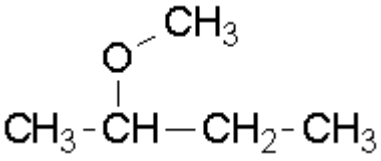
CHM 102 HOMEWORK

PRACTICE QUESTION

INSTRUCTION: DO NOT SUBMIT

1. Which of the following is a derivative of ammonia in which one or more protons have been replaced with alkyl or aryl groups? (a) Amide (b) Amine (c) Alkylhalide (d) Phenyl
2. 3-Bromo-pentan-2-amine is an example of --------- (a) tertiary amine (b) secondary amine (c) primary amine (d) quaternary amine
3.  , the correct name of the compound above is (a) pentoxy methane (b) pentyl methyl ether (c) methoxy pentane (d) ether pentyl methane
4. The relative molecular mass of 3-methyl-butanol is (a) 105 (b) 84 (c) 100 (d) 73
5. Which of the following is true about the IUPAC naming rules for alcohol? (a) The 'e' at the end of the alkane name is replaced with 'ol' (b) The alcohol always gets the highest number substituent. (c) Other substituents are not included in naming alcohols in IUPAC nomenclature (d) You can use the alkane name and add the word 'alcohol' after it.
6. Di-substituted acetylenes are called (a) terminal alkynes (b) internal alkynes (c) unsaturated alkynes (d) parent acetylene
7. Which of the following is the correct molecular formula of 1- cyclopropylbutane (a) C_6H_{14} (b) C_7H_{16} (c) C_6H_{12} (D) C_7H_{14}
8. The parent chain of a hydrocarbon has 50 carbon atoms with CARBON-CARBON double bond is called (a) hectene (b) pentacontane (c) pentacontene (d) Eicosene
9. When an alkyl group is connected to a ring, the ring is generally treated as the parent. This statement is true only (a) when the ring is comprised of more carbon atoms (b) when the ring is comprised of fewer carbon atoms (c) Not possible (d) I am not sure
10. Ethoxy butane belongs to which homologous series (a) alkane (b) Alkoxy family (c) Ether family (d) Non of the above
11. The feasibility of a chemical reaction which can be predicted thermodynamically indicates that (a) $\Delta G = 0$ (b) $\Delta G > 0$ (c) $\Delta G < 0$ (d) $\Delta G = \Delta H + T\,\Delta S$
12. What is the order of the reaction whose rate equation is express as : $R = k[CH_4]^{1/2}\,[Cl_2]^{3/2}$ (a) first order (b) second order (c) third order (d) complex order
13. The unit for the rate constant of a zero order reaction is (a) s-1 (b) $mol^{-1}\ L\ s^{-1}$ (c) $mol\ L\ s^{-1}$ (d) $mol\ L^{-1}\ s^{-1}$
14. The order of a reaction which helps in understanding a reaction mechanism is known as (a) order of reaction (b) molecularity of reaction (c) rate of reaction (d) pathway of reaction

15. The overall rate of reaction which is controlled by the slowest step in a reaction is called (a) molecularity step (b) rate determining step (c) propagation step (d) order of reaction step
16. A rule of thumb for the effect of temperature on rate of reaction is that the rate of reaction is double for every ---------- increase in temperature (a) 40 ^{0}C (b) 30 ^{0}C (c) 20 ^{0}C (d) 10 ^{0}C
17. If the reaction: $P + Q \rightarrow R + S$ Is described as being of zero order with respect to P, it means that (a) the rate s proportional to the concentration of P (b) P is a catalyst in this reaction (c) The concentration of P does not change in the reaction (d) The rate of the reaction is independent of the concentration of P
18. The rate equation for a reaction is given by : rate = k [A] [B] . If the concentration units are mol dm^{-3}, what are the possible units of the rate constant k? (a) mol dm^{-3} s^{-1} (b) mol^{-1} dm^3 s^{-1} (c) mol^2 dm^3 s^{-1} (d) s^{-1}
19. Which of the following may affect the rate constant for a reaction? (a) change in concentration and catalyst (b) Change in concentration and temperature (c) catalyst and temperature (d) change in pressure and catalyst
20. Which of the following expression represent Arrhenius equation? (a) In k = In A + $\frac{Ea}{RT}$ (b) In k = In A - $\frac{Ea}{RT}$ (c) In A = In k + $\frac{RT}{Ea}$ (d) None of the above
21. The rate constants of a reaction at 500 K and 700 K are 0.02s^{-1}and 0.07 s^{-1}respectively, calculate the value for E_a (a) 19230.8 J (b) 17230.8 J (c) 18230.8 J (d) 16230.8 J
22. Temperature dependence of rate constants of is described by (a) rate law (b) rate equation (c) Arrhenius equation (d) Integrated equation
23. The rate of reaction between bromine and methanoic acid is first order with respect both to bromine and to methanoic acid. $Br_{2(aq)} + HCOOH_{(aq)} \rightarrow 2Br^-_{(aq)} + 2H^+_{(aq)} + CO_{2(g)}$. Which of the following can be correctly deduced (a) doubling the concentration of methanoic acid will halve the reaction rate (b) the overall order of the reaction is one (c) The overall order is halve (d) doubling the concentration of methanoic acid doubles the rate of evolution of gas
24. According Arrhenius equation, lowering the activation energy will lead to ---------- (a) decrease in rate of reaction (b) increase the rate of reaction and later decrease it (c) no change in the reaction rate (d) increase the reaction rate
25. The plot of In k against 1/T gives a straight line graph according to Arrhenius equation. The slope of the graph is ----- (a) In A (b) –In A (c) E_a/R (D) $–E_a/R$
26. Stereochemistry is the study of: (a) Functional groups (b) Structural formulas (c) Three-dimensional arrangement of atoms in molecules (d) Bond breaking and making
27. Which of the following is a type of stereoisomerism? (a) Chain isomerism (b) Functional group isomerism (c) Optical isomerism (d) Metamerism
28. Isomers that have the same connectivity but differ in spatial arrangement are called: (a) Chain isomers (b) Functional isomers (c) Stereoisomers (d) Position isomers

