

Assignment on Spectrophotometry 2017 Name: _____

1. A lab analyst prepared the set of ethanol standards and a blank shown below. The absorbance values were read on a uv-visible spectrophotometer at a wavelength of 270 nm.

Table 1. Absorbance values for ethanol standards

| Ethanol concentration (ppm; ug/mL) | Absorbance |
|------------------------------------|------------|
| Blank (0 ppm) | 0.005 |
| 100 | 0.119 |
| 200 | 0.228 |
| 500 | 0.509 |
| 1000 | 0.974 |

- Plot the standard curve for corrected absorbance versus concentration (independent variable).
- A blood sample was prepared so that 10.00 mL of blood was diluted to 100.00 mL. A portion of the diluted (and properly mixed!) sample was read on the spectrophotometer. The corrected absorbance was found to be 0.140. What is the concentration of alcohol in the sample read in the spectrophotometer?
- Taking into account the dilution, what is the content of alcohol in the original blood in units of ppm?
- Convert your answer from part c into units of mg ethanol/100 mL blood. This is known as “mg%” and is the unit used to report the legal limit of blood alcohol in Canada. The legal limit is still 80 mg% (aka 0.08 %). What would law enforcement say about the person who had this blood alcohol content?
- There is some consideration that the BAC (Blood Alcohol Concentration) should be 0.05%. (See <http://www.mto.gov.on.ca/english/safety/impaired/fact-sheet.shtml>). What advice would you have for this individual and others under these emerging recommendations?