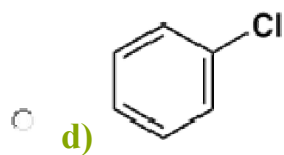
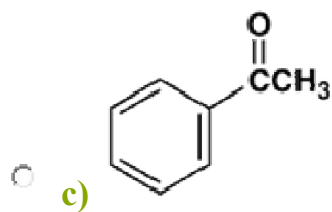
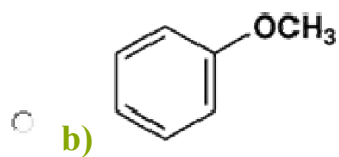
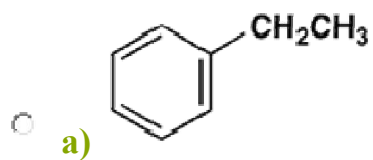


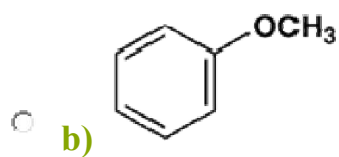
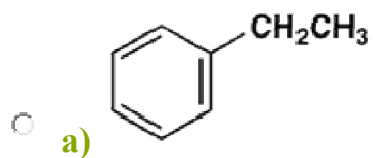
Question 1

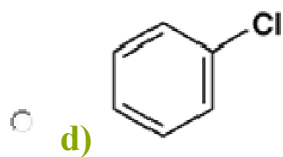
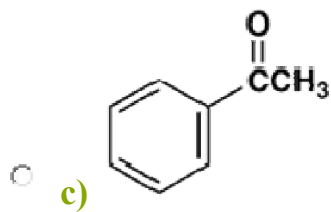
Which is most reactive in electrophilic substitution?



Question 2

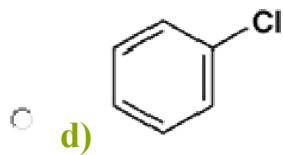
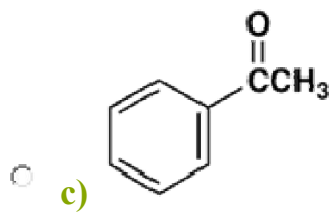
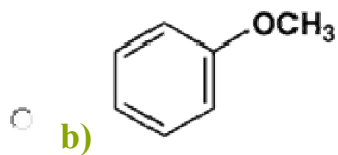
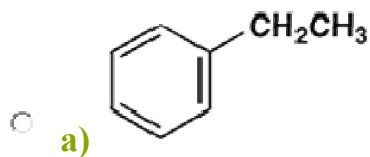
Which is least reactive in electrophilic substitution?





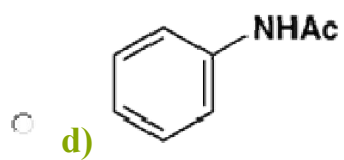
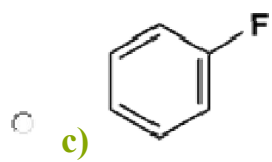
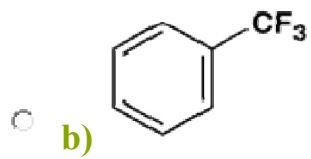
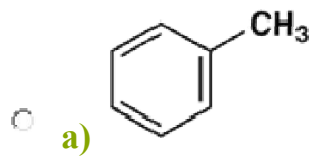
Question 3

Which gives a *meta* nitro compound as the main product upon nitration with a nitric acid-sulfuric acid mixture?



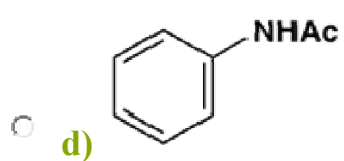
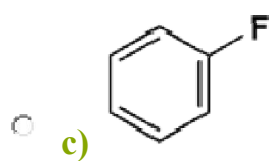
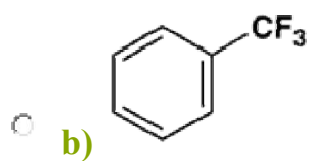
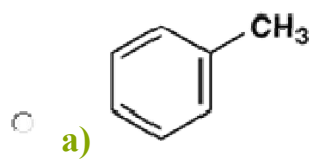
Question 4

Which is most reactive in electrophilic substitution?



