M.Sc. II, Sem - II

Seat No.:

MARCH - 2022 (Summer session) Examination

Subject Code: 81564

(विध्यार्थ्यानी हा विषय कोड OMR वर लिहावा / Student should fill this code on OMR sheet)

Subject Name: Master of Science_81564_61430/74454/81564 - Theoretical Organic Chemistry_04.08.2022_4.00 PM

Date: 04-08-2022 **Time: 16:00:00 to 17:00:00**

QP Code: 9793QP

Total Marks : 50 Each Question 2 Marks, Total 25 Ques, Duration 1 Hr

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1. Which of the following is not a principle of green chemistry?

a. Green solvents and auxillaries
b. Use of renewable feedstocks
c. Hazardous chemical synthesis
d. Design for energy efficiency

2. Identify the non toxic and green solvent among the following?

a. Benzene
b. Liquified carbon dioxide
c. Toluene
d. Carbon tetrachloride

3. [Bmim]OH belongs to the category of_____.

a. ionic liquids
b. supercritical solvents
c. zeolites
d. brominating solution

4. Green chemistry aims to?

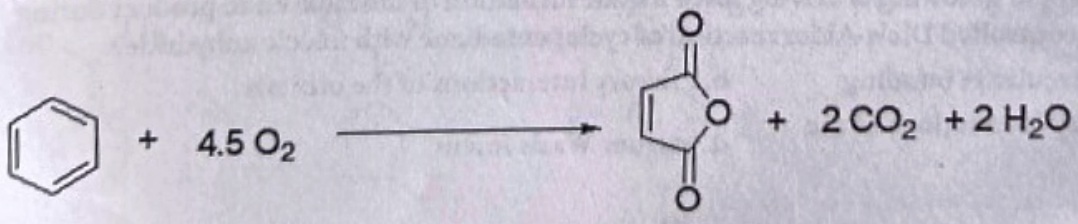
a. Design chemical products and process that maximize profits
b. Design safer chemical products and processes that reduce or eliminate the use and generation of hazardous substances
c. Design chemical products and processes that work most efficiently
d. Utilize non-renewable energy

5. Which one of the following is used to prepare biodegradable bags?

a. vinyl chloride
b. styrene
c. Teflon
d. Lactic acid

6. Question

Calculate the % atom economy of following conversion.

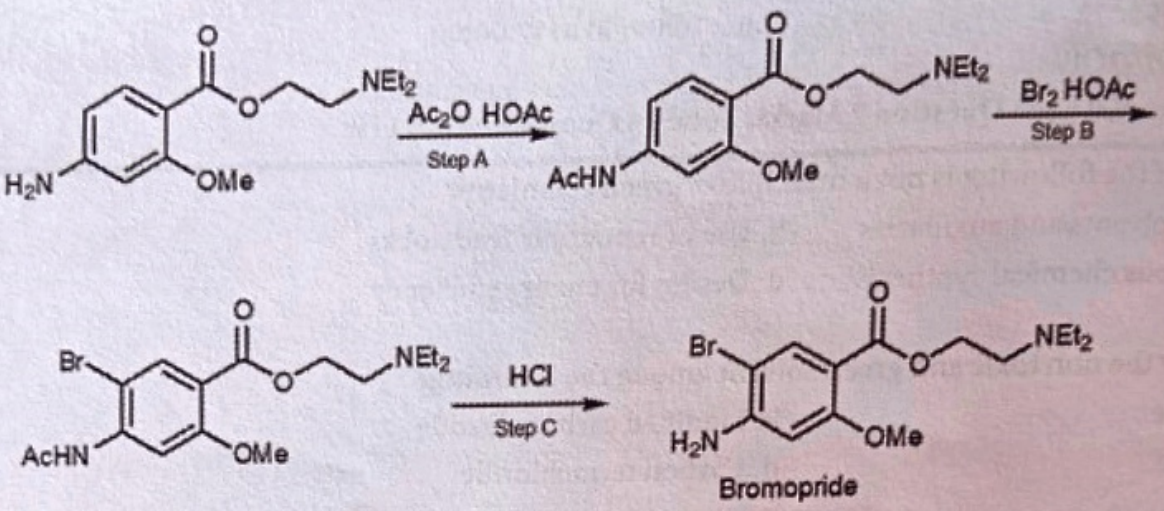


a. 43
b. 33

c. 57 d. 49

7. Question

Which of the principles of green chemistry doesn't support Step A and Step C in the following synthesis of bromopride?



a. Less Hazardous Chemical Syntheses
b. Safer Solvents and Auxiliaries
c. Reduce Derivatives
d. Inherently Safer Chemistry for Accident Prevention

8. Which one of the following products predominates in thermodynamically controlled reaction?

a. Product with cis stereochemistry
b. Product with less energy of activation
c. Product which is thermodynamically more stable
d. Product which is environmentally benign

9. Naphthalene-1-sulphonic acid is the major product of sulphonation of naphthalene using oleum at 80 degree C. Which of the following options correctly justify its formation?

