



Unity Academy Secondary School - Keranyo Branch
Chemistry Review Questions for Grade 12

I. Choose the best answer on the following questions

1. A 500g tooth paste sample has 0.2g of fluoride concentration. What is the concentration of

fluoride in terms of ppm?

- A. 400 B. 200 C. 250 D. 1000

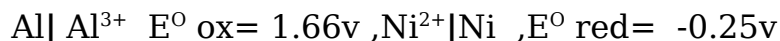
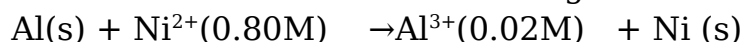
2. What is the $[H_3O^+]$ in a 0.050M solution of $Ba(OH)_2$?

- A. 1.0×10^{-13} C. 1.0×10^{-5}
 B. 5.0×10^{-10} D. 5.0×10^{-2}

3. Which one of the following statements about the Daniel cell is false?

- A. zinc metal immersed in zinc sulphate solution acts as the anode
 B. copper metal dipped in copper sulphate solution acts as the cathode
 C. anode is the positive electrode & cathode is the negative electrode
 D. electrons flow from anode to cathode in the external circuit

4. Calculate E° & E for the following reaction



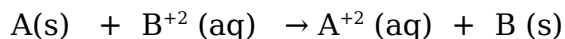
- A. $E^\circ = 2.14V$ & $E_{cell} = 1.441V$ B. $E^\circ_{cell} = 1.41V$ & $E_{cell} = 1.441V$
 C. $E^\circ_{cell} = 0.435V$ D. $E^\circ_{cell} = 0.543V$ & $E_{cell} = 56.7V$

5. Which one is not true about emf?

- A. the driving force that allows the electrons to overcome the resistance
 B. comes from redox reaction that pushes electrons from the anode to the cathode
 C. electrons on the anode have more potential energy
 D. The potential difference causes electrons to flow from the cathode to anode

6. For the following hypothetical equation, in aqueous solution, what is the correct representation

of the cell notation?



- A. $A(s) | A^{+2}(aq) || B^{+2}(aq) | B(s)$
 B. $B^{+2}(aq) | B(s) || A^{+2}(aq) | A(s)$

- C. $A^{+2}(aq) | A(s) || B(s) | B^{+2}(aq)$
 D. $B(s) | B^{+2}(aq) || A^{+2}(aq) | A(s)$

7. During the electrolysis of $CuSO_4(aq)$ using carbon electrodes ,which of the following is the

Correct half reaction for the anode electrode?

- A. $Cu^{+2}(aq) + 2e \rightarrow Cu(s)$
 B. $4OH^-(aq) \rightarrow 2H_2O(l) + O_2(g) + 4e$
 C. $2H_2O(l) \rightarrow O_2(g) + 4H^+(aq) + 4e$
 D. $SO_4^{2-}(aq) + O_2(g) + 4H^+(aq) \rightarrow SO_4^{2-}(aq) + 2H_2O(l)$

8. The standard emf for the cell reaction, $Zn + Cu^{2+} \rightarrow Cu + Zn^{2+}$, is 1.10v. What

would the emf for the cell reaction be when 0.1M Cu^{2+} and 0.1M Zn^{2+} solutions are used at 298k?

- A. 1.10v B. 0.10v C. -1.10v D. -0.11v

9. An electrochemical cell constructed for the reaction



0.75v. the standard

reduction E^0_{red} potential for $Cu^{2+}(aq)$ is 0.34v. What is the standard reduction potentials for $M^{2+}(aq)$?

- A. -1.09v B. -0.41v C. 0.41v D. 1.09v

10. What mass of aluminum is produced in one hour by the electrolysis of molten $AlCl_3$ with a current of 10A?

- A. 1.5g B. 2.5g C. 3.4g

D.4.3g

11. How many moles of MnO_2 are produced in a basic solution when MnO_4^- and CN^- react to

form MnO_2 and CNO^- according to the following un balanced reaction?



