

Instructions

Read the instructions provided for every question properly before attempting the answer.

1. Section - A

1 marks per question

30 display questions

30 maximum answerable

Q1 Type the Answer 1 marks CO5

Electron withdrawing groups ----- the stability of carbanions

Rubrics

Q2 Type the Answer 1 marks CO3

The most stable conformation of n-butane is -----

Rubrics

Q3 MCQ - Single Answer 1 marks CO5

Which of the following group is the meta directing in electrophilic aromatic substitution?

- chloro
- methyl
- nitro
- hydroxyl

Rubrics

Q4 Type the Answer 1 marks CO5

Cyclic compounds, other than 6 membered rings undergo Elimination.

Rubrics

Q5 Type the Answer 1 marks CO4

___ is the strongest nucleophile among the halide ions.

Rubrics

Q6 MCQ - Single Answer 1 marks CO4

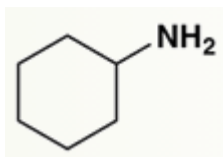
Which of the following pairs does not show an acid and its conjugate base?

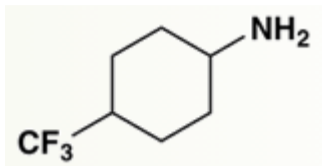
- HCl and Cl⁻
- NH₃ and NH₂⁻
- NH₄⁺ and NH₃
- NH₄⁺ and NH₂⁻

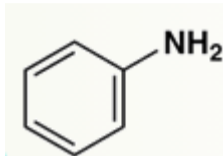
Rubrics

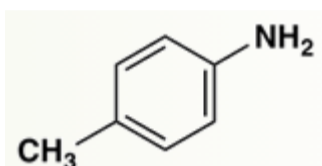
Q7 MCQ - Single Answer 1 marks CO4

Which of the following compound is the most basic?









Rubrics

Q8 Type the Answer 1 marks CO1

Splitting of the equation into different parts, with only one variable in each part is known as -----.

Rubrics

Q9 Type the Answer 1 marks CO2

The probability of finding the electron of an antibonding orbital is ----- at the center of the nuclei of the molecule.

Rubrics

Q10 Type the Answer 1 marks CO4

In aprotic solvent, the order of nucleophilicity and the basicity are ----

Rubrics

Q11 MCQ - Single Answer 1 marks CO5

Which of the following groups has the + M effect?

-NO₂

-Cl

-C≡N

-SO₃H

Rubrics

Q12 Type the Answer 1 marks CO1

A function being operated upon with an operator yielding constant times the function is known as ----- function.

Q13

MCQ - Single Answer

1 marks

CO2

Which of the following species does not exist according to MO theory?

- He₂
- He₂⁺
- H₂⁺
- H₂⁻

Rubrics

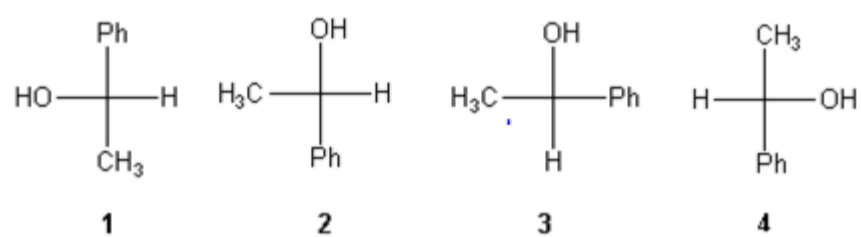
Q14

MCQ - Single Answer

1 marks

CO3

Which of the following Fischer projections is different from the other three?



- 2
- 3
- 1
- 4

Rubrics

Q15

Type the Answer

1 marks

CO1

Analytical solution for Schrödinger equation is ----- for multi electron system.

Rubrics

Q16

Type the Answer

1 marks

CO4

With increase in pKa, acidity -----

Rubrics

Q17

MCQ - Single Answer

1 marks

CO2

An octahedral complex having very narrow energy gap between the two sets of d orbitals is green in color because it absorbs ---- colored light.

- Violet
- Blue
- Red
- Green

Rubrics

Q18

MCQ - Single Answer

1 marks

CO5

Which types of isomers are formed in rearrangement reactions?

- Optical isomer
- Geometrical isomers
- Structural isomers
- Conformational isomers

Rubrics

Q19

MCQ - Single Answer

1 marks

CO3

Which of the following compounds contain both the methyl groups either in axial or in equatorial position?

- cis1,2 –Dimethyl cyclohexane
- cis1,4 –Dimethyl cyclohexane
- cis1,3 –Dimethyl cyclohexane
- trans1,3 –Dimethyl cyclohexane

Rubrics

Q20

MCQ - Single Answer

1 marks

CO5

Which of the following cannot react as a nucleophile?