29. A chiral molecule is one that: (a) Contains a double bond (b) Has a plane of symmetry (c) Cannot be superimposed on its mirror image (d) Contains a ring structure
30. The simplest example of a chiral carbon is found in (a) Methane (b) Ethane (c) 2-chlorobutane (d) Propene
31. A carbon atom is chiral when it is attached to: (a) Two hydrogen atoms (b) Four different group (d) Two identical alkyl groups (d) Three hydrogen atoms
32. The parent chain of a hydrocarbon has 50 carbon atoms with CARBON-CARBON double bond is called (a) hectene (b) pentacontane (c) pentacontene (d) Eicosene
33. Which of the following is a technique used for separating volatile liquids with significant boiling point differences? (a) Sublimation (b) Distillation (c) Chromatography (d) Recrystallization
34. The mobile phase in chromatography can comprise of which of the following? (a) Gas or liquid (b) Liquid or solid (c) Solid or gas (d) Liquid only
35. Which type of chromatography involves the separation of a mixture over a column of adsorbent packed in a glass tube? (a) Thin layer chromatography (b) Partition chromatography (c) Column chromatography (d) Gas liquid chromatography
36. Stereochemistry is the study of: A. Functional groups B. Structural formulas C. Three-dimensional arrangement of atoms in molecules D. Bond breaking and making
37. Which of the following is a type of stereoisomerism? A. Chain isomerism B. Functional group isomerism C. Optical isomerism D. Metamerism
38. Isomers that have the same connectivity but differ in spatial arrangement are called: A. Chain isomers B. Functional isomers C. Stereoisomers D. Position isomers
39. A chiral molecule is one that: A. Contains a double bond B. Has a plane of symmetry C. Cannot be superimposed on its mirror image D. Contains a ring structure
40. The simplest example of a chiral carbon is found in: A. Methane B. Ethane C. 2-chlorobutane D. Propene
41. A carbon atom is chiral when it is attached to: A. Two hydrogen atoms B. Four different groups C. Two identical alkyl groups D. Three hydrogen atoms
42. Compounds that are non-superimposable mirror images are called: A. Diastereomers B. Enantiomers C. Conformers D. Mesomers
43. What type of isomerism arises due to the restricted rotation around a double bond? A. Optical isomerism B. Geometrical isomerism C. Chain isomerism D. Position isomerism
44. What is the primary cause of optical activity in a molecule? A. Lone pairs of electrons B. Presence of a carbon-carbon double bond C. Presence of a chiral center D. Resonance
45. Which instrument is used to measure optical activity? A. Spectroscope B. Polarimeter C. Microscope D. Titrimeter
46. Stereoisomers that are not mirror images of each other are called: A. Enantiomers B. Conformers C. Diastereomers D. Functional isomers
47. Molecules that can rotate plane-polarized light are called: A. Achiral B. Aromatic C. Optically active D. Isotopic
48. A racemic mixture contains: A. One chiral compound B. One enantiomer C. Equal amounts of two enantiomers D. One diastereomer
49. The specific rotation of a racemic mixture is: A. Positive B. Negative C. Depends on the temperature D. Zero

50. The presence of a plane of symmetry in a molecule makes it: A. Chiral B. Optically active C. Achiral D. An enantiomer

