

QUIZ 3 – Summer 2014

NAME: _____

Answer **5 of the 6** problems below.

Put a large X through the problem you do not want us to grade. If there is no X, the first five problems will be graded.

Please read each question carefully. **Some questions may have more than one answer.**

You may use a standard or scientific calculator, your class notes, and any lecture handouts. You **MAY NOT** use a computer, laptop, or other Internet-connected device.

1) You wish to borrow \$100,000 for 10 years at 5.0% annual interest from your local bank. Circle the letter in front of each of the following true statement. There may be more than one.

A) You will pay more if the interest is compounded daily than if the interest is compounded annually.

B) You will pay more if the bank offers you a simple 5% interest loan than if the bank offers a 5% interest loan that is compounded annually.

C) The following equation should be used to calculate how much you will pay the bank if the interest is compounded annually: $\text{Future Value} = \$100,000 * (1 + 0.050)^{10}$

D) The following equation should be used to calculate how much you will pay the bank if the interest is compounded monthly: $\text{Future Value} = \$100,000 * (1 + 0.050)^{120}$

E) The following equation should be used to calculate how much you will pay the bank if the loan is a simple interest loan: $\text{Future Value} = \$100,000(1+0.50)$

2) Complete the following statements by circling the correct answer or filling in the blank.

A) If a bank announces that their nominal annual interest rate is 15.32%, compounded monthly, the effective interest rate is _____

B) \$20,000 today is worth more than / less than / the same as \$20,000 next year.

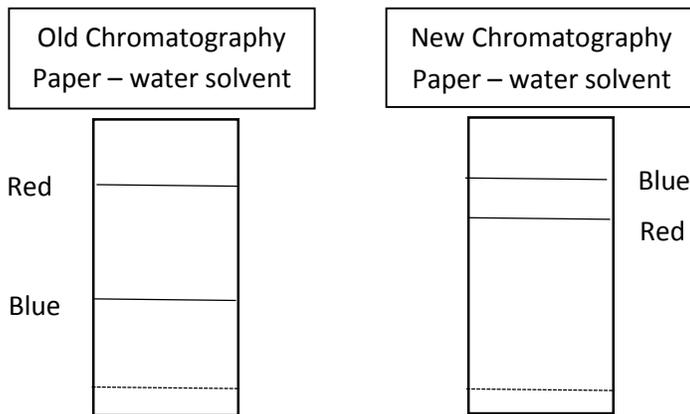
C) If you need \$20,000 at the end of four years, you must put _____ (to the closest dollar) in your account at the end of each year if the account has an interest rate of 2.8% compounded annually.

D) An annuity / residual value / installment loan is when equal payments are paid over a series of time periods.

E) When making financial decisions, opportunity cost should be / should not be considered.

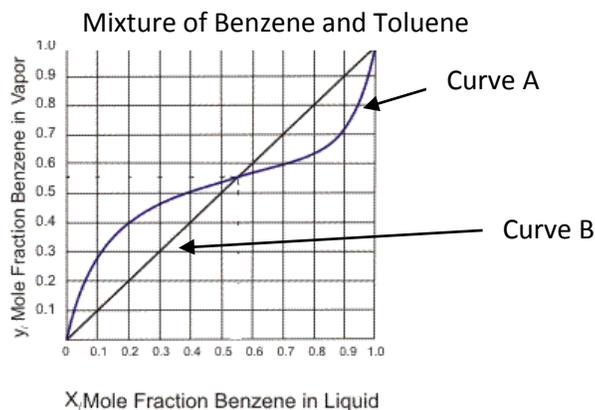
3) You learn that the chromatography paper you have been using in lab is no longer being manufactured. The vendor has suggested that a new paper will complete your separation of pen ink. The results of one test of the both the old and new paper is given below. Circle the letter in front of each of the following true statements. There may be more than one.

- A) The new paper will successfully separate the dyes.
- B) The interactions between the blue dye and the new chromatography paper are stronger than between the blue dye and the old chromatography paper.
- C) Changing the solvent will never change the separation results.
- D) The blue and red dyes are soluble in water.
- E) Capillary action is responsible for moving the solvent and solutes up the surface of the paper.



4) Use the figure below to answer the following questions. Circle the letter in front of each of the following true statements. There may be more than one.

- A) The figure below is an example of a McCabe-Thiele Diagram.
- B) Curve A is a vapor – liquid equilibrium curve.
- C) Curve B is a vapor-liquid equilibrium curve.
- D) A mixture of benzene and toluene has an azeotrope.
- E) It is possible to take a liquid sample that is 0.2 mole fraction of benzene and using a series of distillation steps obtain a mixture that is 0.8 mole fraction of benzene.



- 5) Following is a table that shows the density of formic acid (HCOOH) in g/cm^3 at various temperatures and weight % in water. Use this information to answer the questions below by either circling the correct response or by filling in the blank.

Density of aqueous solutions of formic acid in water (g/cm^3)

| Weight percent formic acid in water | Temperature (C) | | |
|-------------------------------------|-----------------|--------|--------|
| | 0 | 15 | 30 |
| 0.00 | 0.9999 | 0.9991 | 0.9957 |
| 5.00 | 1.0150 | 1.0124 | 1.0075 |
| 10.00 | 1.0295 | 1.0256 | 1.0197 |

- A) The density of a 3.50 wt% solution of formic acid in water at 15°C is: _____
- B) The weight % of formic acid in a solution that is at 30°C and has a density of 1.0000 g/cm^3 is: _____
- C) If the molar mass of C is 12.01 g/mole , of H is 1.008 g/mole and O is 15.999 g/mole , the molar mass of formic acid is _____
- D) You determine that the density of a 43.5 mL ($1 \text{ mL} = 1 \text{ cm}^3$) solution of formic acid in water is 1.0197 g/cm^3 at 30°C . The mass of formic acid in the 43.5 mL solution is _____
- E) The density of pure formic acid is:
greater than water / less than water / same as water / can't be determined using information provided.
- 6) Complete the following statements by circling the correct answer.
- A) A hydrometer has a scale that decreases / increases as you read from the top to the bottom.
- B) A separation process that depends on differing abilities of substances to form gases is called:
distillation / liquid chromatography / gas absorption / solvent extraction / membrane separation.
- C) An exothermic reaction generates heat / consumes heat / neither generates nor consumes heat.
- D) As the distillation of the ethanol/water solution proceeded during your lab, the specific gravity of the solution in the 1000 mL Erlenmyer flask should have increased with time / decreased with time / not have changed with time.
- E) As the distillation of the ethanol/water solution proceeded during your lab, the specific gravity of the distillate samples being collected should have increased with time / decreased with time / not have changed with time .