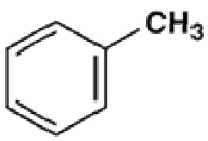
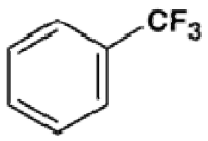
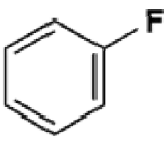
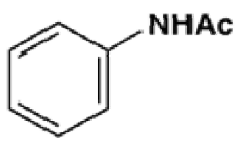
Question 5

Which is least reactive in electrophilic substitution?



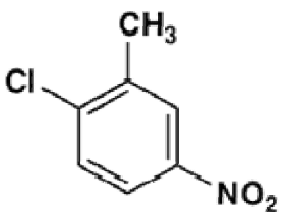
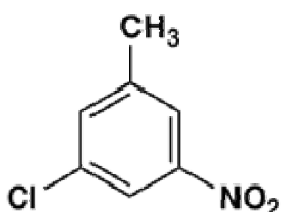
Question 6

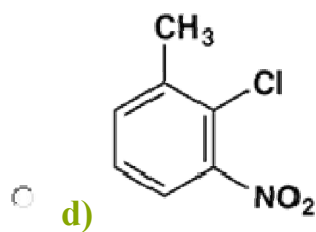
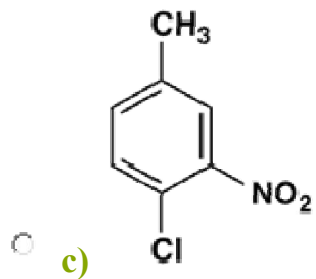
Which gives a *meta* nitro compound as the main product upon nitration with a nitric acid-sulfuric acid mixture?

- a) 
- b) 
- c) 
- d) 

Question 7

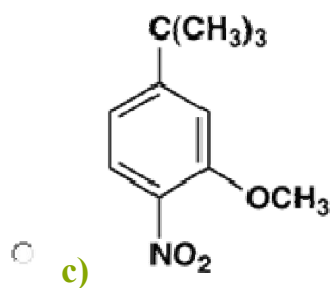
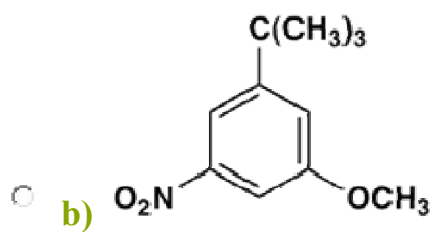
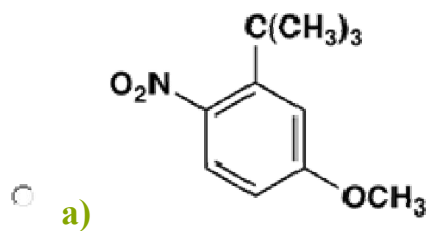
Which will be the main product upon chlorination of *m*-nitrotoluene with $\text{Cl}_2/\text{AlCl}_3$?

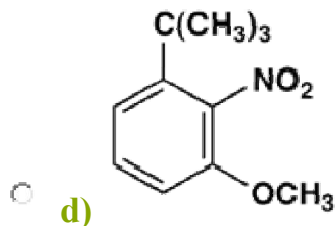
- a) 
- b) 



Question 8

Which is obtained as the main mononitration product upon reaction of *m-t*-butylanisole (1-*t*-butyl-3-methoxybenzene) with $\text{HNO}_3\text{-H}_2\text{SO}_4$?





Question 9

Which of the following statements regarding Friedel-Crafts reactions is wrong?

