

JBA 2025 – Content Check 4

Name: _____ Score: _____

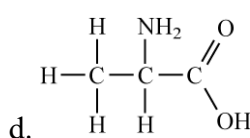
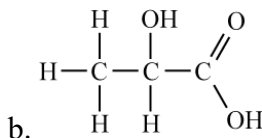
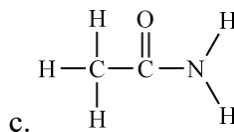
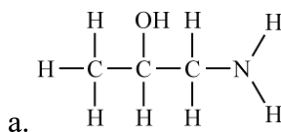
Multiple choice questions are worth two points each.

1. Constitutional isomers are compounds that have

- a. the same chemical formulas and molecular structures but different physical properties.
- b. the same chemical formulas but different molecular structures and physical properties.
- c. different chemical formulas and molecular structures but the same physical properties.
- d. the same chemical formulas, molecular structures and physical properties.

Answer **b**

2. Amino acids are compounds that contain **both** amine and carboxylic acid groups. Which compound is an amino acid? is:



Answer **d**

3. Which of these classes of compounds form most of the membranes for your cells?

- a. carbohydrates
- b. lipids (or fats)
- c. amino acids
- d. nucleic acids.

Answer **b**

4. What key role do carbohydrates serve in the body?

- a. They form cell walls
- b. They encode genetic information
- c. They are sources of energy
- d. They serve no role in the body.

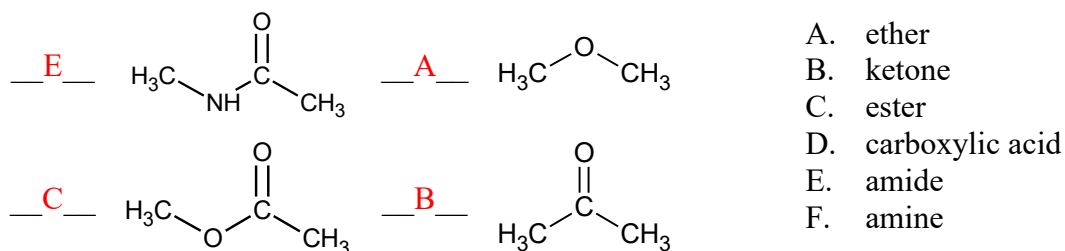
Answer **c**

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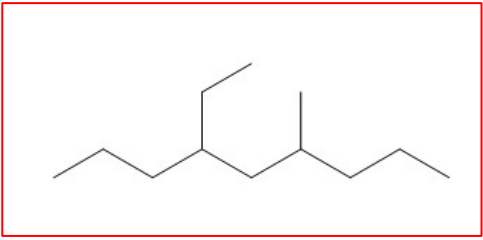
5. Match the term with its definition. (4 points)

<u> B </u> stereoisomers	A. a compound with substituents on the same side of a double bond
<u> F </u> chiral carbon	B. compounds that have the same chemical formula and bonding but different arrangement in space
<u> C </u> saturated fat	C. a water insoluble compound with no carbon-carbon multiple bonds
<u> D </u> trans-	D. a compound with substituents on the opposite sides of a double bond
	E. a reactive species with one unpaired electron
	F. an atom bonded to 4 different groups

6. Identify the functional group shown in each structure: (4 points)

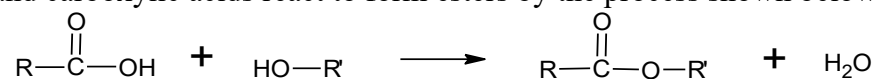


7. Complete the table for the alkanes below. (6 points)

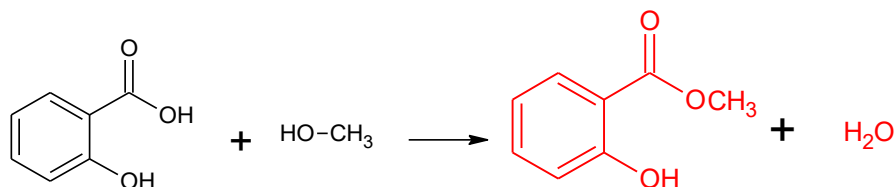
<i>Structure</i> (Line angle or Lewis structures are acceptable)	<i>Name</i>
	4-ethyl-6-methyl nonane
$ \begin{array}{c} \text{H}_3\text{C}-\text{CH}-\text{CH}_3 \\ \\ \text{CH}_2 \\ \\ \text{H}_3\text{C}-\text{CH}_2-\text{C}-\text{CH}_3 \\ \\ \text{CH}_3 \end{array} $	2,4,4-trimethylhexane

Please write legibly! If I can't read it, I can't grade it!

