

Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.PHARM (NEW)/SEM-8/PT-801/2013  
2013**

**PHARMACEUTICAL ANALYSIS**

Time Allotted : 3 Hours

Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP - A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) In relation  $A = \epsilon bc$ , what is represented by  $\epsilon$  ?
- a) Absorptivity                      b) Molar absorptivity
- c) Concentration                    d) None of these.
- ii) Caffeine reduces the fluorescent intensity of riboflavin  
by means of
- a) Chemical quenching            b) Collisional quenching
- c) Static quenching                d) Self quenching.

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[ Turn over



iii) The collision among atoms produces small changes in the ground state energy level and consequently broadening of peak occurs. This is called

- a) Doppler broadening
- b) Pressure broadening
- c) Pascal broadening
- d) Volume broadening.

iv) Which of the following compounds will have multiplets in its spectra ?

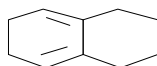
- a)  $(\text{CH}_3)_2 - \text{C} = \text{CH}_2$
- b)  $\text{CH}_3 - \text{CCl} = \text{CH}_2$
- c)  $\text{C}_6\text{H}_{12}$
- d)  $\text{H} - \text{CO} - \text{O} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$  .

v) The main technique used to analyze crystal structure of a sample is

- a) Gas chromatography
- b) Atomic absorption spectroscopy
- c) X-ray diffraction
- d) Ultraviolet-visible spectroscopy.



vi) What is the  $\lambda_{max}$  for the following compound ?



- a) 283 nm                                  b) 244 nm
- c) 273 nm                                  d) 234 nm.
- vii) Unit of chemical shift is
- a) Hz    b) tesla
- c) ppm    d) none of these.
- viii) What is Nuclear-Zeeman effect in NMR ?
- a) Transition from lower energy spin state to higher energy spin state
- b) Splitting of spin states in applied external magnetic field
- c) Splitting of spin states in absence of field
- d) Precessional motion of nuclei in applied magnetic field.
- ix) Alcohols exhibit a strong and broad band in the region of  $1200-1000 \text{ cm}^{-1}$  due to
- a) O - H stretching
- b) C - H stretching
- c) C - C stretching
- d) C - O stretching.



- x) Base peak for *n*-octane appears at *m/z*
- a) 57    b) 15  
c) 43    d) 29.
- xi) Expected apparent mass of metastable ion produced when *m/z* 77 decomposes by loss of CH = CH to *m/z* 51 is
- a) 26    b) 33.4  
c) 35    d) 52.
- xii) Vicinal protons are the protons which are separated by
- a) one bond                                      b) two bonds  
c) three bonds                                d) four bonds.

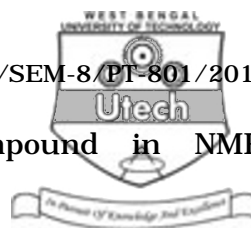
**GROUP - B**

**( Short Answer Type Questions )**

Answer any *three* of the following.                      3 × 5 = 15

2. What is the principle of Radio Immuno Assay ( RIA ) ? Write down two applications of RIA.    3 + 2
3. Absorbance of a verapamil hydrochloride solution in 0.1 M hydrochloric acid having concentration 25 μg/ml is found to be 0.295 at 278 nm. What should be the A (1%, 1 cm) value of verapamil hydrochloride ?

What are auxochrome and chromophore ? Which one is the best choice of solvent in UV spectroscopy ?                      2 + 2 + 1



4. Why is TMS a good reference compound in NMR spectroscopy ?
5. The molecular formula of an organic compound is  $C_4H_8O$ . It gives characteristics band between the frequencies of  $1680-1760\text{ cm}^{-1}$  in IR spectra. In NMR three signals appear at (i)  $7.52\text{ }\tau$  quartlet, (ii)  $7.88\text{ }\tau$  singlet and (iii)  $8.93\text{ }\tau$  triplet. Determine the structural formula of the compound.
6. Prove that  $A = 2 - \log (\%T)$ . How Woodward-Fischer rules are applied to calculate the absorption maxima of different conjugated diene systems. 2 + 3

### GROUP - C

#### ( Long Answer Type Questions )

Answer any *three* of the following. 3 × 15 = 45

7. What is parent peak ? How is it used in the determination of the molecular weight ? Giving a diagram of a common mass spectrometer, describe its various units. Discuss the application of mass spectroscopy in the determination of molecular weight. 2 + 2 + 7 + 4



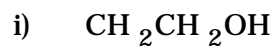
8. a) Why are atomic absorption lines very narrow? Why can non-metal elements not be determined directly by atomic absorption spectroscopy?
- b) Describe the atomization process that takes place in a flame.
- c) How does the rapid formation of a stable oxide of analyte affect its flame profile?
- d) Define chemical interference. Give example how this interference is corrected.  $1 \frac{1}{2} + 2 + 4 + 2 \frac{1}{2} + 2 + 3$
9. a) What is infrared spectroscopy? What are different vibrations that cause IR absorption? Write on sampling technique to get IR spectra. Write on sources and detectors used in IR spectroscopy.
- b) What are different regions of IR spectra? Write in brief on steps of interpretation of IR spectra.  $8 + 7$



10. a) Write a short note about spin-spin coupling and spin-spin splitting.

b) How does the electron negativity influence the chemical shift ?

c) Predict the multiplicity of signal in proton NMR of



11. Define the term Luminescence. Establish a relation between fluorescence intensity and concentration. Mention the application of fluorimetry in the pharmaceutical field.

2 + 7 + 6

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