51. Diamond form of Carbon does not conduct electricity due to the absence of (a) spectators electron (b) free electron (c) delocalized electron (d) ions
52. In Group IV, the lowest melting point is (a) Tin (Sn) (b) Silicon (Si) (c) Lead (Pb) (d) Germanium (Ge)
53. The elements in group IVA are generally represented by (a) ns^1np^3 (b) ns^2np^2 (c) ns^0np^4 (d) ns^3np^1
54. The change from non-metallic to the metallic character of the element in group IV is determined by one of the following except (a) increase in the number of available orbital (b) increase in the size of atom (c) More effective nuclear charge (d) less effective nuclear charge
55. The ionization energy of Lead is slightly high than the expected value due to (a) increase in nuclear charge (b) decrease in atomic radius (c) actinide contraction (d) lanthanide contraction
56. All the elements in group IVA show allotropy except (a) Si (b) Ge (c) Sn (d) Pb
57. Which of the statement is incorrect (a) M^{4+} compounds of group IVA behave as a covalent (b) M^{2+} compounds of group IVA behave as an ionic (c) M^{4+} ions of group IVA are larger than M^{2+} (d) M^{4+} of group IVA are smaller than M^{2+}
58. All the group IVA show maximum covalency of six involving sp^3d^2 hybridization except (a) (b) Si (c) Ge (d) Pb
59. Which of the following is not an allotropes of **Tin** (a) rhombic tin (b) monoclinic tin (c) white tin (d) grey tin
60. Ge^{2+} is more stable than Ge^{4+} (a) true (b) false (c) I'm not sure (d) No answer
61. The comnpound of Sn^{2+} are less stable than Sn^{4+} (a) true (b) false (c) I'm not sure (d) non of the above
62. Which of the statements about best describe the reactivity of group 1VA with dilute HCl (a) Sn dissolves rapidly in dilute (b) Ge dissolves rapidly in dilute HCl (c) Sn dissolves dissolves rapidly in slowly in concentrated HCl (d) Ge is not attacked by dilute HCl
63. The correct order of stability of the ions of group IVA is (a) $Ge^{2+} < Sn^{2+} < Pb^{2+}$ (b) $Ge^{2+} > Sn^{2+} > Pb^{2+}$ (c) $Pb^{4+} > Sn^{4+} > Ge^{4+}$ (d) No answer
64. All the elements of the group IVA form dihalides except (a) Pb (b) Ge (c) C (d) Si
65. Tin is one of the element found in IVA of the periodic table which is mined as (a) galena (b) bauxite (c) cassiterite (d) clays

66. What is the IUPAC name of the compound below?

$CH_3CH_2C(CH_3)_2CH_2CH_3$

A. 2,2-dimethylpentane
B. 3,3-dimethylpentane
C. 2,2-dimethylbutane
D. 2,3-dimethylpentane

67. Which of the following has a nitrile functional group?
A. $CH_3CH_2NH_2$
B. CH_3CH_2CN
C. CH_3COOH
D. CH_3CHO
68. The compound $CH_3CH=CHCH_2CH_3$ is named:
A. Pent-1-ene
B. 2-pentene
C. Pent-2-ene
D. 1-pentene

69. Which of these is an ether?
A. CH_3CH_2OH
B. $CH_3CH_2OCH_3$
C. CH_3COCH_3
D. $CH_3CH_2NH_2$

70. The structure of **2-bromo-3-methylpentane** contains:
A. A five-carbon chain with Br on C-2 and CH_3 on C-3
B. A six-carbon chain with Br on C-3
C. A three-carbon chain with CH_3 and Br on same carbon
D. A straight chain of 4 carbon atoms

71. Which compound is a **primary amine**?
A. CH_3NH_2
B. $(CH_3)_2NH$
C. $(CH_3)_3N$
D. $CH_3CH_2NO_2$

72. Which of the following names is **incorrect** according to IUPAC rules?
A. 3-ethyl-2-methylpentane
B. 2-methyl-3-ethylpentane
C. 2,3-dimethylbutane
D. 3,3-dimethylhexane

73. The structure of **3-chloro-2-pentene** includes:
A. A chlorine on carbon 2
B. A chlorine on carbon 3 and a double bond between C-2 and C-3
C. A triple bond
D. A chlorine and methyl group on same carbon

74. The correct IUPAC name for $CH\equiv CCH_2CH_3$ is:
A. Butyne
B. 1-butyne
C. 2-butyne
D. Propyne

75. The functional group in an ether is:
A. $–NH_2$
B. –OH
C. –O–
D. –CN
76. Which of the following compounds is **tertiary amine**?
A. CH_3NH_2
B. $CH_3CH_2NHCH_3$
C. $(CH_3)_3N$
D. $CH_3CH_2CH_2NH_2$

77. Which of the following compounds has **no isomer**
A. Butyne
B. Propane
C. Pentane
D. Butane

78. Identify the correct name of the compound:
$CH_3CH_2CH_2CH_2Br$
A. 1-bromobutane
B. 2-bromobutane
C. 3-bromobutane
D. Butyl bromide

79. The nitrile group is found in:
A. Propanamide
B. Propanoic acid
C. Propanenitrile
D. Propanal

80. What is the correct IUPAC name for $(CH_3)_2CHCH_2CH_3$?
A. 2-methylbutane
B. Isobutane
C. Methylpropane
D. Pentane