- $\text{CH}_3\text{CH}_2\text{SH}$
- $\text{CH}_3\text{CH}_2\text{NH}_2$
- BF_3
- OH^-

Rubrics

Q21

Type the Answer

1 marks

CO3

(2R,3R)-2,3-Dichloropentane is optically -----

Rubrics

Q22

MCQ - Single Answer

1 marks

CO3

Which of the following is the correct definition of a pair of diastereomers?

- A pair of stereoisomers that are non-superimposable mirror images of one another
- A pair of stereoisomers that are superimposable mirror images of one another
- A pair of stereoisomers that are not mirror images of one another
- Any pair of stereoisomers

Rubrics

Q23 MCQ - Single Answer 1 marks

CO2

The filling of molecular orbital takes place according to

- Pauli Exclusion Principle
- The Aufbau Principle
- Hund's rule of maximum multiplicity
- All of the above

Rubrics

Q24 Type the Answer 1 marks

CO5

In electrophilic rearrangement, migrating group moves ----- its electron pair.

Rubrics

Q25 Type the Answer 1 marks

CO1

Operator that gives the total energy of the system in quantum mechanics is known as ----- operator.

Rubrics

Q26 Type the Answer 1 marks

CO5

S_N2 reaction is favored over S_N1 by a ----- nucleophile.

Rubrics

Q27 Type the Answer 1 marks

CO1

A function being operated upon with an operator yielding constant times the function is known as ----- function.

Rubrics

Q28 Type the Answer 1 marks

CO5

Elimination reaction follows E1cB mechanism when the nucleofuge is -----

Rubrics

Q29 Type the Answer 1 marks

CO1

Balmer series is observed in hydrogen atom when the electron jumps from higher orbits to ----- orbit.

Rubrics

Q30 Type the Answer 1 marks

CO2

Bonding and antibonding molecular orbitals formed when the sign of amplitudes of atomic orbitals are ----- and ----- respectively.

Rubrics

2. Section - B

10 marks per question

5 display questions

5 maximum answerable

Q1 Scan and/or Upload 10 marks

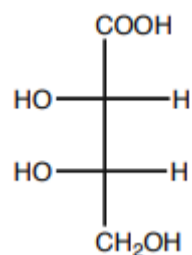
CO5

- (a) Discuss the effect of substrate, base, leaving group and solvent on the substitution versus elimination reaction. 6 Marks
- (b) What is the stereochemistry of products of S_N1 and S_N2 reactions? 4 Marks

Rubrics

Q2 Scan and/or Upload 10 marks CO3

- (a) Explain any one method of resolution of racemic mixtures. 5 Marks
 (b) Identify the chiral carbons and their R S configuration in the following compound. 5 Marks



Rubrics

Q3 Scan and/or Upload 10 marks CO2

- (a) Draw the σ and π bonding molecular orbitals from atomic p orbitals and state which of them can be rotated along axis of nuclei and why? 5 Marks
 (b) Draw the molecular diagram for O_2 and predict its magnetic behavior. 5 Marks

Rubrics

Q4 Scan and/or Upload 10 marks CO4

Explain the thermodynamically controlled and kinetically controlled reactions with the help of potential energy diagrams and how the reaction conditions favour them.

Rubrics

Q5 Scan and/or Upload 10 marks CO1

- (a) A metal is irradiated with the visible light of wavelength λ nm and the kinetic energy of the photoelectron is 0.2 eV. Calculate the work function of the metal. Given $h = 6.626 \times 10^{-34}$ J.s; $c = 3 \times 10^8$ m/s ; 1 eV = 1.602×10^{-19} J; $\lambda =$ last three digits of your SAP ID 6 Marks

- (b) What is the Born interpretation of Schrödinger wave equation and how does it differ from Schrödinger's own interpretation of his equation? 4 Marks

Rubrics

3. Section - C

20 marks per question

1 display questions

1 maximum answerable

Q1 Scan and/or Upload 20 marks CO1 CO2

- (a) Starting from Schrödinger equation for particle in one-dimensional box, derive the Eigen function and Eigen value of energy. CO1 12 Marks
 (b) Explain the crystal field theory of octahedral complexes and how does it help to account for the magnetic properties and color of the coordination compounds. CO2 8 Marks

(Or)

- (a) Apply the Schrödinger equation for particle in three-dimensional box to hydrogen atom and derive the radial equation. CO1 12 Marks
 (b) Discuss the various isomerism shown by coordination compounds with an example each. CO2 8 Marks

Rubrics

