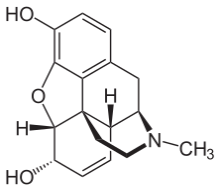
**ISLAMIC UNIVERSITYOF SCIENCE & TECHNOLOGY**
**DEPARMENT OF CHEMISTRY**

**M. Sc. (Ist Semester) (Mid-term)** **Max. Marks: 30**
**Course Title:** Stereochemistry and Reaction Intermediates (PCH-CC-102) **Time:**
**Roll no:**

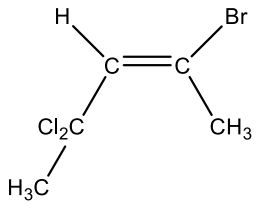
1. For morphine molecule shown below, how many asymmetric centres it has and how many stereoisomers are possible for it?



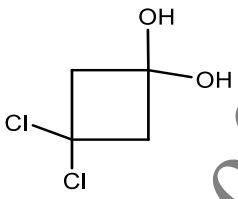
a) 9 asymmetric centres and has 1024 stereoisomers.
b) 3 asymmetric centres and has 8 stereoisomers.
c) 5 asymmetric centres and has 32 stereoisomers.
d) 2 asymmetric centres and has 4 stereoisomers.

2. Which of the following molecule has a chiral centre/ centres

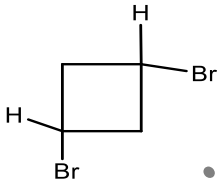
a).



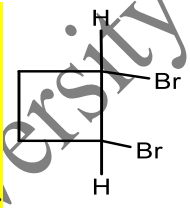
b).



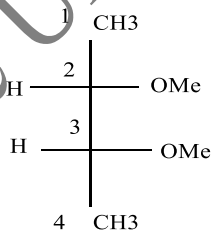
c).



d).



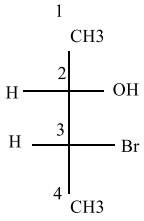
Q.3. The enantiomer of the following compound will have



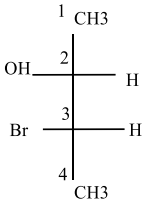
a). 2R, 3R configuration
b). 2S, 3S configuration
c). 2R, 3S configuration
d). 2S, 3R configuration

Q.4. Match the following.

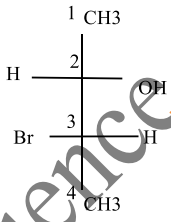
a).



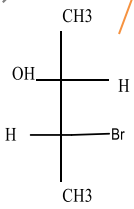
b).



c).

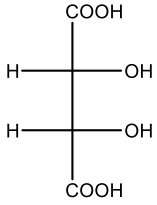


d).



1) (2R, 3R)-3-bromo-2-butanol
2) (2R, 3S)-3-bromo-2-butanol
3) (2S, 3R)-3-bromo-2-butanol
4) (2S, 3S)-3-bromo-2-butanol

Q.5. For tartaric acid, which of the following will indicate a meso compound.



a). (2R, 3R)-tartaric acid
b). (2S, 3S)-tartaric acid
c). (2R, 3S)-tartaric acid
d). None of the above

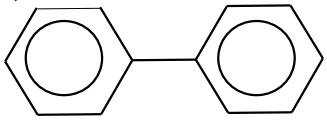
**Signature of Student** **Signature of Invigilator**

**ISLAMIC UNIVERSITYOF SCIENCE & TECHNOLOGY**
**DEPARMENT OF CHEMISTRY**

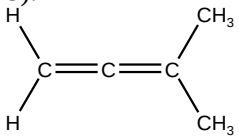
**M. Sc. (Ist Semester) (Mid-term)** **Max. Marks: 30**
**Course Title:** Stereochemistry and Reaction Intermediates (PCH-CC-102) **Time:**
**Roll no:**

**Q.6.** which of the following molecule will exhibit atropisomerism.

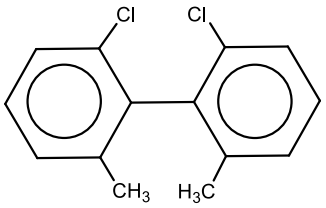
a).



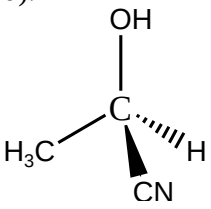
b).




c).



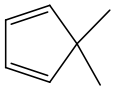

d).




**Q.7.** Which of the following fill all the criteria of aromaticity.

a).

b).

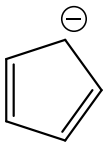


d). None

c).

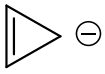
**Q.8.** Choose the anti-aromatic species from the following:

a).

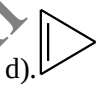


b).

c).



d).

