(1) If a 0.0020 M of $KMnO_4$ has an absorbance of 0.58, determine the following: (here assume a 1-cm pathlength)
a) the molar extinction coefficient, .

b) the %transmittance of the solution

c) what would the %T be if 2.0 mL of the above solution is diluted by adding to it 5.0 mL?

(2) Iron(II) can be assayed spectrophotometrically by chelating it with ferrozine to form a purple complex: Fe^{2+} + 3 $ferrozine^{2-}$ ---> $[Fe(ferrozine)_3]^{4-}$ (purple complex) (MW of Fe = 55.85g/mol)
Suppose that a 500.0 mL solution is prepared by dissolving a 0.421 g standard ore containing 0.220% Fe, and chelating it with excess ferrozine. Spectral analysis was carried out using an older single beam spectrophotometer. A blank reading showed a transmittance of 79.4%. It is found that the standard solution has a 42.4% transmittance (at =562 nm and pathlength of 1.00 cm).

A 250. mL solution prepared similarly but using a 0.170 g ore sample with an unknown %Fe content, is found to have a 24.5% transmittance (at 562 nm and a 2.00 cm pathlength).

For your benefit a summary of the data is given below using = $_{max}$= 562 nm (note: V and b values)

Sample	% Fe	grams ore	vol of sol'n	pathlength	%transmit
blank	0	-	-	1.00 cm	79.4%
standard	0.220	.421 g	500.0 mL	1.00 cm	42.4%
unknown	?	.170 g	250.0	2.00 cm	24.5%

a) What is the molar extinction coefficient of the absorbing complex? _____

b) What is the % Fe composition of the unknown steel sample? _____