- A.1 B.2 C.3 D.5

12.A100ml Sample of a 0.01M solution of HCl is placed in a beaker and 0.01M NaOH is added from a burette .calculate the P^H after the addition of 150ml of NaOH.

$$(\log 2 = 0.3, \log 5 = 0.69)$$

13. What is the balanced equation for the cell notation of the following galvanic cell?



- A. $\text{Pb(s)} + 2\text{Cl}^{-}(\text{aq}) \rightarrow \text{Pb}^{2+}(\text{aq}) + \text{Cl}_2(\text{g})$
- B. $\text{Pb(s)} + \text{Cl}_2(\text{g}) \rightarrow \text{Pb}^{2+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq})$
- C. $\text{Pb}^{2+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq}) \rightarrow \text{Pb(s)} + \text{Cl}_2(\text{g})$
- D. $\text{Pb}^{2+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq}) \rightarrow \text{PbCl}_2(\text{s})$

14. During electrolysis of an aqueous solution of AgNO_3 . What would happen to the mass

Of silver metal deposited if the current is doubled and the electrolysis time is decreased

To half of its initial value?

- A. It would stay the same
- B. It would increase twice the initial value
- C. It would decrease to $\frac{1}{4}$ of its initial value
- D. It would decrease to $\frac{1}{2}$ of its initial value.

15. The standard emf for the cell reaction, $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Cu} + \text{Zn}^{2+}$,

is 1.10V. What would the emf for the cell reaction be when 0.1M Cu^{2+} and 0.1M Zn^{2+}

Solutions are used at 298K? (given: $R = 8.314\text{J/molK}$, $F = 96500\text{C}$)

- A. -1.10V
- B. 0.10V
- C. 1.10V
- D. -0.10V

16. A certain reaction has a rate constant $2.5 \times 10^{-3} \text{Lmol}^{-1} \text{s}^{-1}$ at 600°C . What will be the value of the rate constant at 720°C , if the activation energy for the reaction is 85KJ mol^{-1}

- A. $1.03 \times 10^{-2} \text{Lmol}^{-1} \text{s}^{-1}$
- B. $1108 \times 10^{-3} \text{Lmol}^{-1} \text{s}^{-1}$
- C. $45 \times 10^{-2} \text{Lmol}^{-1} \text{s}^{-1}$
- D. $3.09 \times 10^{-4} \text{Lmol}^{-1} \text{s}^{-1}$

17. What mass of aluminum is produced in one hour by the electrolysis of molten AlCl_3 with a current of 10A?

A. 1.5g

B. 2.5g

C. 3.4g

D. 4.3g

18. What are the expected products of the electrolysis of an aqueous solution of CuCl_2 ?

A. Cu and H_2 at the cathode and Cl_2 and O_2 at the anode

B. Cu at the cathode and Cl_2 at the anode

C. Cu and H_2 at the cathode and only Cl_2 at the anode

D. Cu at the cathode and Cl_2 and O_2 at the anode

19. for a certain reaction: $\Delta H = 45\text{KJ}$ and $\Delta S = 125\text{J/K}$. assuming that ΔH and ΔS don't vary

with temperature, at what temperature will the reaction have $\Delta G = 0$?

A. 630K

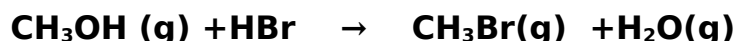
B. 337K

C. 360K

D. 298K

20. Using bond energy, estimate ΔH for the reaction below. the bond energy of

C-O, H-Br, C-Br and O-H are 358, 366, 276, and 463 KJ/mol respectively.



