

## CHM102 List of Questions

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**Q1** The saturated hydrocarbons contain the carbon and hydrogen atoms linked to each other by single bonds and are called \_\_\_\_\_.

- ☐ Alkanes
- ☐ Alkenes
- ☐ Alkynes
- ☐ Aromatics

**Q2** The \_\_\_\_\_ provide a backbone to which various functional groups may be attached to yield an enormous variety of organic compounds.

- ☐ Isomers
- ☐ Structural formula
- ☐ Bonds
- ☐ Hydrocarbons

**Q3** \_\_\_\_\_ are the compounds that have identical molecular formulas but differ in the ways in which the atoms are bonded to each other.

- ☐ Alkenes
- ☐ Alkanes
- ☐ Isomers
- ☐ Monomers

**Q4** Compounds that differ from each other in their molecular formulas by the unit  $\text{CH}_2$  are called members of a \_\_\_\_\_ series.

- ☐ Heterologous
- ☐ Homologous
- ☐ Isomeric
- ☐ None of the above

**Q5** In allene the central atom is \_\_\_\_\_ hybridized and the terminal atoms are \_\_\_\_\_ hybridized

- ☐  $\text{sp}^2, \text{sp}^3$
- ☐  $\text{sp}, \text{sp}^2$
- ☐  $\text{sp}, \text{sp}^3$
- ☐  $\text{sp}^2, \text{sp}$

**Q6** The addition of ozone to an alkyne produces \_\_\_\_\_.

- ☐ ozonide
- ☐ Ozonide
- ☐ Ozonide
- ☐ None of the above

**Q7** The reaction between an alkyl halide and sodium metal to form an alkane is called \_\_\_\_\_ reaction.

- ☐ Kolbe
- ☐ Diels-Alder
- ☐ Wurtz
- ☐ Wittig

**Q8** A benzene ring with a methyl group at position one and nitro group at position three is \_\_\_\_\_

- ☐ p-nitrotoluene
- ☐ p-nitroxylen
- ☐ o-nitroaniline
- ☐ o-nitrobenzene

**Q9** The first product in fractionation of petroleum is called \_\_\_\_\_.

- ☐ Gasoline
- ☐ Natural gas
- ☐ Light petrol
- ☐ Paraffin

**Q10** Increase in number of carbon atoms results in the following effects EXCEPT \_\_\_\_\_.

- ☐ Surface area increases
- ☐ Boiling point increases
- ☐ Intermolecular forces increases
- ☐ Melting point increases

**Q11** A catalyst mixed with a selective inhibiting agent is called \_\_\_\_\_ catalyst.

- ☐ Basic
- ☐ Neutral
- ☐ Poisoned
- ☐ Acidic

**Q12** Reactions that lead to the attachment of an alkyl group to a molecular fragment are called \_\_\_\_\_.

- ☐ dealkylation
- ☐ esterification
- ☐ carboxylation
- ☐ alkylation

**Q13** In the \_\_\_\_\_ alkynes, the triple bond lies at the end of the carbon chain.

- ☐ Internal
- ☐ external
- ☐ terminal
- ☐ interim

**Q14** Hydrocarbons can be classified as \_\_\_\_\_.

- ☐ alkane, alkene, alkyne
- ☐ amine, amide, imine
- ☐ ester, ketone, aldehyde
- ☐ aliphatic, alicyclic, aromatic

**Q15** \_\_\_\_\_ best describes the functional group of an alkene.

- ☐ C $\blacklozenge$ ??C
- ☐ C=C
- ☐ C=O
- ☐ C $\blacklozenge$ ? $\blacklozenge$ C

**Q16** \_\_\_\_\_ can be defined as an atom or group of atoms in a molecule which exhibits characteristic chemical properties