- a) Alkylation of benzene with an alkyl chloride requires only a catalytic amount of a Lewis acid such as aluminum chloride.
- b) Alkylation of benzene with an alcohol requires only a catalytic amount of a Brønsted acid such as phosphoric acid.
- c) Acetylation of benzene with acetyl chloride requires only a catalytic amount of a Lewis acid.
- d) Acetylation of benzene with acetic anhydride requires more than one equivalent of a Lewis acid.

Question 10

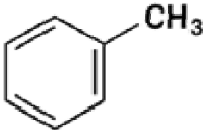
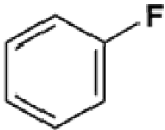
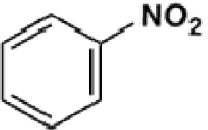
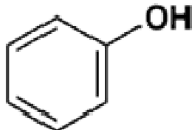
Which of the following statements regarding electrophilic aromatic substitution is wrong?

- a) Acetyl and cyano substituents are both deactivating and *m*-directing.
- b) Alkyl groups are activating and *o,p*-directing.
- c) Ammonio groups are *m*-directing but amino groups are *o,p*-directing.

- d) Chloro and methoxy substituents are both deactivating and *o,p*-directing.

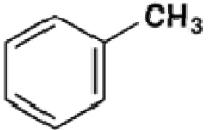
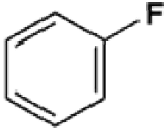
Question 11

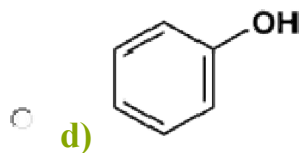
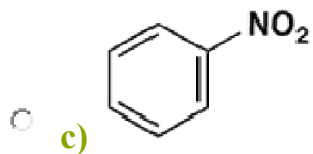
Which is most reactive in electrophilic substitution?

- a) 
- b) 
- c) 
- d) 

Question 12

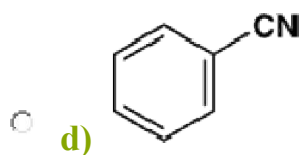
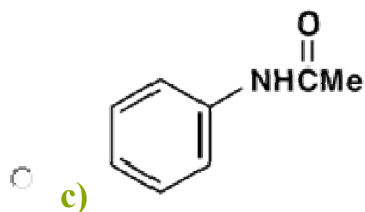
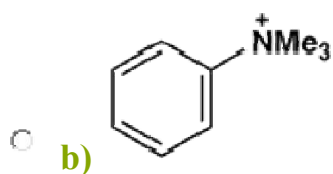
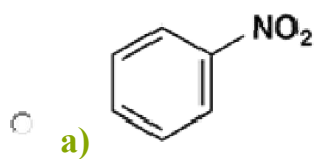
Which is least reactive in electrophilic substitution?

- a) 
- b) 



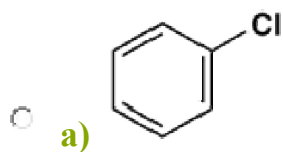
Question 13

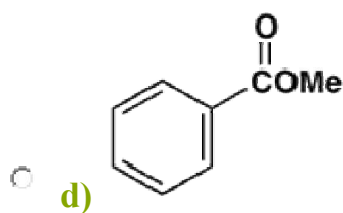
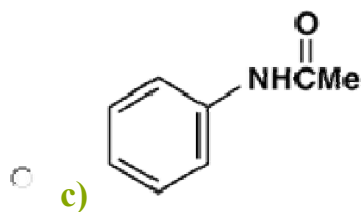
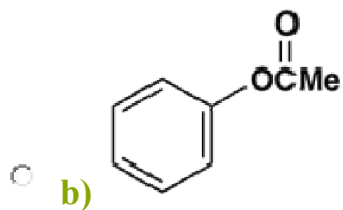
Which gives a *para* nitro compound as the main product upon nitration with a nitric acid-sulfuric acid mixture?



Question 14

Which gives a *meta* nitro compound as the main product upon nitration with a nitric acid-sulfuric acid mixture?





Question 15

Which of (a)-(d) does **not** give isopropylbenzene as a product upon reaction with benzene?