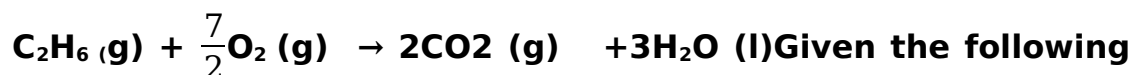
A. -15KJ/mol

B. 15KJ/mol

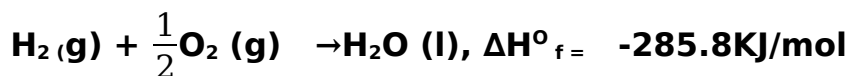
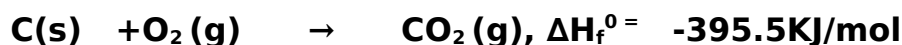
C. 30KJ/mol

D. 46KJ/mol

21. What is the enthalpy for the reaction?



Given the following information:



A. -764KJ

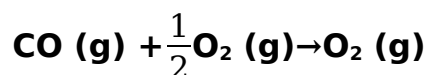
B. -1560KJ

C. -1664KJ

D. -3120KJ

22. At constant T and P, which one of the following statement about the enthalpy (ΔH)

& internal energy (ΔE) changes is correct for the reaction.



A. $\Delta H = \Delta E$ B. $\Delta H < \Delta E$ C. $\Delta H > \Delta E$ D. none

23. What is the change in internal energy, ΔE of a system if it absorbed 300KJ of heat from the surroundings & does 500KJ of work on the surroundings?

A. 100KJ B. -200KJ C. 400KJ D. 200KJ

24. The acid-base indicator methyl red has a K_a of 1×10^{-5} . its acidic form is red while its alkaline form is yellow .if methyl red is added to a solution with $P^H=7$.the color will be.

A. Red B. pink C. orange D. yellow

25. For preparing a buffer of $P^H=6$ by mixing sodium acetate & acetic acid, what would be the ratio of the concentration of a salt & an acid ($K_a = 10^{-5}$)

A. 1:10 B. 10:1 C. 100:1 D. 1:100

26. What is the percentage of HF molecules ionized in 0.10M HF solution ($K_a = 6.8 \times 10^{-4}$)?

A. 2 B. 5 C. 8.25 D. 10

27. Which one of the following substances could be amphiprotic ?

I. NO_3^- II. H_2O III. NH_3 IV. HCO_3^-

A. I, II and III B. I and II C. II and IV D. II, III

and IV

28. What volume of a 0.25M NaOH solution is required to react exactly with 0.135L of

0.50M H_3PO_4 ? A. 0.81L B. 0.2025 L C. 0.7L D. 0.0675L

29. which catalyst is used in the hydrogenation of vegetable oils?

A. iron B. Nickel C. Platinum D. Molybdenum

30. Consider the reaction:

O

||

$CHCH_2 - C - OCH_3 + NaOH \rightarrow$

What is the product of this reaction?

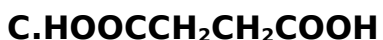
A. Sodium acetate & ethanol & methanol

B. sodium acetate

C. sodium propionate & methanol acid & methanol

D. Methyl propionic

31. Which one of the following organic molecules has the highest water solubility?



32. The organic compound CH_3COCH_3 is.

A. aldehyde

B. ester

C. carbonyl

D. ketone

33. consider the reaction $\text{PCl}_5(\text{g}) \rightarrow \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$ in a closed container at equilibrium

at a constant temperature .what will be the effect of adding more PCl_5 on the equilibrium concentration of $\text{Cl}_2(\text{g})$? It

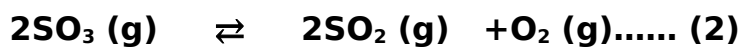
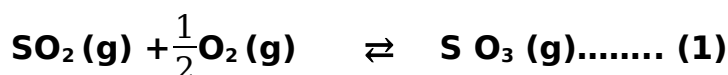
A. decrease

B. can not be determine with out the value of the K_p

C. remains unaffected

D. increase

34. The equilibrium constant for reaction (1) is k .what is the equilibrium constant for reaction (2)?



A. K^2

B. $2K$

C. $\frac{1}{2K}$

D. $\frac{1}{K^2}$

35. Which one of the following indicates the correct expression for the equilibrium constant

(K) for the process given below?