- ☐ hybridization
- ☐ functional group
- ☐ covalent bond
- ☐ ionic bonding

**Q17** Addition of ethyne to sodamide in ether yields sodium etynide and one of the following compounds

- ☐ ammonia
- ☐ water
- ☐ Hydrogen sulphide
- ☐ ethane

**Q18** All but one of these is involved in alkylation

- ☐ ethyne
- ☐ sodium amide
- ☐ Grignard reagent
- ☐ Diels-Alder reagent

**Q19** One of the statements is not true of dienes.

- ☐ They general formula  $C_n H_{2n-2}$
- ☐ They are called diolefins
- ☐ They are isomeric with alkynes
- ☐ divided into two main classes depending on the relative positions of the two double bonds in the molecule:

**Q20** One of these statements is not true

- ☐ Alkanes burn in excess of air or oxygen to give carbonmonoxide and water
- ☐ Combustion is highly exothermic
- ☐ the heat of combustion of pentane is 2549 KJmol<sup>-1</sup>
- ☐ Combustion is the most important reaction of alkanes

**Q21** The earliest nomenclature of the organic compounds were based on?

- ☐ Characteristic fragrance only
- ☐ Their origin or properties
- ☐ Chemical and physical properties
- ☐ Aroma, fragrance and smell

**Q22** An aromatic compound which contained side chain hydroxyl group is called?

- ☐ Phenol
- ☐ Aromatic alcohol
- ☐ Hydroxybenzen
- ☐ Aryl halide

**Q23** In alcohol in which the oxygen atom is replaced by a sulphur atom is called?

- ☐ Sulphuric acid
- ☐ Sulfhydryl
- ☐ Sulphurnol
- ☐ Thiol

**Q24** Depending on the number of alkyl group attached to the nitrogen atom, the amines are classified as?

- ☐ Imine, amino and amide
- ☐ Saturated unsaturated and partially saturated
- ☐ Primary, secondary and tertiary amines
- ☐ First degree, second degree and third degree amines

**Q25** When a compound has carbon-nitrogen triple bond it is called?

- ☐ Amino
- ☐ Nitrile
- ☐ Imine
- ☐ Amine

**Q26** When a compound has carbon-nitrogen double bond it is called?

- ☐ Imine
- ☐ Amino
- ☐ Amine
- ☐ Nitrile

**Q27** When a compound has a carbon-nitrogen single bond it is called?

- ☐ Nitrile
- ☐ Imine
- ☐ Nitrite
- ☐ amine

**Q28** Benzene is an example of which type of hydrocarbon?

- ☐ Alicyclic hydrocarbon
- ☐ Arene hydrocarbon
- ☒ Aromatic hydrocarbon
- ☐ Alkene hydrocarbon

**Q29 The hydrocarbons are broadly classified into \_\_\_\_?**

- ☐ Alkane, alkene and alkyne
- ☒ Aliphatic, alicyclic and aromatic
- ☐ Alicyclic, heterocyclic and aromatic
- ☐ Saturated, unsaturated and aromatic

**Q30 A functional group can be defined as?**

- ☒ An atom or group of atoms in a molecule which exhibit a characteristic chemical properties
- ☐ An atom or group of atoms in a molecule which exhibit a characteristic physical properties
- ☐ A group of atoms in a molecule which exhibit a characteristic chemical properties
- ☐ An atom in a molecule which exhibit a characteristic chemical properties

**Q31 What is the functional group of esters?**

- ☐  $\text{COOCO}$
- ☐  $\text{COOH}$
- ☐  $\text{CHO}$
- ☒  $\text{RCOOR}$

**Q32 What is the functional group of aldehyde?**

- ☐  $\text{COO}$
- ☐  $\text{C=O}$
- ☒  $\text{CHO}$
- ☐  $\text{RCHO}$

**Q33 -OH is a functional group for which organic compound?**

- ☐ Ketone
- ☒ Alcohol
- ☐ Base
- ☐ Acid

**Q34 Grouping organic compounds base on their functional groups makes it easier to understand their \_\_\_\_?**

- ☒ Chemical properties only
- ☐ Physical properties only
- ☐ Structural properties only
- ☐ Physical and chemical properties

**Q35 Choose the correct option that best indicate the hybrid orbitals type, bond length and bond angle for acetylene?**

- ☐  $\text{sp}^2$ , 134 pm and  $120^\circ$
- ☐  $\text{sp}^3$ , 154 pm and  $190.5^\circ$
- ☐  $\text{sp}^2$ , 120 pm and  $180^\circ$
- ☒  $\text{sp}$ , 120 pm and  $180^\circ$

