Serial No. PCH-16-

ISLAMIC UNIVERSITYOF SCIENCE & TECHNOLOGY
DEPARMENT OF CHEMISTRY

M Sc. (3^{rd} Semester) (Mid term) **Max. Marks: 30**
Course Title: Spectroscopy of Organic Compounds (PCH-DCE-305) **Time: 40min**
Rollno:

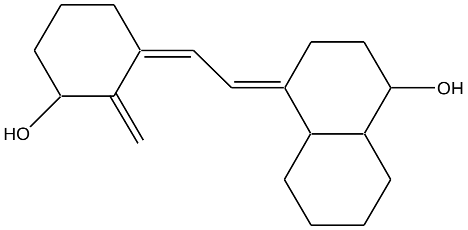
1. UV spectrum of acetaldehyde has absorption peak around 290 nm. What type of transition is responsible for this absorption.

   a) $\pi \rightarrow \pi^*$
   b) $n \rightarrow \pi^*$
   c) $\sigma \rightarrow \sigma^*$
   d) $n \rightarrow \sigma^*$

2. Which among the following chromophores acts as an independent chromophore?

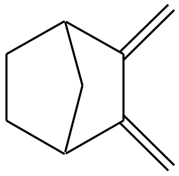
   a) Azo group $N=N$
   b) Ketonic group $C=O$
   c) Alkenic group $C=C$
   d) All the above

3. Given the fact that 1,3 butadiene has a UV absorption of 217 nm, the absorption wavelength (in nm) for the conjugated system shown below is



   a) 278
   b) 282
   c) 288
   d) 293

4. Adding the strain correction of 15 nm to the bicyclic system, the absorption maximum for the compound given below will be



   a) 248
   b) 252
   c) 260
   d) 268

5. By increasing the polarity of solvent , $n \rightarrow \pi^*$ transitions undergo

   a) Red shift
   b) Blue shift
   c) Red shift and blue shift
   d) Neither of the above

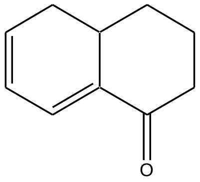
6. Woodword Fieser rule is not applicable for

   a) Conjugated polyenes having more than five double bonds
   b) Systems having distortion of chromophore
   c) Systems having ring strain
   d) All the above

7. By the introduction of polar group on α carbon in cyclic ketones (steroids), which position is effective in bringing the absorption maximum to longer wavelength.

   a) Equitorial position
   b) Axial position
   c) Both a and b
   d) Neither a nor b

8. Absorption maximum for the given compound using base value of 215 nm for the α.β-unsaturated carbonyl compound is



   a) 310 nm
   b) 317 nm
   c) 304 nm
   d) 323 nm

9. Which among the following isomers of benzenes show absorption at longer wavelength

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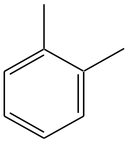
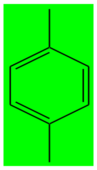
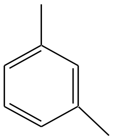
a) 

b) 

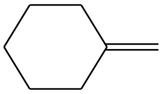
c) 

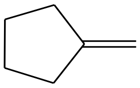
d) None of the above

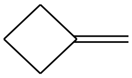
10. Which among the following band is formed by the forbidden transition (n→π*) and is known to occur by the presence of chromophoric group having atleast one lone pair of electron/s on the hetero atom

a) K- Band
b) R- Band
c) B-Band
d) E-Band

11. The correct order of IR stretching frequency of the C=C in the following olefins is

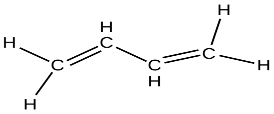

I

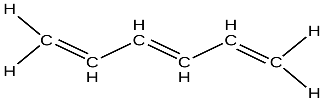

II

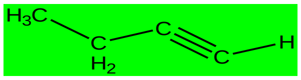

III

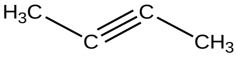
a) I > II > III
b) II > I > III
c) III > II > I
d) I > III > II

12. Among the compounds given in the option a-d, the one that exhibits a sharp band around 3300 cm^{-1} in the IR spectrum is (Note* s character is directly proportional to wavenumber)

a) 

b) 

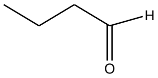
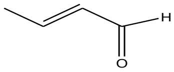
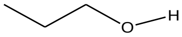
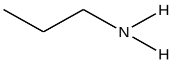
c) 

d) 

13. The bond that gives the most intense band in the Infrared spectrum for its stretching vibration is

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

14. Match the compounds in List-I with the stretching frequencies (cm^{-1}) of principal functional group given in List-II

List-I	List-II
A. 	I) 3600cm^{-1}
B. 	II) 3400cm^{-1}
C. 	III) 1750cm^{-1}
D. 	IV) 1725cm^{-1}

a) (A-III), (B-IV), (C-II), (D-I)
b) (A-II), (B-I), (C-III), (D-IV)
c) (A-III), (B-IV), (C-I), (D-II)
d) (A-III), (B-II), (C-I), (D-IV)

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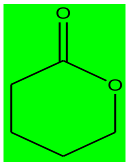
15. Fermi resonance occurs when

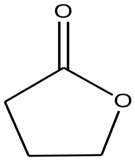
    a) Vibrational levels are of same symmetry species
    b) Interacting groups are located in the same molecule for appreciable mechanical coupling to occur
    c) Molecule transfers its energy from fundamental to overtone and back again
    d) All the above

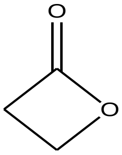
16. Best used solvent/s in case of IR spectroscopy is/are

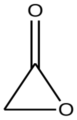
    a) Chloroform
    b) Carbon tetrachloride
    c) Carbon disulphide
    d) All the above

17. Among the compounds given in the option a-d, C=O stretching vibration of lactones will be lowest in

a)


b)


c)


d)


18. On dilution of dihydroxy compounds capable of forming intramolecular hydrogen bonding in non-polar solvents like chloroform and carbon tetrachloride, the effect on O-H stretching frequency will

    a) increase with dilution
    b) decrease with dilution
    c) remain same
    d) cannot be predicted

19. An organic compound displays a strong band around 1730-1750 cm^{-1} and a weak doublet around 2720-2820 cm^{-1}. The compound belongs to a/an

    a) Anhydrides
    b) Esters
    c) Aldehydes
    d) Ketones.

20. How is the O-H absorption peak shifted by replacing H by a D?
    (Note* The O-H and O-D bonds have approximately the same bond strength (Force constant)

    a) O-D absorption peak remains same as O-H
    b) O-D absorption peak increases
    c) O-D absorption peak decreases
    d) None of the above

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