A. $K = \frac{[\text{PCl}_3][\text{Cl}_2]}{[\text{PCl}_5]}$

B. $K = [\text{Cl}_2]$

C. $K = [\text{PCl}_3][\text{Cl}_2]$

D. $K = \frac{[\text{PCl}_5]}{[\text{PCl}_3][\text{Cl}_2]}$

36. which of the following statement correctly describes a chemical reaction at equilibrium?

A. The concentration of products & reactants are equal

B. The change in the concentration of the products & reactants is constant

C. The rate of the forward reaction is less than the rate of the reverse reaction

D. The rate of the forward reaction is greater than the rate of the reverse reaction

37. What is the half -life, $t_{\frac{1}{2}}$ for a zero order reaction $A \rightarrow B$, (K is rate constant)?

A. $\ln 2k$ B. $\frac{[A]_0}{2K}$ C. $\ln K[A]_0$ D. $\frac{\ln 2}{[A]_0}$

38. The reaction $2X + Y \rightarrow Z$ was studied & the following data were obtained

Expt.	[x]	[y]	Rate(mole,L ⁻¹ ,S ⁻¹)
1	3.0	3.0	1.8
2	3.0	1.5	0.45
3	1.5	1.5	0.45

What is the proper rate expression?

A. rate=k[x] B. rate=k[x]² C. rate=k[y]² D. rate=k[x]²[y]

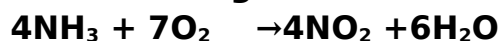
39. A particular reaction was found to depend on the concentration of the hydrogen ion, [H⁺]. The initial rate changed as a function of [H⁺] as follows

[H ⁺],M	0.005	0.01	0.02
Initial rate(M/S)	3.4×10^{-7}	1.7×10^{-7}	0.85×10^{-7}

What is the order of the reaction in [H⁺]?

A.-1 B.1 C.2 D.0

40. Which of the following is not a valid expression for the rate of the reaction given below?



A. $-\frac{1\Delta[O_2]}{7\Delta t}$ B. $\frac{1\Delta[NO_2]}{4\Delta t}$ C. $-\frac{1\Delta[H_2O]}{6\Delta t}$ D. $-\frac{1\Delta[NH_3]}{4\Delta t}$

41. Compounds that contains the carboxyl(carbonyl and hydroxyl) group are said to be :

A. Esters

C. Ketons

B. Organic acids

D. Aldehydes

42. Chlorine has an oxidation number +5 in:

A. NaCl O₃

B. NaClO

C. NaCl O₂

D. NaClO₄

43. For the reaction :



The following experimental results were obtained .

Experiment	[A]	[B]	Rate(mol L ⁻¹ S ⁻¹)
1	0.50	0.50	0.300
2	0.50	0.25	0.075
3	0.25	0.25	0.075

What is the value of the rate constant?

A. 1.2L mol⁻¹. S⁻¹

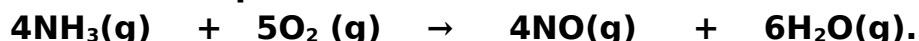
C. 0.6L.mol⁻¹ .S⁻¹

B. 0.25 L .mol⁻¹ .S⁻¹

D. 2.1L .mol⁻¹.S⁻¹

44. One of the steps in the manufacture of nitric acid is the oxidation of ammonia

Shown in the equation below:



If gaseous water appears at a rate 0.025mol.min⁻¹, at what rate does ammonia disappear?

A. 0.0040mol.min⁻¹

C. 0.150mol.min⁻¹

B. 0.038 mol.min⁻¹

D. 0.017mol.min⁻¹

45. The half-life for the first order decomposition of nitromethane, CH₃NO₂, at 500K

is 650sec. If the initial concentration of CH₃NO₂ is 0.500M .What will its

Concentration after 1300sec. have elapsed?