**Q36 Choose the correct option that best indicate the hybrid orbitals type, bond length and bond angle for methane.**

- ☐  $\text{sp}^3$ , 154 pm and  $190^\circ$
- ☐  $\text{sp}$ , 134 and  $180^\circ$
- ☒  $\text{sp}^2$ , 134 pm and  $120^\circ$
- ☐  $\text{sp}^3$ , 134 pm and  $120^\circ$

**Q37 Indicate the corresponding bond resulting from  $\text{sp}^3$ ,  $\text{sp}^2$  and  $\text{sp}$  hybridization**

- ☐ Triple bond, double bond and single bond.
- ☒ Single bond, double bond and triple bond.
- ☐ Double bond, single bond and triple bond
- ☐ Single bond, triple bond and double bond

**Q38 Which of these statements is correct?**

- ☐ Pi bonds are formed by sideways overlap of p-orbitals.
- ☐ Sigma bonds are formed by the edge-on overlap of pure S and P hybrid orbitals
- ☐ The electron density in sigma bond is maximum along the inter-nuclear axis
- ☒ All of the above

**Q39 The bond energy  $\text{C-C}$  is equivalent to?**

- ☐ 348  $\text{KJmol}^{-1}$
- ☐ 341  $\text{KJmol}^{-1}$
- ☐ 415  $\text{KJmol}^{-1}$
- ☐ 433  $\text{KJmol}^{-1}$

**Q40 What is the measure of the length of  $\text{C-C}$  bond?**

- ☒ 154 pm
- ☐ 154 cm
- ☐ 164 cm
- ☐ 164 pm

**Q41 The relationship between bond length and bond order is \_\_\_\_\_.**

- ☐ Bond order decreases as bond length decreases
- ☒ Bond order increases as bond length decreases
- ☐ Bond order increases as bond length increases
- ☐ Bond order decreases as bond length increases

**Q42** \_\_\_\_\_ is how a sigma ( $\delta$ ) bond is formed.

- ☐ edge-on overlap of p orbitals
- ☐ sideways overlap of p orbitals
- ☐ sideways overlap of s and p orbitals
- ☒ edge-on overlap of pure s and p orbitals

**Q43** Which of these theoretical concept enables realistic modelling of molecular structure? \_\_\_\_

- ☒ hybridization
- ☐ ionization
- ☐ substitution
- ☐ hydrogenation

**Q44** A benzene ring with a methyl group at position one and nitro group at position three is \_\_\_\_\_?

- ☐ o-c1ccccc1[N+](=O)[O-]nitrobenzene
- ☐ p-c1ccc(cc1)[N+](=O)[O-]nitroxylen
- ☒ p-c1ccccc1[N+](=O)[O-]Cnitrotoluene
- ☐ o-Nc1ccccc1[N+](=O)[O-]nitroaniline

**Q45** Which of these compounds have a benzene ring with a methyl group at position one?

- ☐ Anisole
- ☒ Toluene
- ☐ Phenol
- ☐ Aniline

**Q46** In \_\_\_\_\_ compounds, the molecules are formed by the sharing of electron pairs between the constituent atoms.

- ☐ non-covalent
- ☐ electrovalent
- ☐ ionic
- ☒ covalent

**Q47** When alkene reacts with borane, addition to the  $C=C$  takes place to yield organoborane a compound with a carbon-boron bond, the reaction is known as \_\_\_\_\_.

