Subject: **Chemistry**

Paper name: **Organic Chemistry - III**

Paper No: **X (CHEM/6/CC/362)**

Semester: **VI**

A. Multiple Choice questions

1. When an organic molecule absorbs light below 254 nm, it will undergo

(a) only electronic transition

(b) only vibrational transition

(c) only rotational transition

(d) electronic, vibrational and rotational transitions

2. The energy required for various electronic transitions are in the order of

(a) $\sigma \rightarrow \sigma^* > n \rightarrow \pi^* > n \rightarrow \sigma^* > \pi \rightarrow \pi^*$

(b) $\sigma \rightarrow \sigma^* > n \rightarrow \sigma^* > n \rightarrow \pi^* > \pi \rightarrow \pi^*$

(c) $\sigma \rightarrow \sigma^* > n \rightarrow \sigma^* > \pi \rightarrow \pi^* > n \rightarrow \pi^*$

(d) $\sigma \rightarrow \sigma^* > \pi \rightarrow \pi^* > n \rightarrow \pi^* > n \rightarrow \sigma^*$

3. Phosphorescence is a transition of

(a) $T_1^v \rightarrow S_0^v$

(b) $T_1^0 \rightarrow S_0^0$

(c) $T_1^v \rightarrow T_0^v$

(d) $T_1 \rightarrow S_0^v$

4. When fluorescence and phosphorescence occur in same molecule phosphorescence is found at

(a) Lower frequency than fluorescence

(b) Higher frequencies than fluorescence

(c) Equal frequency with fluorescence

(d) 10 times higher frequencies than fluorescence

5. The major product in Norrish Type-II reactions are

(a) Aldehyde and ketone

(b) Ketone and alkene

(c) Alcohol and ketone

(d) Alkene and alcohol

6. Which statement is wrong for a Pericyclic reaction?

(a) It is having cyclic transition state.

(b) It is influenced by change in solvent.

(c) Only π-electrons are involved in the formation of bonds.

(d) It is highly stereospecific.

7. A reaction in which two or more π-electron system react to form a ring at the expense of one π bond in each of the reacting partners is called

(a) An electrocyclic reaction

(b) Cycloaddition reaction

(c) Sigmatropic reaction

(d) Group transfer reaction

8. In an electrocyclic Pericyclic reaction, the electrons involved in photochemical reaction is in

(a) HOMO

(b) LUMO

(c) Both LUMO and HOMO

(d) Ground state

9. The ground state HOMO of hexatriene is having

(a) C_2 symmetry

(b) 1-node

(c) 3 – node

(d) Mirror plane symmetry

10. The HOMO of an ethylene molecule in a ground state has

(a) Mirror plane symmetry

(b) 1 node

(c) C_2-symmetry

(d) 2 node

11. Reaction of organolithium compounds with ketones in acidic medium gives

(a) aldehydes

(b) amines

(c) alcohols

(d) carboxylic acid

12. Thiols react with ketones in the presence of hydrochloric acid to give

(a) mercaptals

(b) mercaptols

(c) mercaptides

(d) thiol esters

13. Grignard reagent on protonation gives

(a) alcohol

(b) aldehyde

(c) ketone

(d) alkane

14. The Reformatsky reaction and the Simmons−Smith reaction using

(a) organsulphur reagent

(b) organolithium reagent

(c) Grignard reagent

(d) organozinc reagents

15. Nature of Metal-Carbon bond in organometallic compounds is a

(a) ionic bond

(b) co-ordinate bond

(c) non-polarized covalent bond

(d) polarized covalent bond

16. The aim of green chemistry is

(a) to design the chemical product and process that maximize profits

(b) to design the chemical product and process that reduce hazardous substance

(c) to design the chemical product and process that work most efficiently

(d) utilization of non-renewable energy

17. Mannich reaction is an example of

(a) microwave assisted reaction

(b) UV- assisted reaction

(c) IR- assisted reaction

(d) none of the above

18. Hofmann elimination is an example of

(a) IR- assisted reaction

(b) UV- assisted reaction

(c) microwave assisted reaction

(d) all of the above

19. The product of Wittig reaction is

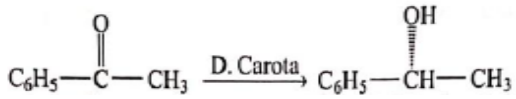
(a) alcohol

(b) aldehyde

(c) alkane

(d) alkene

20. Identify the type of reaction of given example is



(a) biocatalysts dehydrogenation reaction

(b) biocatalysts oxidation reaction

(c) biocatalysts reduction reaction

(d) all of the above

21. Which one of the following compound will give single NMR signal?

(a) CH_3OCH_3

(b) $CH_3CH_2OCH_3$

(c) CH_3COOCH_3

(d) $CH_2=CHCl$

22. Which of the following technique can be used to determine the molecular weight of a compound?

(a) UV-Vis spectroscopy

(b) IR spectroscopy

(c) NMR spectroscopy

(d) Mass spectrometry

23. In mass spectrometry, only a compound is detected whose m/z value is

(a) 0
(b) Neutral
(c) Positive
(d) Negative

24. The High resolution ^{1}H-NMR spectra of pure ethyl alcohol shows

(a) 3H triplet, 2H quartet and 1H singlet

(b) 3H triplet, 2H multiplet and 1H triplet

(c) 2H triplet, 3H quartet and 1H doublet

(d) 2H triplet, 2H multiplet and 1H quartet

25. In ^{1}H-NMR spectra, an electron withdrawing group near a particular proton will cause
    (a) shielding
    (b) deshielding
    (c) coupling
    (d) splitting

B: Fill up the blanks

1. Norrish type-I reaction involves_____cleavage.
2. The product of Paterno-Buchi reaction is an_____.
3. Photochemical reduction of carbonyl compounds occurs from_____transition.
4. Diels-Alder reaction is an example_____cycloaddition reaction.
5. According to FMO method, if the HOMO of the open chain partner has m-symmetry, the processes will follow_____path.
6. A thermal electrocyclic reaction is symmetry allowed when the total number of $(4q+2)_s$ and $(4r)_a$ component is_____.
7. Organometallic compounds acting as source of _____ for C-C bond formation.
8. Reactivity of organometallic compounds generally_____with the ionic character of the Carbon-Metal bond.
9. Grignard reagents are unable to react with_____ ketone.
10. Butyraldehyde is obtained from 1-chlorobutane in the presence of ultrasonic irradiation with lithium and_____.
11. Dehydrogenases reaction followed by _____abstraction from alcohols and amines.
12. The condensation of an aldehyde or ketone with an amine or ammonia and a non-enolizable aldehyde or ketone to obtained aminoalkylated derivatives is known as the_____.
13. Deshielded protons in $^{1}H_{NMR}$ spectra are in_____field.
14. The presence of H-bonding in a molecule causes_____of the proton.
15. The most intense peak in the mass spectrum is called_____.

Key Answers

A. Multiple choice questions

1. (a)
2. (c)
3. (b)
4. (a)
5. (b)
6. (b)
7. (b)
8. (b)
9. (d)
10. (c)
11. (c)
12. (b)
13. (d)
14. (d)
15. (d)
16. (b)
17. (a)
18. (c)
19. (d)
20. (c)
21. (a)
22. (d)
23. (c)
24. (b)
25. (b)

B: Fill up the blanks

1. 1.α
2. oxetane
3. $n \rightarrow \pi^*$

4. [4+2]
5. disrotatory
6. odd
7. nucleophile
8. increases
9. steric hindrance
10. dimethyl formamide
11. hydrogen
12. Mannich reaction
13. low/down
14. deshielding
15. base peak