A. 0.125M

C. 8.05M

B. 0.50M

D. 0.693M

46. For the reaction , $\text{Sb}_2\text{S}_3(\text{s}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{Sb}(\text{s}) + 3\text{H}_2\text{S}(\text{g})$ $K_p = 0.429$

, what is the value of K_c for this reaction at 713K?

(R = 0.082atm.L/mol.K)

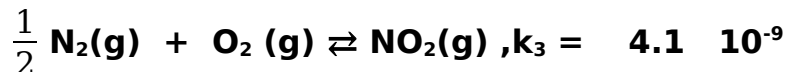
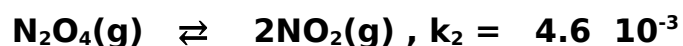
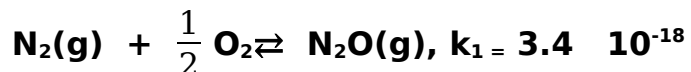
A. 212.5

B. 0.429

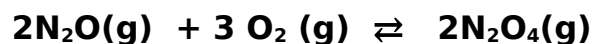
C. 9.04

D. 6.67

47. Given the equilibrium constant values:



What is the value of K_c for the following reaction?



A. 2.4×10^{-6}

C. 1.2×10^{-6}

B. 1.2×10^6

D. 4.8×10^6

48. 2.3g of ethanol ($\text{CH}_3\text{CH}_2\text{OH}$) is added to 500g of water. What is the molality of the resulting solution?

(Given; At.wt. C = 12, H = 1, O = 16)

A. 0.01 m

C. 0.1m

B. 1.0m

D. 10.0m

49. A solution of NH_4Cl made by dissolving 3.16g NH_4Cl in 30.14g water has a density

Of 1.0272 g cm^{-3} . What is the mole fraction of NH_4Cl ?

(Given At.wt. N = 14, Cl = 35.5, H = 1)

A. 0.2100

C. 0.0341

B. 0.650

D. 0.9659

50. Two electrolytic cells were placed in series, one of AgNO_3 and the other of CuSO_4 . If

1.273g of Ag is deposited, how much Cu was deposited at the same time?

(Given At.wt. Ag = 108, Cu = 64)

A. 0.377

C. 0.954

B. 0.748

D. 0.0118

51. How long has a current of 3 A to be applied through a solution of silver nitrate

To coat a metal surface of 80 cm^2 with 0.05 cm thick layer? Density of Ag = 10.5 g/cm^3 .

(Given At.wt. Ag = 108, F = 96500c)

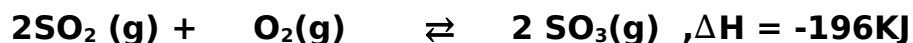
A. 1251 sec.

C. 1028sec.

B. 476sec.

D. 684sec.

52. The second step in the production of sulphuric acid is given by the reaction below



Which condition would increase the yield of this reaction?

A. High temperature and low pressure C. High temperature and high pressure

B. Low temperature and high pressure D. Low temperature and low pressure

53. Devices in which oxidation reduction reaction is induced by an electric current

Are called.....

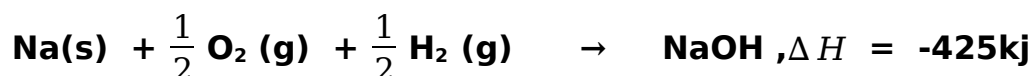
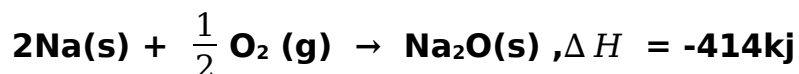
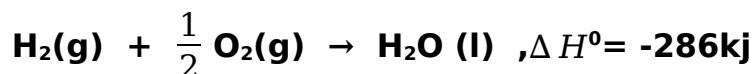
A. Galvanic cells