- ☒ hydroboration
- ☐ hydrohalogenation
- ☐ halogenation
- ☐ hydrogenation

**Q48** Rapid decolourization of bromine solution serves as a test for the presence of the \_\_\_\_\_ in a compound.

- ☐  $C=O$
- ☐  $C-C$
- ☒  $C=C$
- ☐  $C\equiv C$

**Q49** Alkyl halides are converted into alkenes by \_\_\_\_\_, by treating with a strong base.

- ☐ hydrogenation
- ☒ dehydrogenation
- ☐ alkylation
- ☐ acylation

**Q50** \_\_\_\_\_ involves elimination of the halogen atom together with a hydrogen atom from an adjacent carbon atom.

- ☐ hydrohalogenation
- ☐ Dihydrohalogenation
- ☐ halogenation
- ☒ Dehydrohalogenation

**Q51** Reactions that lead to the attachment of alkyl group to a molecular fragment are called \_\_\_\_\_.

- ☐ Nucleophilic reaction
- ☐ Addition reaction
- ☐ Acylation reaction
- ☒ Alkylation reaction

**Q52** The terminal alkynes on hydroboration give \_\_\_\_\_.

- ☒ aldehydes
- ☐ ketones
- ☐ alkenes
- ☐ alkanes

**Q53** In \_\_\_\_\_ reaction, a conjugated diene is treated with an unsaturated compound called dienophile to yield a cyclic system.

- ☒ Diels-Alder reaction
- ☐ Wittig reaction
- ☐ Wurtz reaction
- ☐ Kolbe electrolytic reaction

**Q54** CCCCCCCCCCC is a straight chain alkane containing how many carbon atoms?

- ☐ 9
- ☐ 10
- ☒ 11
- ☐ 12

**Q55** A member of a homologue series must poses a similar structure but differ in the \_\_\_\_ repeating unit.

- ☐  $CH_4$
- ☐  $CH_3$
- ☒  $CH_2$

☐  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

**Q56** The number of possible isomers of an alkane increases with increase in number of carbon atoms. True or false.

- ☐ Inconclusive
- ☐ Partially true
- ☐ False
- ☒ True

**Q57** Iso-butane means?

- ☐ Straight chain butane
- ☒ Branched butane
- ☐ Conjugated butane
- ☐ Straight chain butanol

**Q58** n-butane means?

- ☒ Straight chain butane
- ☐ Straight chain butanol
- ☐ Conjugated butane
- ☐ Branched butane

**Q59** What are isomers?

- ☐ Are compound of the same molecular weight but different chemical properties
- ☐ Are compounds having identical chemical properties but different molecular weight.
- ☒ Are compounds having the same molecular formula but different structural presentation
- ☐ Are compounds that have the same molecular formula and the same structural presentation

**Q60** \_\_\_\_\_ determines the number of hybrid orbitals generated.

- ☒ Number of shells
- ☐ Number of atomic orbitals
- ☐ Number of electrons
- ☐ Number of electrons

**Q61** The relationship between bond length and bond order is \_\_\_\_\_.

- ☐ Bond order decreases as bond length decreases
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**Q62** \_\_\_\_\_ is how a sigma ( $\sigma$ ) bond is formed.

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- ☒ p-nitrotoluene
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- ☐ alkanes

**Q73** In \_\_\_\_\_ reaction, a conjugated diene is treated with an unsaturated compound called dienophile to yield a cyclic system.

- ☒ Diels-Alder reaction
- ☐ Wittig reaction
- ☐ Wurtz reaction
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**Q74** ♦♦Undecane♦♦ is a straight chain alkane containing how many carbon atoms?

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- ☐ Conjugated butane
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**Q79** What are isomers?

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**Q80** \_\_\_\_\_ determines the number of hybrid orbitals generated.

- ☒ Number of shells
- ☐ Number of atomic orbitals
- ☐ Number of electrons
- ☐ Number of electrons

**Q81** Explain why the bonds formed in  $\text{sp}^3$  hybrid orbitals are stronger and stable compare to the bonds formed by using pure atomic orbitals?