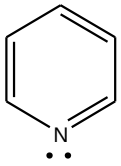


**Q.9.** On treating cyclooctatetraene with conc. $H_2SO_4$, a proton adds to one of the double bonds and you get a:

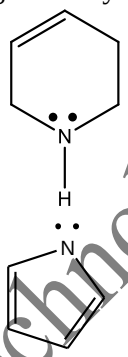
a). Aromatic species
b). Non-aromatic species
c). Homoaromatic species
d). Antiaromatic species

**Q.10.** Aromaticity effects the basicity of which of the following molecule significantly:

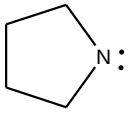
a).




b).



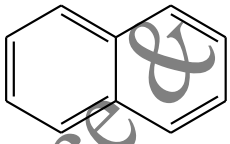

c).



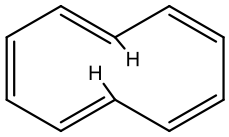

d).

**Q.11.** Which of the following molecules is non-planar and hence non-aromatic.

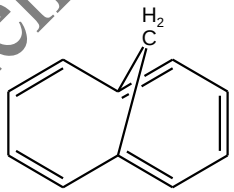
a).



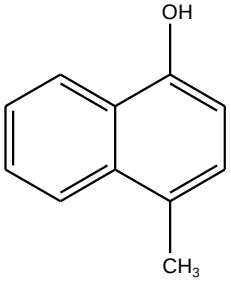
b).




C).



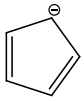

d).



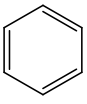

**Q.12.** Using molecular orbital theory, which of the following molecules contain degenerate MO's with unpaired electrons.

a).

b).



c).



d).



**Signature of Student** **Signature of Invigilator**

**ISLAMIC UNIVERSITYOF SCIENCE & TECHNOLOGY**
**DEPARMENT OF CHEMISTRY**

**M. Sc. (Ist Semester) (Mid-term)** **Max. Marks: 30**
**Course Title:** Stereochemistry and Reaction Intermediates (PCH-CC-102) **Time:**
**Roll no:**

**Q.13.** Pick out the correct statement about Fullerenes
a). The basic unit of fullerenes contain hexagonal and heptagonal rings.
b). Each carbon is $sp^2$ hybridized and these carbons are arranged in layers, like in Graphite.
c). Each carbon is $sp^3$ hybridized and these carbons are arranged in spheres or hollow clusters of 60 carbons.
d). None of the above.

**Q.14.** In fullerenes which of the following is true:
a). Hexagonal rings are joined by only hexagonal rings.
b).Hexagonal rings are joined by both pentagonal and hexagonal rings.
c). Pentagonal rings are directly connected to each other.
d). Pentagonal rings are joined by both pentagonal and hexagonal rings.

**Q.15.** Pick out the wrong statement:

a). If a molecule has a reflection plane, inversion centre or improper rotation, the molecule will be optically inactive.
b). Molecules that lack an alternating axis of symmetry are always chiral.
c). The absence of alternating axis of symmetry is a necessary and sufficient condition for a molecule to show optical activity.
d). The absence of reflection plane is a necessary and sufficient condition for a molecule to show optical activity.

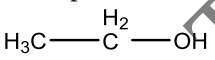
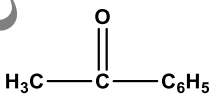
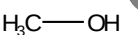
**Q.16.**Which of the following strategies can be useful in slowing down pyramidal inversion:

a). Putting nitrogen atom in a three membered ring.
b). Attaching an electronegative atom with nitrogen
c). Attaching nitrogen to the similar atom bearing an unshared electron pair.
d). Both a and c

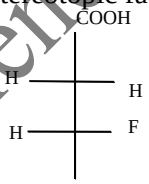
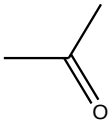
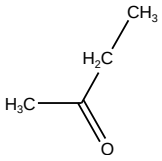
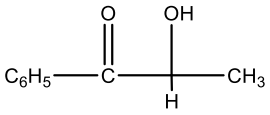
**Q.17.**Which of the following statements is true:

a). Diastereoisomers are superimposable mirror images.
b). Enantiomers are non-superimposable mirror images.
c). Diastereoisomers have same configuration at one chiral centre and different at other.
d). both b and c

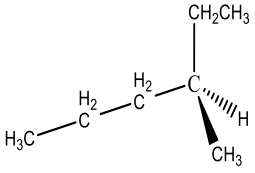
**Q.18.**Which of the following molecules is a prochiral species.

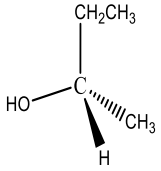
a). 
b). 
c). 
d). both a and b

**Q.19.**Which of the following molecule contains diastereotopic faces:

a). 
b). 
c). 
d). 

**Q.20.** For the molecules


(a)


(b)

a). both (a) and (b) have S configuration.
b). both (a) and (b) have R configuration.
c). (a) has R and (b) has S configuration.
d). (a) has S and (b) has R configuration



**Signature of Student** **Signature of Invigilator**