C. Electromotive cells

B. Voltaic cells

D. Electrolytic cells

54. Based on the following information:



What will be the standard enthalpy change for the reaction in



A. -978 KJ

C. -722KJ

B. -150KJ

D. -275KJ

55. What is a thermodynamic system that exchange energy but not matter?

A. Adiabatic B. Isolated C. Open D. Closed

56. The suppression of ionization of a weak acid or a weak base by adding one of

Its own ions is known as:

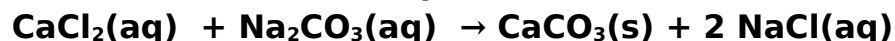
A. Buffer effect

C. Common ion effect

B. Ionization effect

D. Association effect

57. When the molecular equation:



Is written in terms of ionic equation, which one of the following pairs will be

The spectator ions?

A. Ca^{+2} and Cl^- B. CO_3^{-2} and Cl^- C. Ca^{+2} and CO_3^{-2} D. Na^+ and Cl^-

58. What will be the ratio of the boiling point elevation of a 0.1m solution of sucrose

, sodium sulphate and potassium bromide?

A. 1:3:1

C. 1:3:2

B. 1:1:2

D. 1:2:2

59. What will be the normality of a 2.3M sulphuric acid solution?

A. 4.6N B. 0.23N C. 0.46N D. 2.3N

60. A possible mechanism for the reaction $\text{A} + 2\text{B} \rightarrow \text{AB}_2$ is

Step1: $A + B \rightarrow AB$ Slow

Step2: $AB + B \rightarrow AB_2$ fast

Overall: $A + 2B \rightarrow AB_2$

According to the mechanism ,what will be the rate law?

A. Rate = $k[A][B]$

C. Rate = $k[A][B]^2$

B. Rate = $k[B]^2$

D. Rate = $k[A]$

61. Which one of the following is correct when a reaction reaches equilibrium?

A. The reactant rate for the forward reaction is decreased to zero

B. The of the forward and reverse reaction becomes equal

C. The rate of the reverse reaction is reached maximum

D. The amount of reactants and products becomes equal

62. The rate of reaction increases with increasing the concentration of reactants

Molecule ,because

A. The average kinetic energy of the molecule increases

B. The frequency of molecular collisions increases

C. The order of the reaction increases

D. The activation energy increases

63. A 1.0×10^{-4} M solution has PH of 10.00.The solute is a

A. weak acid B. weak base C. strong base D. strong acid

64. What is the purpose of a salt bridge in an electrochemical cell?

A. To provide a source of ions to react at the anode and cathode

B. To maintain electrical neutrality in the half -cell through migration of ions

C. To provide means of electrons to travel from the cathode to the anode

D. To provide means of electrons to travel from the anode to cathode

65. What is the molarity of a solution made by dissolving 10g of glucose ($C_6H_{12}O_6$)

In sufficient water to form 200ml solution?

(Given.At.Wt. C = 12 , H = 1 , O = 16)

A. 0.18

C. 0.362

B. 0.251

D. 0.278

66. What is the ionization constant for a weak acid, HA , that is 1.60% ionized in

0.0950M solution?

A. 2.69×10^{-3}

C. 9.91×10^{-6}

B. 3.77×10^{-2}

D. 2.47×10^{-5}

67. Which of the following does NOT affect the solubility of a gas dissolved in a liquid?

A. Nature of solute and solvent

C. Temperature

B. Pressure

D. rate at which the gas dissolves

68. For a voltaic (Galvanic) cell using $\text{Ag}, \text{Ag}^+(1.0\text{M})$ and $\text{Zn}, \text{Zn}^{+2}(1.0\text{M})$

Half cells, which of the following statements is INCORRECT?

A. The zinc electrode is the anode

B. Electrons will flow through the external circuit from the zinc to the Ag- electrode

C. The mass of the zinc electrode will decrease as the cell operates

D. Reduction occurs at the zinc electrode as the cell operates

69. How many moles of NH_4Cl must be added to 1.5 L of 0.2M solution of NH_3

To form a buffer whose PH is 9.00 .

