Course No: PHARM3222
Course Title: Instr.Phar.Anal.
Date: 18/1/2018
No. of Questions: (5)
Time:2 Hr
Using Calculator (yes)

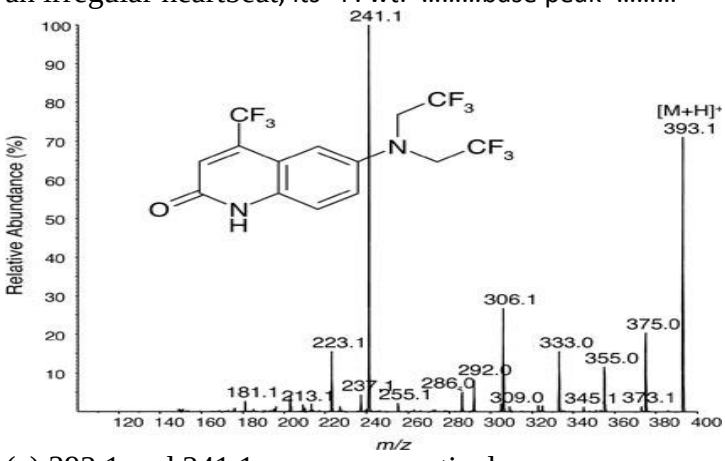
University of Palestine

FinalExam For First semester
Scond Semester 2017/2018
Total Grade:80

Instructor: DrFarid Abu Shammala
Student No.: _____
Student Name: _____
College Name: Pharm. and Bio.Tech.
Dep. / Specialist: _____
Using Dictionary: No

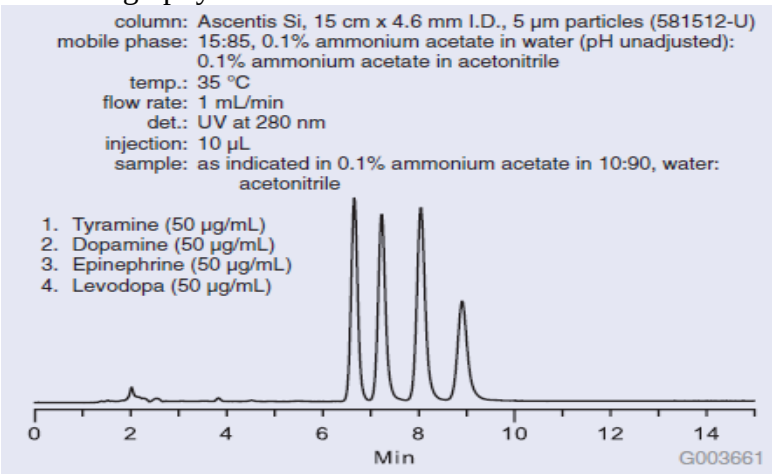
Question one: Multiple choice question (40 points)

1. Mass spectrum of benzothiazepine calcium channel blockers (calcium antagonists), relax and widen blood vessels by affecting the muscle cells in the arterial walls. Its benefit of slowing your heart rate, reduce blood pressure, relieve chest pain (angina) and control an irregular heartbeat, its F. wt.=.....base peak=.....



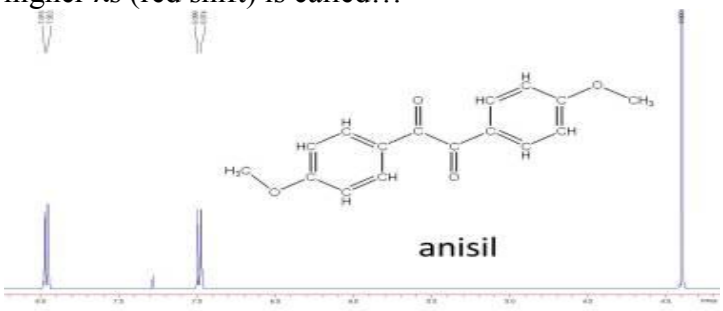
(a) 392.1 and 241.1 a.m. u. respectively
(b) 375.0 and 241.1 a.m. u. respectively
(c) 355.0 and 241.1 a.m. u. respectively
(d)333.0 and 241.1 a.m. u. respectively

2. The following HPLC separation of four biogenic amines given that the polarity increase in the order Levodopa>Epinephrine> Dopamine >Tyramine , then the chromatography is…



