

Student's Name: ..... No. ....

**ANSWER ALL QUESTIONS:**

I. Answer the following statements with TRUE (T) or FALSE (F) :

- (A) 1. The chromatographic technique used to separate substances according to functional group differences is known as size-exclusion chromatography. ( )
2. Separation in gas liquid chromatography (GLC) is achieved by difference in interaction of sample with the gas mobile phase and liquid stationary phase. ( )
3. The extent of retention of sample to the stationary phase in liquid-liquid chromatography is affected by the degree of polarity of the compound. ( )
4. The peak symmetry affects the resolution between adjacent peaks. ( )
5. The column ability to provide narrow peaks and improved separation is expressed by the resolution,  $R_s$ , of the column. ( )
6. HPLC acquires a high degree of versatility not found in other chromatographic techniques because of the faster separation achieved by the use of high pressure. ( )
7. In liquid-solid chromatography, the separation depends upon relative adsorption of solutes to the stationary phase. ( )
8. The column efficiency is directly proportional to the height equivalent to one theoretical plate (HETP). ( )

- (B) 1. In both gravimetric and spectrophotometric analysis, assay can be carried without referring to an authentic sample of the drug. ( )
2. For both Lambert and Beer laws, the rate of decrease in intensity of light passing through a solution ( $I_t$ ) is proportional to the intensity of light striking the solution ( $I_0$ ). ( )
3. The impurity index is the ratio of absorbance ratios of sample and reference substances at two different wavelengths. ( )
4. The contribution of sample concentration and cell path length to the shape of curve are eliminated by changing from  $\log A$  versus  $\lambda$  to  $A$  versus  $\lambda$ . ( )
5. A compound can be assayed in presence of a sloping linear interference by taking the absorbance difference  $\bar{A}_1 - \bar{A}_2$  and applying Beer's law. ( )
6. Spectrophotometric methods are valuable tools for determination of molar ratios of components of a complex. ( )
7. For the Job's method, complexation occurs only when the additive absorbance against the mole fraction of the two compounds gives a linear relationship. ( )

II. Fill in the spaces with the appropriate phrase(s) :

(A) 1. The function of solvent pumping system is to provide ... ..

.....

2. The pumps used for HPLC must be constructed of materials that ... ..

.....

3. Chemically bonded stationary phases are preferably to use than mechanically held ones in order to ... ..

.....

4. Three of the general operating requirements of solvent pumping system in HPLC are:

(a) .....

(b) .....

(c) .....

5. The number of theoretical plates,  $N$ , is a useful measure of the column efficiency because ... ..

.....

- (B) 1. Acid-dye techniques are normally used spectrophotometrically for the determination of ... ..  
.....
2. First derivative curves of absorption spectra solve the problem of ... ..  
.....
3. The compensation method is applied in order to ... ..  
.....
4. For  $\Delta A$  method, a change in chemical conditions may alter ... ..  
.....
5. For measurement of complexation by molar-ratio method, the formation constant of a complex can be evaluated graphically from ... ..  
.....

III. Give reason(s) for each of the following :

- (A) 1. Small particle size stationary phases, shorter columns and small size sample loading are used in HPLC compared to other columnar techniques.

2. The solvent reservoir should (a) hold at least 500 ml and (b) be made of glass or stainless steel.

- (B) 1. A plot of the absorbance of an acid or base as a function of the pH of solution can be used for the determination of the pKa.

2. The change in absorbance of a solution may be used to follow the change in concentration of absorbing constituent during photometric titration (Give three examples).





2. For first derivative curves, the irrelevant absorption could be a constant, linear or a quadratic.
  - a) Indicate with suitable ratios how can the above irrelevant absorption be detected.

- b) Suggest a method of determination that eliminate (or correct for) each of the above irrelevant absorptions.