- a)** $(\text{CH}_3)_2\text{CHCl}/\text{AlCl}_3$
- b)** $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}/\text{AlCl}_3$
- c)** $\text{CH}_3\text{CH}=\text{CH}_2/\text{H}_3\text{PO}_4$
- d)** $(\text{CH}_3)_2\text{C}=\text{CH}_2/\text{H}_3\text{PO}_4$

Question 16

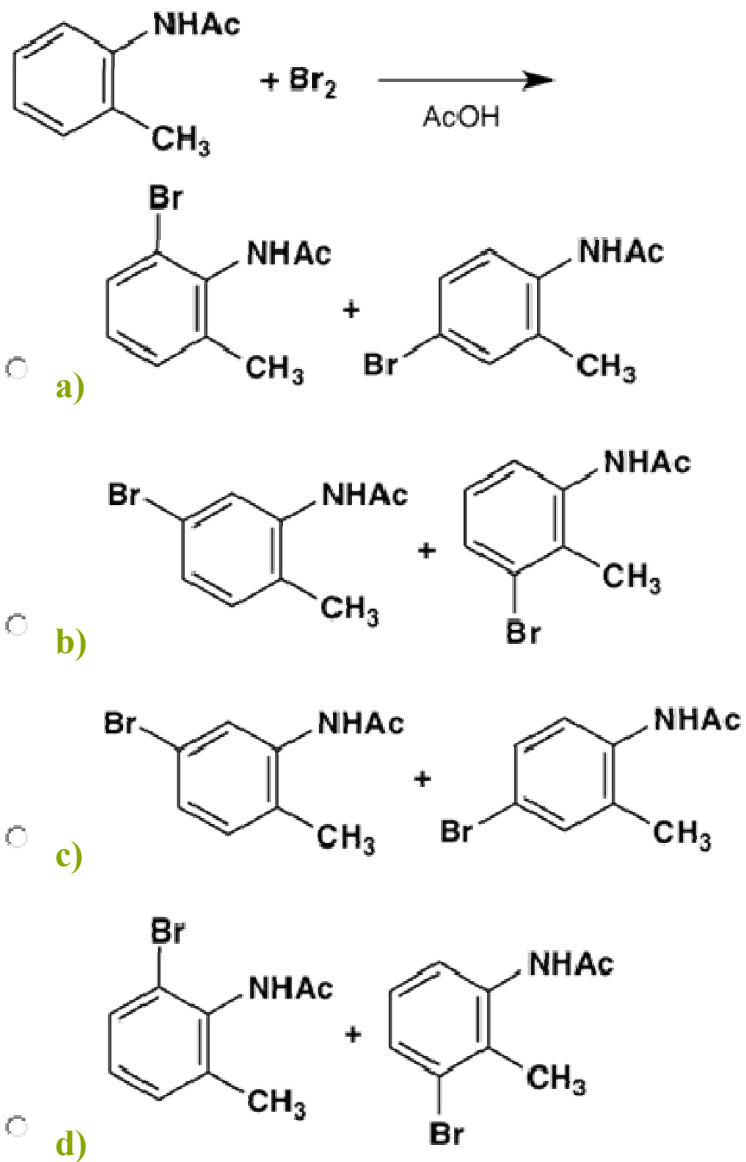
Which combination of reagents used in the indicated order with benzene will give *m*-nitropropylbenzene?

- a)** 1) $\text{HNO}_3/\text{H}_2\text{SO}_4$, 2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}/\text{AlCl}_3$
- b)** 1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}/\text{AlCl}_3$, 2) $\text{HNO}_3/\text{H}_2\text{SO}_4$

- c) 1) $\text{CH}_3\text{CH}_2\text{COCl}/\text{AlCl}_3$, 2) $\text{HNO}_3/\text{H}_2\text{SO}_4$, 3) $\text{H}_2\text{NNH}_2/\text{NaOH}$
- d) 1) $\text{HNO}_3/\text{H}_2\text{SO}_4$, 2) $\text{CH}_3\text{CH}_2\text{COCl}/\text{AlCl}_3$, 3) $\text{H}_2\text{NNH}_2/\text{NaOH}$