- ☐ The lobes in  $\text{sp}^3$  hybrid orbitals are separated by anode.
- ☒ In  $\text{sp}^3$  hybrid orbital, the electron density is concentrated in one direction leading to greater overlap.
- ☐  $\text{sp}^3$  hybrid orbitals are similar to p orbitals.
- ☐  $\text{sp}^3$  hybrid orbitals have two lobes of unequal sizes

**Q82** When molecules are formed it can be deduced that?

- ☐ There was donation of electrons by one atom to another.
- ☐ There was sharing of electron pair between atoms.
- ☐ There was a molecular orbital interaction
- ☒ All of the above options

**Q83** Who proposed the model of orbital hybridization?

- ☐ Bronsted
- ☒ kekule

- ☐ Pouline
- ☐ Lewis

**Q84** The name of the compound whose structure appeared here  $\text{CH}_3(\text{CH}_2)_6\text{CH}_3$  is \_\_\_\_.

- ☐ Propane
- ☐ Hexane
- ☐ Butane
- ☐ Octane

**Q85** The formula  $\text{CH}_3\text{CH}_3$  represents the \_\_\_\_\_ for ethane.

- ☐ Condense structure
- ☐ Spatial structure
- ☐ Lewis structure
- ☐ Fischer-trops structure

**Q86** The structure which shows how various atoms are connected to each other is called?

- ☐ Fischer structure
- ☐ Lewis structure
- ☐ Condense structure
- ☐ spatial structure

**Q87** These two factors can affect the shape of a molecule in covalent bonding

- ☐ Temperature and pressure
- ☐ Molecular size and atomic size
- ☐ Bond length and bond angle
- ☐ Bond length and bond energy

**Q88** When is bond dissociation equals bond energy

- ☐ molecule is complex
- ☐ molecule is triatomic
- ☐ molecule is monoatomic
- ☐ molecule is diatomic

**Q89** what type of energy change is experienced when covalent bonds are formed?

- ☐ release of energy
- ☐ sharing of energy
- ☐ Dissociation of energy
- ☐ Absorption of energy

**Q90** Which of these statements is correct?

- ☐  $\sigma$  bond is formed by Edge on overlap of p orbitals
- ☐ the electron density in sigma  $\delta$  bond is maximum along the internuclear axis
- ☐ the electron density in  $\pi$   $\sigma$  bond is maximum along the internuclear axis
- ☐ the electron density in sigma  $\delta$  bond is maximum at the above and below the internuclear axis

**Q91** Which of these shows how a sigma  $\sigma$  bond is formed.

- ☐ sideways overlap of S and P orbitals
- ☐ Edge on overlap of p orbitals
- ☐ sideways overlap of p orbitals
- ☐ edge on overlaps of pure S and P orbitals

**Q92** Which of these shows how a sigma  $\delta$  bond is formed.

- ☐ sideways overlap of S and P orbitals
- ☐ Edge on overlap of p orbitals
- ☐ sideways overlap of p orbitals
- ☐ edge on overlaps of pure S and P orbitals

**Q93** Which of these is a methylbenzen compound?

- ☐ Phenol
- ☐ Toluene
- ☐ aniline
- ☐ floroanisole

**Q94** the following compounds are not  $\text{sp}^2$  hybridized except?

- ☐ alkene
- ☐ alkyne
- ☐ alkane
- ☐ alkyl

**Q95** Below are factors affecting bond lenth of a compound except?

- ☐ presence of double bond
- ☐ presence of single bond
- ☐ presence of side group
- ☐ types of bonded atoms

**Q96** The rapid decolouration of bromine is a test method which determined the presence of what?

- ☐  $\text{C}=\text{O}$  Bond
- ☐  $\text{C}-\text{C}$  bond
- ☐  $\text{C}=\text{C}$  bond
- ☐  $\text{C}\equiv\text{C}$  bond

**Q97** The process by which alkyl halides are converted to alkenes in the presence of strong base is called?

- ☐ Alkylation
- ☐ Dehydrogenation

- ☐ Hydrogenation
- ☐ Acylation

**Q98** Alkylation reaction is a reaction that leads to the attachment of \_\_\_\_\_ on a molecular fragment.

- ☐ Acyl group
- ☒ alkyl group
- ☐ alkenyl group
- ☐ methyl group

**Q99** The hydroboration of terminal alkynes gives?

- ☐ alkanes
- ☐ alkenes
- ☒ aldehyde
- ☐ ketones

**Q100** When a conjugated diene is treated with an unsaturated compound called dienophile to yield a cyclic system the reaction process is called.

- ☒ Diels-Alder reaction
- ☐ Wittig reaction
- ☐ Wurtz reaction
- ☐ Friedel Craft reaction