REV-01
BSC/19/24

2023/12

SET A

B.SC. CHEMISTRY
FIFTH SEMESTER
GREEN CHEMISTRY
BSC - 505A

[USE OMR FOR OBJECTIVE PART]

Duration : 3 hrs. **Full Marks : 70**

Objective

Time : 30 min. **Marks : 20**

Choose the correct answer from the following: ***1X20=20***

1. Which is the most atom-economic reaction of the following
   a. isomerization b. elimination
   c. substitution d. addition-elimination

2. Which is a green oxidant
   a. PCC b. Jones reagent
   c. hydrogen peroxide d. Collins reagent

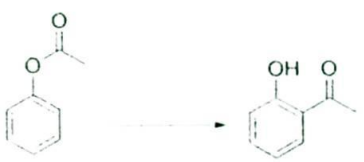
3. Which is a WRONG statement for a cocrystal
   a. good crystal packing is required b. covalent bond formation is necessary
   c. enthalpy change is greater than entropy change d. none of the above

4. How many tripeptides will be generated from 3 different amino acids by the split and mix combinatorial method?
   a. 9 b. 18
   c. 27 d. 12

5. Which of the following is not a biocatalyst?
   a. Enzyme b. chlorophyll
   c. glucose d. none of these

6. Benzaldehyde can be converted to cyanobenzene by
   a. NH_3 / µW b. NBS / µW
   c. NH_2OH / µW d. $MeNH_2$ /µW

7. Which is the most suitable reaction condition for the following reaction?



   a. Al_2O_3/ µW b. $AlCl_3$/ µW
   c. $Al(OH)_3$/ µW d. $AlCl_3$/ heat (conventional)

8. What will be the value of 'n' of the following structure for adipic acid?

a. n = 1
b. n = 2
c. n = 3
d. n = 4

9. The green synthesis of methyl methacrylate involves
a. Iron as catalyst
b. Reductive addition reaction
c. Oxidative elimination reaction
d. Insertion reaction

10. BHT is highly important compound as it can act as
a. sunscreen
b. oxidant
c. antioxidant
d. coagulant

11. 'KA' oil is the mixture of
a. hexanone & hexanol
b. cyclohexanone & cyclohexanol
c. petanone & pentanol
d. cyclopetanone & cyclopentanol

12. Which of the following is a multi-functional reagent
a. $NaBH_4$
b. $PdCl_2$
c. amylase
d. peroxide

13. Which of the following is used as a protecting agent for primary amines?
a. carboxylic acid
b. Boc anhydride
c. bromine
d. thiol

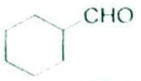
14. Which of the following effects is known to emit ultrasonic wave
a. Piezoelectric effect
b. Pyroelectric effect
c. Photoelectric effect
d. All of these

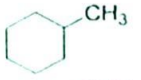
15. The name of the following reaction is

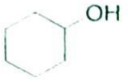
a. Saponification reaction
b. Cannizzaro reaction
c. Reformatsky reaction
d. Strecker reaction

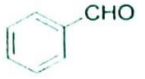
16. A green reagent used for selective mono-methylation of methylene-active compounds is
a. DMC
b. DCC
c. PCC
d. TCM

17. The reactant, [A], in the following ultrasonic oxidation reaction is

a. 

b. 

c. 

d. 

18. What is the range of ultrasonic sound wave responsible for carrying out chemical reaction?
a. 20 Hz to 100 Hz
b. 20 kHz to 100 kHz
c. 10 Hz to 50 Hz
d. 50 Hz to 100 Hz

19. Bromobenzene on being treated with Li in THF under sonication yields biphenyl. This reaction is an example of
a. Hetero coupling reaction
b. Homo coupling reaction
c. Ullmann reaction
d. None of these

20. TBAB is an example of
a. Lindlar catalyst
b. PT catalyst
c. GN catalyst
d. None of these

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Descriptive

me : 2 hrs. 30 min. Marks : 50

[Answer question no.1 & any four (4) from the rest]

a. What is BHT? Discuss its importance and the green synthesis. 4+3+3 =10

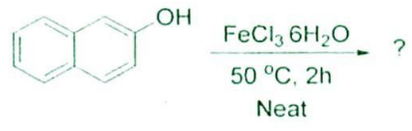
b. Write down the differences between a cocrystal and eutectic.

c. Explain the principle of ultrasound assisted organic synthesis.

a. How can we calculate the atom economy and E-factor of a reaction? 3

b. What are the obstacles to achieving the goals of Green Chemistry? 3

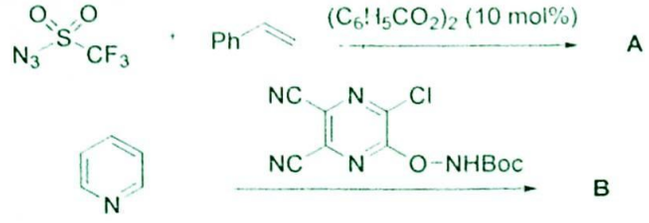
c. Complete the following reactions 2+2=4



a. What is biodiesel and how is it synthesized? 3

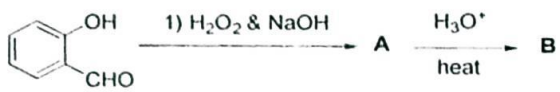
b. Write down the 12 principles of Green Chemistry. 4

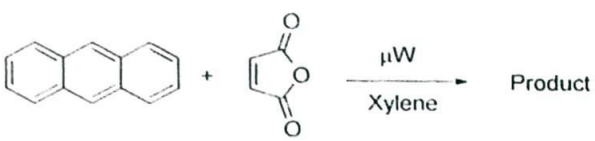
c. What is A and B in the following reactions 2×1.5 =3



4. a. Write the structure of paracetamol and show its green chemical synthetic approach. 5

b. Write the products (A, B & C) of the following reactions 3+2=5

(i) 

(ii) 

5. a. Discuss the advantages of microwave irradiation in organic synthesis over the conventional method. Justify your answer with suitable chemical reactions. 6+4=10

b. What is the general structure of Urethane? Why it is important? Discuss its general synthesis and drawbacks of the process.

6. a. What is bioethanol and how is it synthesized? 3

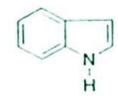
b. What is PLA? 2

c. What are the conventional reagents used for carrying out methylation? Give reasons why such reagents cannot be used in green methods for methylation. Name one green reagent for carrying out methylation and justify your answer. 3

7. a. What do you mean by ultrasound assisted organic reaction? Explain ultrasonic esterification with suitable examples. 5+5=10

b. Write the different advantages of ultrasound assisted organic synthesis with suitable examples.

8. **a.** Complete the following reaction with the product and justify the following reaction to be green. 5



Indol

MeI/Solid KOH/Toluene

PEG methyl ether, 20° C, 30 min.
Ultrasound

Product
Yield = 65%

b. Write notes on the following reactions: 5

i. ultrasonic coupling reaction

ii. ultrasonic Strecker synthesis

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