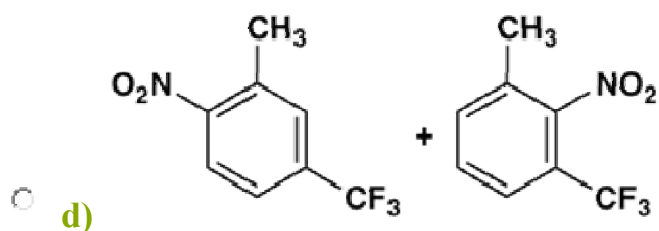
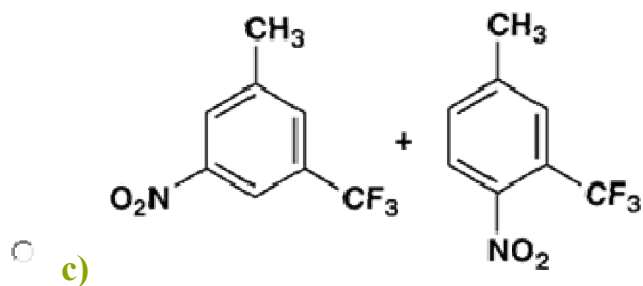
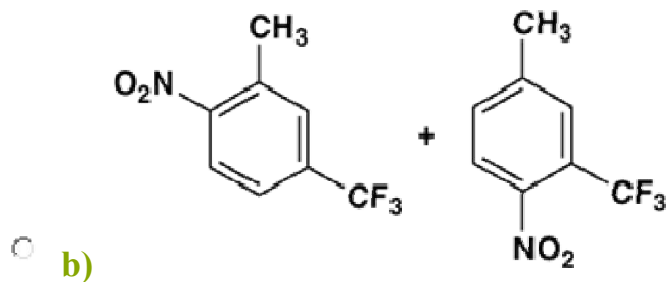
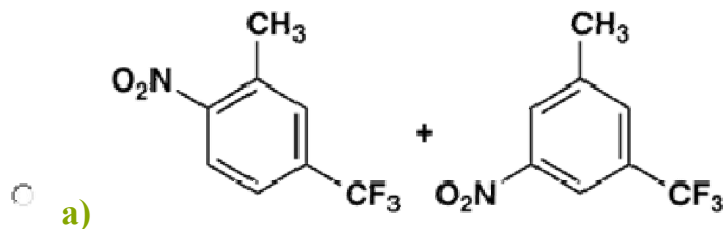
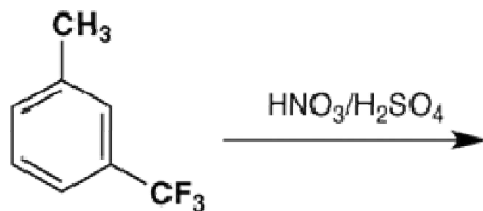
Question 17

Which pair of compounds are the most probable main products of the following reaction?



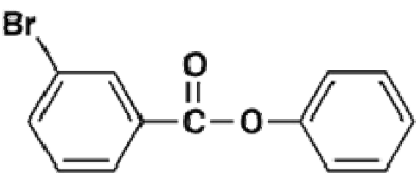
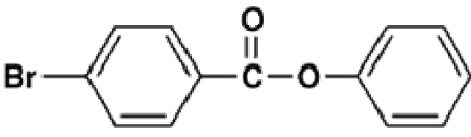
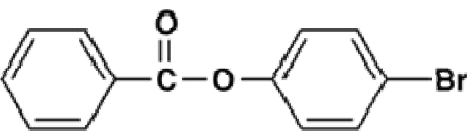
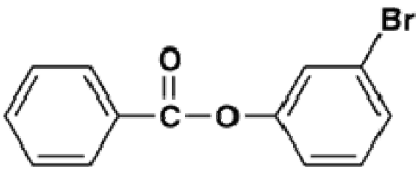
Question 18

Which pair of compounds are the most probable main products of the following reaction?