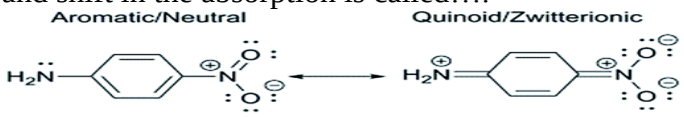
(a) Reverse phase chromatography
(b) Normal phase chromatography
(c) Non-polar phase chromatography
(d) Supper critical fluid chromatography

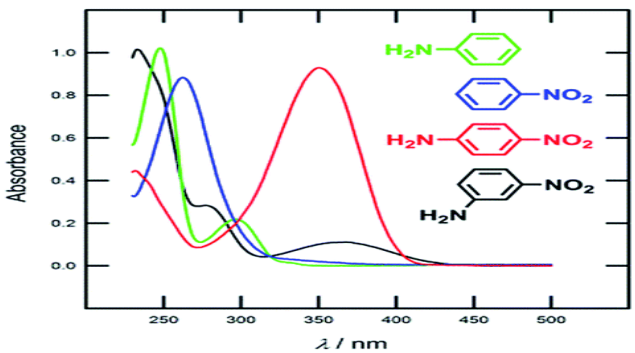
3. Lamisil is an antifungal medication that fights infections caused by fungus. It has UV λ_{max} at 305 nm in dichloromethane The shifts in more polar solvent to higher λs (red shift) is called…



(a) Hypsochromic shift(b) Hyperchromic shift
(c) Hypochromic shift(d) Bathochromic shift

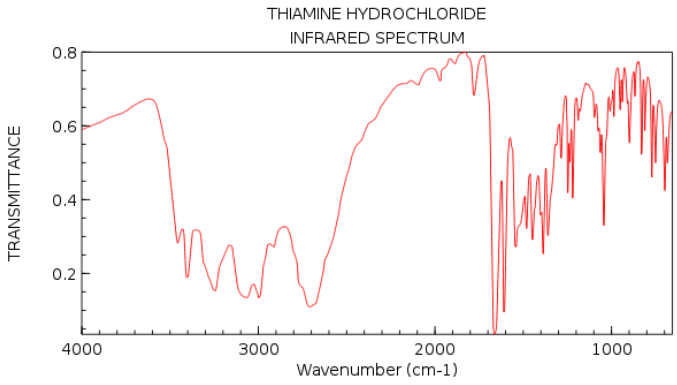
4. A functional group that does not absorb by itself , but its presence in a molecule as shown below caused increase and shift in the absorption is called….





(a) Chromophore(b) Auxochrome
(c) Thermochrome(d) Izophorme

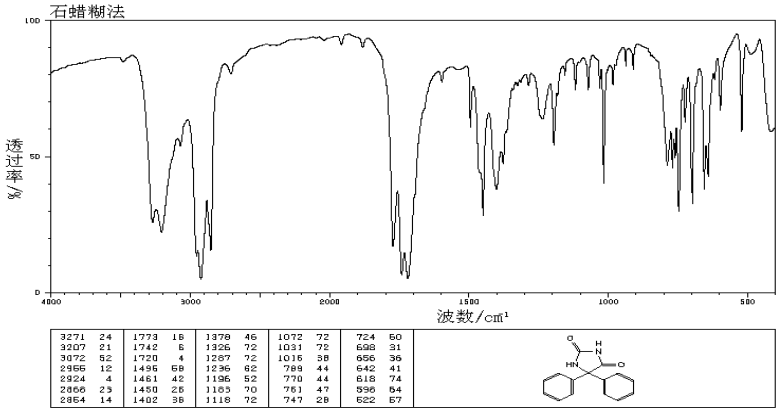
5. Thiamine hydrochloride FTIR spectrum shown below, the broadness of band at 3590 peak indicate the presence of:



NIST Chemistry WebBook (http://webbook.nist.gov/chemistry)

(a) S-H stretching(b) O-H stretching
(c) C-H stretching (d) N-H stretching

6. Phenytoin is useful for prevention of tonic-seizures the medium intensity peak for N-H stretching occurs at:



(a) 3300cm^{-1}(b) 3100cm^{-1}
(c)3000cm^{-1}(d) 2900cm^{-1}

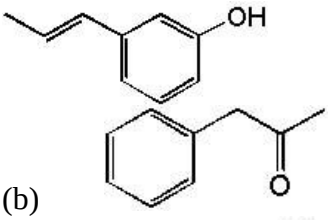
7. In Fluorescence detector the photoelectric detector is located at …
(a)180 deg to the excitation beam
(b)45 deg to the excitation beam
(c)90 deg to the excitation beam
(d)60 deg to the excitation beam

8. The unit of molar absorptivity (**ε**) is….
(a) L cm -1mol-1
(b) cm Mol L-1
(c)mol L-1 cm-1
(d)Unitless

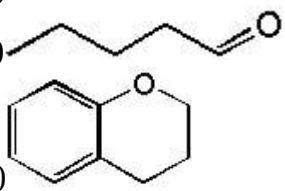
9. Deduce the structure of an unknown compound with molecular formula $C_9H_{10}O$ using information given by its infrared spectrum.

