cr}^{3+}(\text{aq})$   
 (A) Reduction of  $\text{Cr}^{3+}(\text{aq})$   
 (B) Reduction of  $\text{Ce}^{4+}(\text{aq})$   
 (C) Oxidation of  $\text{Cr}(\text{s})$   
 (D) Oxidation of  $\text{Ce}^{3+}(\text{aq})$
39. Which two half reactions, when coupled, will make a galvanic cell that will produce the largest voltage under standard conditions?  
 I.  $\text{Cu}^{2+}(\text{aq}) + 2 \text{e}^- \rightarrow \text{Cu}(\text{s}) \quad E^\circ = +0.34 \text{ V}$   
 II.  $\text{Pb}^{2+}(\text{aq}) + 2 \text{e}^- \rightarrow \text{Pb}(\text{s}) \quad E^\circ = -0.13 \text{ V}$   
 III.  $\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag}(\text{s}) \quad E^\circ = +0.80 \text{ V}$   
 IV.  $\text{Al}^{3+}(\text{aq}) + 3 \text{e}^- \rightarrow \text{Al}(\text{s}) \quad E^\circ = -1.66 \text{ V}$   
 (A) I and II (B) I and IV  
 (C) II and IV (D) III and IV
40. An electrolysis cell is operated for 3000 s using a current of 1.50 A. From which 1.0 M solution will the greatest mass of metal be deposited?  
 (A)  $\text{TlNO}_3$  (B)  $\text{Pb}(\text{NO}_3)_2$   
 (C)  $\text{ZnCl}_2$  (D)  $\text{In}(\text{NO}_3)_3$
41. The reduction of  $\text{O}_2$  to  $\text{H}_2\text{O}$  in acidic solution has a standard reduction potential of +1.23 V. What is the effect on the half-cell potential at 25 °C when the pH of the solution is increased by one unit?  
 $\text{O}_2(\text{g}) + 4 \text{H}^+(\text{aq}) + 4 \text{e}^- \rightarrow 2 \text{H}_2\text{O}(\text{l})$   
 (A) The half-cell potential decreases by 59 mV.  
 (B) The half-cell potential increases by 59 mV.  
 (C) The half-cell potential decreases by 236 mV.  
 (D) The half-cell potential increases by 236 mV.
42. Given the two standard reduction potentials below, what is the  $K_{\text{sp}}$  of  $\text{Ag}_2\text{CrO}_4$  at 25 °C?  
 $\text{Ag}_2\text{CrO}_4(\text{s}) + 2 \text{e}^- \rightarrow 2 \text{Ag}(\text{s}) + \text{CrO}_4^{2-}(\text{aq}) \quad E^\circ = +0.446 \text{ V}$   
 $\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag}(\text{s}) \quad E^\circ = +0.799 \text{ V}$   
 (A)  $8.64 \times 10^{11}$  (B)  $1.08 \times 10^{-6}$   
 (C)  $1.16 \times 10^{-12}$  (D)  $1.11 \times 10^{-39}$
43. What is the value of the quantum number  $l$  for a 5p orbital?  
 (A) 1 (B) 2 (C) 3 (D) 4
44. Which element has chemical properties most similar to those of P?  
 (A) N (B) Al (C) S (D) As
45. Which metal has the lowest melting point?  
 (A) Li (B) Na (C) K (D) Rb
46. Which gas-phase atom has no unpaired electrons in its ground state?  
 (A) Li (B) Be (C) B (D) C
47. Which halogen atom has the greatest electron affinity?  
 (A) F (B) Cl (C) Br (D) I
48. Which electronic transition in atomic hydrogen corresponds to the emission of visible light?  
 (A)  $n = 5 \rightarrow n = 2$  (B)  $n = 1 \rightarrow n = 2$   
 (C)  $n = 3 \rightarrow n = 4$  (D)  $n = 3 \rightarrow n = 1$
49. Which species are linear?  
 I.  $\text{NO}_2^+$  II.  $\text{I}_3^-$   
 (A) I only (B) II only  
 (C) Both I and II (D) Neither I nor II
50. The peroxydisulfate anion,  $\text{HSO}_5^-$ , has  
 (A) five sulfur-oxygen bonds and no oxygen-oxygen bonds.  
 (B) four sulfur-oxygen bonds and one oxygen-oxygen bond.  
 (C) three sulfur-oxygen bonds and two oxygen-oxygen bonds.  
 (D) one sulfur-oxygen bond and four oxygen-oxygen bonds.
51. Which statement about bonding is correct?  
 (A) A  $\sigma$  bond has cylindrical symmetry about the bonding axis.  
 (B) A  $\pi$  bond is twice as strong as a  $\sigma$  bond.  
 (C) A double bond consists of two  $\pi$  bonds.  
 (D) A  $\pi$  bond results from the sideways overlap of hybridized orbitals.

52. What is the geometry of the chlorate ion,  $\text{ClO}_3^-$ ?
- (A) trigonal planar      (B) trigonal pyramidal  
(C) T-shaped      (D) zigzag
53. What is the bond order in NO?
- (A) 1.0      (B) 1.5      (C) 2.0      (D) 2.5
54. In the Lewis structure of ozone,  $\text{O}_3$ , what is the formal charge on the central oxygen?
- (A) 2-      (B) 1-      (C) 0      (D) 1+
55. Hydrogenation of an alkene converts it to an
- (A) alkane.      (B) alkyne.  
(C) alcohol.      (D) aldehyde.
56. What is the relationship between the two compounds below?
- $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$      $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$
- (A) Identical      (B) Stereoisomers  
(C) Geometric isomers      (D) Structural isomers
57. Which class of organic compounds does NOT contain oxygen?
- (A) Alcohol      (B) Amide  
(C) Amine      (D) Ketone
58. Compared to ionic compounds of similar molar mass, hydrocarbons typically have
- I. Higher water solubility      II. Higher melting points
- (A) I only      (B) II only  
(C) Both I and II      (D) Neither I nor II
59. Which of the following compounds could contain exactly one triple bond?
- (A)  $\text{C}_5\text{H}_{10}$       (B)  $\text{C}_5\text{H}_{12}$       (C)  $\text{C}_6\text{H}_{10}$       (D)  $\text{C}_6\text{H}_{12}$
60. Which of the following is NOT classified as a biopolymer?
- (A) Collagen      (B) Glucose  
(C) Cellulose      (D) Chitin

# KEY

Number	Answer	Number	Answer
1.	B	31.	A
2.	A	32.	D
3.	D	33.	D
4.	C	34.	C
5.	B	35.	C
6.	A	36.	C
7.	C	37.	B
8.	C	38.	B
9.	D	39.	D
10.	A	40.	A
11.	B	41.	A
12.	B	42.	C
13.	A	43.	A
14.	B	44.	D
15.	A	45.	D
16.	C	46.	B
17.	D	47.	B
18.	B	48.	A
19.	B	49.	C
20.	B	50.	B
21.	A	51.	A
22.	D	52.	B
23.	B	53.	D
24.	A	54.	D
25.	C	55.	A
26.	B	56.	D
27.	C	57.	C
28.	C	58.	D
29.	B	59.	C
30.	D	60.	B