Question 19

Which will be the main product upon bromination of phenyl benzoate with $\text{Br}_2/\text{AlBr}_3$?

- a) 
- b) 
- c) 
- d) 

Question 20

Which of the following statements regarding electrophilic aromatic substitution is wrong?

- a) Sulfonation of toluene is reversible.
- b) Friedel-Crafts alkylation of benzene can be reversible.
- c) Friedel-Crafts alkylation with primary alkyl chloride may involve rearrangement.
- d) Friedel-Crafts acylation of nitrobenzene readily gives a *meta* substitution product.

Questions and Answers – Cycloalkanes and Cycloalkenes

1. Cycloalkanes are associated with the general formula

- a) C_nH_{2n+2}
- b) $C_nH_{2(n+2)}$
- c) C_nH_{2n+1-r}
- d) $C_nH_{2(n+1-r)}$

Answer: d

Explanation: It is almost the same as that in the case of alkanes. Here the difference is that 2 is replaced by 1-r where r represents the number of rings in them.

2. Cycloalkanes have the same melting and boiling points as their corresponding alkanes. State true or false

- a) True
- b) False

Answer: b

Explanation: The melting and boiling points of the cycloalkanes are much more than the corresponding alkanes.

3. Identify the incorrect statement regarding cycloalkanes

- a) These have sp^3 hybridized carbons
- b) These have tetrahedral bond angles
- c) Stability of the cycloalkanes varies directly with their respective size
- d) These undergo nucleophilic substitution reactions

Answer: b

Explanation: Cycloalkane compounds do not have a perfect tetrahedral bond angle, instead they show a minor deviation from it which leads to destabilizing effect.

4. Identify the compound with the highest ring strain

- a) Cyclomethane
- b) Cyclopropane
- c) Cyclobutane
- d) Cyclopentane

Answer: b

Explanation: Cyclopropane is the compound with the highest ring strain. This is because the carbon atoms are arranged in the shape of a triangle thus forming C-C-C.

5. Which among the following compounds explodes on contact with oxygen

- a) Cyclopropane
- b) Cyclobutane
- c) Cyclopentane
- d) Cyclohexane

Answer: a

Explanation: Cyclopropane reacts very aggressively at ordinary temperatures and hence it explodes when comes in contact with oxygen.

6. Identify the incorrect statement regarding cyclobutane

- a) The carbon atoms in the cyclobutane are non-coplanar
- b) These exist in nature as colourless gas
- c) Cyclobutane is a commercially important compound
- d) These compounds often show butterfly conformation

Answer: c

Explanation: Cyclobutane is a compound which has no commercial and medicinal importance but the complex derivative forms of them are used for a variety of purposes.

7. Identify the alicyclic hydrocarbon which is highly flammable

- a) Cycloheptane
- b) Cyclopentane
- c) Cyclopropane
- d) Cyclooctane

Answer: b

Explanation: cyclopentane is a hydrocarbon with 5 carbon atoms and they are highly flammable.

8. Identify the incorrect statement regarding cyclohexane:

- a) It is non-polar
- b) It serves as an organic solvent
- c) It is a hydrophilic hydrocarbon
- d) It is commercially used for variety of applications

Answer: c

Explanation: This compound is a hydrophobic hydrocarbon as it is non-polar by nature.

9. Identify the incorrect statement regarding cycloalkenes

- a) The bonds in them are fewer compared to those in alkenes
- b) They occur in gaseous form in nature
- c) These undergo polymerization
- d) The conjugated double bonds in them increase their stability

Answer: b

Explanation: Cycloalkenes mostly appear in liquid state but sometimes they are even found in solid state.

10. Cycloalkene exhibits aromatic character. State true or false

- a) True
- b) False

Answer: b

Explanation: Cycloalkene is a compound which has carbon atoms arranged in a closed ring but they do not exhibit aromatic character.