Intensity (peak):	Frequency (cm–1):
s	3090 sharp
m	2900
m	2800
s	1710
m-w	1600
m-w	1500
m	1465
m	1450
m	1375

(a)



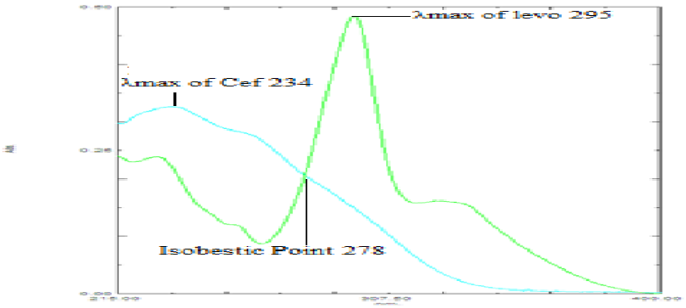
(b)

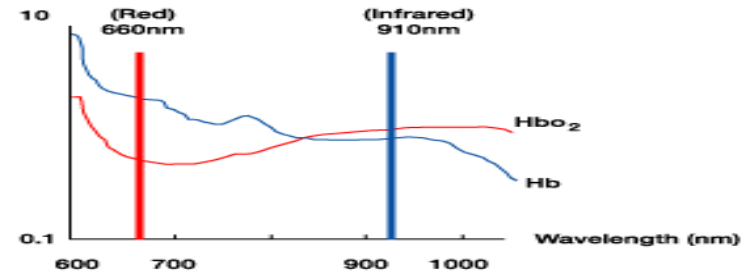


(c)

(d)

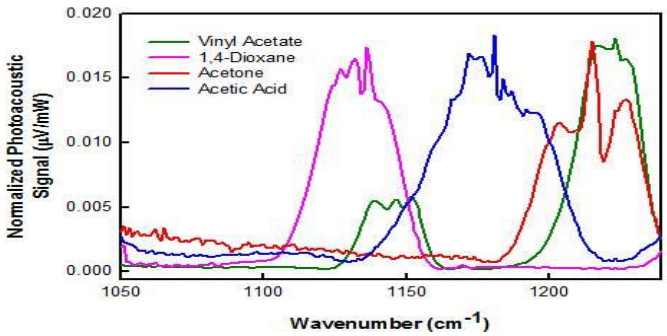
10. Below the UV-Vis spectra for levo and cef**eye drops** and the lower figure for hemoglobin (Oxyhaemoglobin and deoxyhaemoglobin) , the isosbestic points absorbance constant throughout the whole reaction, and thus used as reference points in the study of….





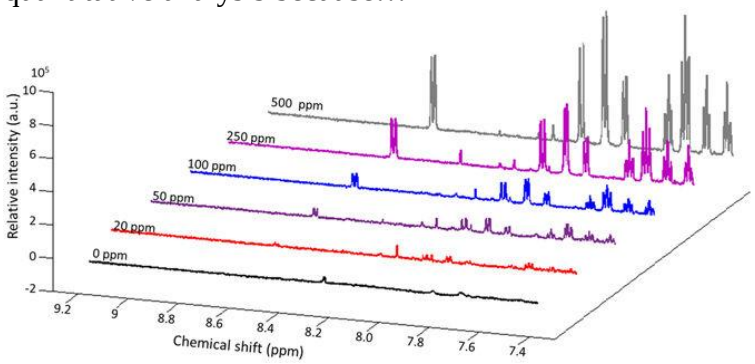
(a)Reaction rates.
(b) Clinical chemistry, as a quality assurance method, to verify the accuracy in λ of a spectrophotometer
(c) Oximetry to determine hemoglobin concentration, regardless of its saturation.
(d) All mentioned above

11. The figure below is photoacoustic spectrum of some chemicals, it depends on measurement of...



(a)Electron spin resonance (b) Phosphorescence
(c) Pressure flocculation (d) Fluorescence emission