($k_b = 1.8 \times 10^{-5}$)?

A. 0.36

C. 0.54

B. 0.65

D. 0.80

70. How many moles of H_2SO_4 are needed to prepare 5.0L of a 2.0M solution of H_2SO_4 ?

A. 2.5

B. 5.0

C. 20

D. 10

71. Adurg decomposes by zero- order kinetics with a rate constant of $2\text{mgmL}^{-1}\text{month}^{-1}$

If the initial concentration is 100mg mL^{-1} , how long will it take for the drug

To decompose by 90% ?

A. 5 months

C. 3 months

B. 2 months

D. 4months

72. The pK_a of a weak monoprotic acid is 4.8, what should be the ratio of $[\text{Acid}]/[\text{Salt}]$

Of a buffer, if PH = 5.8 is required.

A. 1.0

C. 2.0

B. 0.1

D. 10

73. The solubility of oxygen gas in water at 25°C and 1 atm, pressure of oxygen is 0.04 g/ L

The solubility of oxygen gas in water at 3 atm. And 25°C is.....g/L.

A. 0.014

C. 0.123

B. 0.31

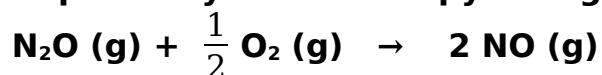
D. 0.041

74. An aqueous solution contains 0.100M NaOH at 25°C , the PH of the solution is:

A. 13
B. 0.1

C. 1.00
D. 7.00

75. The enthalpies of formation of gaseous N_2O and NO at 298K are 82 and 90 kJ/mol, respectively. The enthalpy change for the reaction



A. -8KJ
B. 98KJ
C. -98KJ
D. 8KJ

76. If a student wishes to prepare approximately 100ml of an aqueous solution of 6M

HCl using 12M HCl. Which procedure is correct?

- A. Adding 50ml of 12M HCl to 50 ml of water while stirring the mixture steadily
- B. Adding 25ml of 12M HCl to 50ml of water while stirring the mixture steadily
- C. Adding 50ml of water to 50ml of 12M HCl while stirring the mixture steadily
- D. Adding 25ml of water to 50 ml of 12M HCl while stirring the mixture steadily

77. What is the IUPAC name for the compound



A. 1-hydroxyl -2,4-dimethyl pentanone
B. 1,1,3-trimethyl butanoic acid
C. 2-carboxyl isohexone
D. 2,4-dimethyl pentanoic acid

78. What is the concentration of sodium chloride in water needed in order to produce an aqueous solution that has an identical osmotic pressure (isotonic) with blood?

(Given: $\pi = 7.70 \text{ atm. at } 25^\circ\text{C}$, $R = 0.082 \text{ atm.L/mol.K}$)

A. 0.003 mol L^{-1}
B. 0.006 mol L^{-1}
C. $0.1575 \text{ mol L}^{-1}$
D. 0.315 mol L^{-1}

79. Which of the following is NOT a characteristic of the electrolytic cell containing

Aqueous solution of NaCl used in the manufacturing of sodium hydroxide?

- A. The sodium hydroxide solution is produced in the electrolytic cell
- B. The electrolyte must be a dilute solution of NaCl
- C. Hydrogen is produced at the cathode
- D. The production of chlorine gas occurs at the anode.

80. A laboratory instructor is preparing 5.0 L of a 0.10M $\text{Pb}(\text{NO}_3)_2$ (molecular mass 331)

Solution. What is the mass required?

- A. 165.5 g of $\text{Pb}(\text{NO}_3)_2$ and add 5.0kg of water
- B. 165.5g of $\text{Pb}(\text{NO}_3)_2$ and add water until the solution has a volume of 5.0L

C. 33.1g of $\text{Pb}(\text{NO}_3)_2$ and add water until the solution has a volume of 5 L

D. 33.1g of $\text{Pb}(\text{NO}_3)_2$ and add 5.0L of water