a. Sulphonation of aromatic compounds always occur at position 1
b. Naphthalene-1-sulphonic acid is more stable amongst possible sulphonated products.
c. Naphthalene-1-sulphonic acid is aromatic
d. Arenium ion which is a transition state leading to naphthalene-1-sulphonic acid has lower energy of activation

10. Which of the following is driving force for the formation of unstable endo product during kinetically controlled Diels-Alder reaction of cyclopentadiene with maleic anhydride?

a. Intermolecular H bonding
b. Primary interactions of the orbitals
c. Secondary interactions of the orbitals
d. van der Waals forces

11. Identify the kinetically controlled product during Friedel-Craft benzylation of toluene using benzyl bromide in the presence of GaBr3?

a. o-Benzyl toluene
b. m-Benzyl toluene

c. p-Benzyl toluene
d. Mixture of o-benzyl toluene and p-benzyl toluene

12. Which of the following product predominates in the Wittig reaction of benzaldehyde with Ph3P=CHCOOMe?

a. E isomer
b. Z isomer
c. Equal quantities of E and Z isomer
d. None of these as reaction is non stereospecific

13. Which one of the following intermediates is speculated in acetolysis of anti-7-norborneyl tosylate?

a. Carbanion
b. Non classical carbocation
c. Benzyne
d. No intermediate is formed as reaction is concerted

14. Which one of the following compounds is aromatic?

a. Cyclopropenyl anion
b. Cyclopentadienyl cation
c. Cycloheptatrienyl anion
d. Cycloheptatrienyl cation

15. Consider the following statements. (i) The PNMR spectrum of [18] annulene shows two signals at -60 degrees Celsius. (ii) The PNMR spectrum of [18] annulene shows only one signal at 110 degrees Celsius. Which one of the following is correct option regarding statements i and ii.

a. Only (i) is correct
b. Only (ii) is correct.
c. Both (i) and (ii) are correct
d. Both (i) and (ii) are incorrect

16. The final product of Diels-Alder reaction of cyclopentadiene with maleic anhydride followed by reaction with potassium acetate in acetic acid is _____.

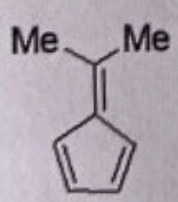
a. Tropolone
b. Tropone
c. Fulvene
d. Azuelene

17. Which of the following statement is INCORRECT in regards to ferrocene?

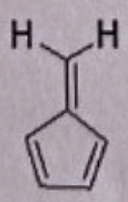
a. Ferrocene undergo Mannich reaction
b. Ferrocene undergo Diels-Alder reaction with maleic anhydride
c. Ferrocene can be arylated using aryl diazonium chloride
d. Ferrocene undergo electrophilic substitution reaction

18. Question

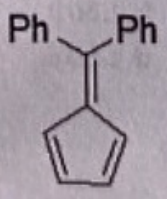
Identify the correct option regarding increasing dipole moment of the following.



I



II



III

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

19. Total number of pentagons and hexagons in Buckminster fullerene are_____

a. 12 hexagons and 20 pentagons
b. 12 pentagons and 20 hexagons
c. 12 hexagons and 12 pentagons
d. 20 pentagons and 20 hexagons

20. Inorganic salts are usually insoluble in organic solvents e.g, KMnO4 is insoluble in benzene. However, presence of one of the following compounds in benzene makes KMnO4 soluble and give a purple-coloured solution. Which is that compound?

a. Catenane
b. Crown-ether
c. Cyclodextrin
d. Annulene

21. What of the following statements is correct?

a. a) The delocalization energy of benzene is 2 β
b. b) The delocalization energy of cyclooctatetraene is 1.66 β
c. c) The delocalization energy of cyclooctatetraenide dication is 3.66 β
d. d) All are correct

22. Question

Which of the following molecule has equal number of bonding and anti-bonding molecular orbitals?

A) C_3H_4

B) C_4H_4

C) C_5H_6

D) C_7H_8

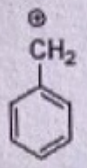
a. A
b. B
c. C
d. D

23. What is the energy difference between HOMO and LUMO in 1,3-butadiene?

a. 1.24 α
b. 1.60 β
c. 1.24 β
d. 1.60 α

24. Question

Identify the charge density in the following molecule.



A) $\frac{1}{\sqrt{7}}$

B) $\frac{1}{\sqrt{8}}$

C) $\frac{1}{\sqrt{17}}$

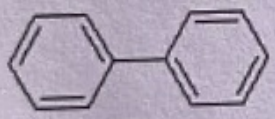
D) $\frac{1}{\sqrt{20}}$

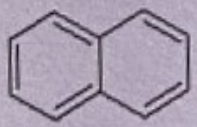
a. A
b. B
c. C
d. D

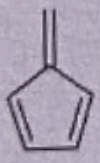
25. Question

Which of the following is non-alternant hydrocarbon?

A) 

B) 

C) 

D) 

a. A
b. B
c. C
d. D