12. In the NMR spectrum of progesterone below it is impossible to detect a signal at less than 20ppm for quantitative analysis because…



(a) S/N >10 (b) S/N <3
(c) S/N >50 (d) S/N >20

13. The shifts to higher **ε**UV-Vis spectrophotometer is called…
(a) Hypsochromic shift
(b) Hyperchromic shift
(c) Hypochromic shift
(d) Bathochromic shift

14. Which of the following is the cause of deviations from Beer's law for principle of UV-Vis spectrophotometry?
(a) A dichromatic beam passing through a sample
(b) Stray radiation
(c) High concentration
(d) All mentioned above

15. Column efficiency is measured in terms of number of plates which is…
(a)Inversely related to the square of the peak width
(b)Directly related to the square of the peak width
(c) Inversely related to the cube root of the peak width
(d)Directly related to the square of the peak width

16. As the chain length of the stationary phase is increased (C_8- C_{18}), the retention times of the less polar solutes is…
(a) Decreased
(b) Increased
(c) Remain the same
(d) Decrease then increase

17. In agarose gel electrophoresis, DNA is moved towards the..
(a) Cathode
(b) Anode
(c) DNA doesn't move
(d) None of above

18.The relative migration of the proteinsin SDS-PAGE of uniform density is directly proportional to…
(a) Field strength.
(b) Charge on the molecule
(c) Inversely proportional to molecular weight
(d) All mentioned above

19. Sometimes it is better doanalysis using derivative spectroscopy (DA/Dλ is plotted against the wavelength) due to….
(a) The derivative spectrum contains sharper peaks
(b) Derivative spectroscopy is excellent for determination of multi-components in a sample, because they canbe resolved
(c) Due to better location of peaks and wavelengths maxima can be achieved
(d) All mentioned above

20. Two pieces of dissimilar metals fused together at the ends, a type of detector, is also known as…
(a) Resistance temperature detector (RTD)
(b) Thermistor
(c) Thermocouple
(d) Golay cell

Question Two: (10 points)

6) (a) Show the basic design of an instrument used for FTIR spectroscopy

b) List at least five of the desirable properties of the mobile phase in high performance liquid chromatography (HPLC).

c) List at least five of the reasons of deviation from Beers law.

Question three: (10 points)

a) Write briefly about the following:

1. Downstream processin electrophoresis.

2. The Guard column used in HPLC

3. If of S/N_{power}= 100 calculate of S/N ratio in terms of voltage and decibles(dB).

4. Explain briefly how to reduce S/N ratio both hardware and software methods

Question four: (10 points)

a) Describe briefly the difference between

1. Isocratic and gradient elution

2. Normal phase or reversed phase chromatography

3. Liquid-liquid chromatography and bonded-phase chromatography.

4. Write **only one** Staining methods for the determination of DNA, lipoprotein, Isoenzyme and proteins (both serum and CSF)by Direct Densitometry in electrophoresis.

Question five: (10 points)

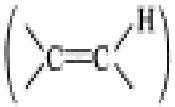
a) Describe briefly SDS-polyacrylamide gel electrophoresis

b)Describe briefly cation and anion exchange chromatography.

b) Type of buffers used in electrophoresis

End of Questions
Good Luck

TABLE 17-2 Abbreviated Table of Group Frequencies for Organic Groups

Bond	Type of Compound	Frequency Range, cm^{-1}	Intensity
C—H	Alkanes	2850–2970	Strong
		1340–1470	Strong
C—H	Alkenes 	3010–3095	Medium
		675–995	Strong
C—H	Alkynes (—C≡C—H)	3300	Strong
C—H	Aromatic rings	3010–3100	Medium
		690–900	Strong
O—H	Monomeric alcohols, phenols	3590–3650	Variable
	Hydrogen-bonded alcohols, phenols	3200–3600	Variable, sometimes broad
	Monomeric carboxylic acids	3500–3650	Medium
	Hydrogen-bonded carboxylic acids	2500–2700	Broad
N—H	Amines, amides	3300–3500	Medium
C=C	Alkenes	1610–1680	Variable
C=C	Aromatic rings	1500–1600	Variable
C≡C	Alkynes	2100–2260	Variable
C—N	Amines, amides	1180–1360	Strong
C≡N	Nitriles	2210–2280	Strong
C—O	Alcohols, ethers, carboxylic acids, esters	1050–1300	Strong
C=O	Aldehydes, ketones, carboxylic acids, esters	1690–1760	Strong
NO_2	Nitro compounds	1500–1570	Strong
		1300–1370	Strong