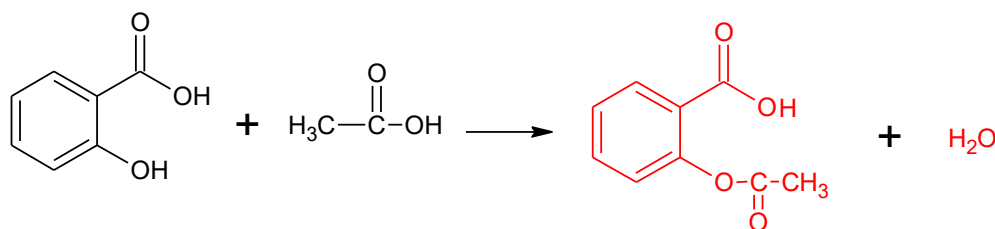
8. Alcohols and carboxylic acids react to form esters by the process shown below.



a. Complete the reaction of salicylic acid with methanol to form methyl salicylate (oil of wintergreen). (3 points)



b. Complete the reaction of salicylic acid with acetic acid to form acetylsalicylic acid (aspirin). (3 points)



9. Complete the following table (6 points)

<i>Line angle</i>	<i>Lewis Structure showing all atoms</i>	<i>Molecular Formula</i>
		$\text{C}_5\text{H}_{10}\text{O}_2$
		$\text{C}_5\text{H}_8\text{O}$

10. Compounds that can serve as monomers for polymerization reactions must have one key property for polymer chains to grow. What property is this? Show how this property appears in both addition OR condensation polymerization. (6 points)

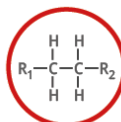
Monomers must be able to react in two locations in order for the polymer to continue to grow. For addition polymerization, the alkene produces a di-radical that can react in two locations and continue to grow. For condensation polymerization, the monomers must have two functional groups that can react independently. (Example structures would be useful here.)

Please write legibly! If I can't read it, I can't grade it!

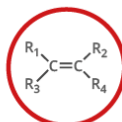
FUNCTIONAL GROUPS IN ORGANIC CHEMISTRY

FUNCTIONAL GROUPS ARE GROUPS OF ATOMS IN ORGANIC MOLECULES THAT ARE RESPONSIBLE FOR THE CHARACTERISTIC CHEMICAL REACTIONS OF THOSE MOLECULES. IN THE GENERAL FORMULAE SHOWN BELOW FOR EACH FUNCTIONAL GROUP, 'R' REPRESENTS THE REST OF THE MOLECULE, AND 'X' REPRESENTS ANY HALOGEN ATOM.

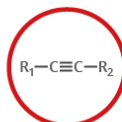
● HYDROCARBONS ● SIMPLE OXYGEN HETEROATOMICS ● HALOGEN HETEROATOMICS ● CARBONYL COMPOUNDS ● NITROGEN-BASED ● SULFUR-BASED ● AROMATIC



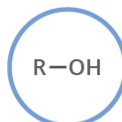
ALKANE
Naming: -ane
e.g. ethane



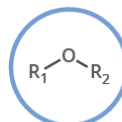
ALKENE
Naming: -ene
e.g. ethene



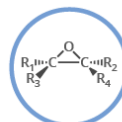
ALKYNE
Naming: -yne
e.g. ethyne



ALCOHOL
Naming: -ol
e.g. ethanol



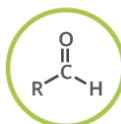
ETHER
Naming: -oxy-ane
e.g. methoxyethane



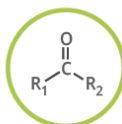
EPOXIDE
Naming: -ene oxide
e.g. ethene oxide



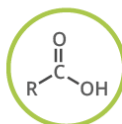
HALOALKANE
Naming: halo-
e.g. chloroethane



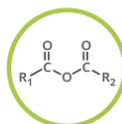
ALDEHYDE
Naming: -al
e.g. ethanal



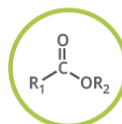
KETONE
Naming: -one
e.g. propanone



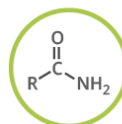
CARBOXYLIC ACID
Naming: -oic acid
e.g. ethanoic acid



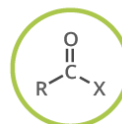
ACID ANHYDRIDE
Naming: -oic anhydride
e.g. ethanoic anhydride



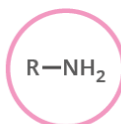
ESTER
Naming: -yl -oate
e.g. ethyl ethanoate



AMIDE
Naming: -amide
e.g. ethanamide



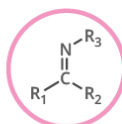
ACYL HALIDE
Naming: -yl halide
e.g. ethanoyl chloride



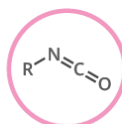
AMINE
Naming: -amine
e.g. ethanamine



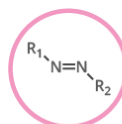
NITRILE
Naming: -nitrile
e.g. ethanenitrile



IMINE
Naming: -imine
e.g. ethanimine



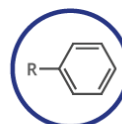
ISOCYANATE
Naming: -yl isocyanate
e.g. ethyl isocyanate



AZO COMPOUND
Naming: -azo-
e.g. azoethane



THIOL
Naming: -thiol
e.g. methanethiol



ARENE
Naming: -yl benzene
e.g. ethyl benzene



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1 1A	2 2A	3 3A	4 4A	5 5A	6 6A	7 7A	8 8A	9 9A	10 10A	11 11A	12 12A	13 13A	14 14A	15 15A	16 16A	17 17A	18 18A
1 H Hydrogen 1.008	2 He Helium 4.003																
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305	13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948										
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.294
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71 Lanthanide Series	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine [210]	86 Rn Radon [222]
87 Fr Francium 223.02	88 Ra Radium 226.025	89-103 Actinide Series	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [278]	110 Ds Darmstadtium [281]	111 Rg Roentgenium [280]	112 Cn Copernicium [285]	113 Nh Nihonium [286]	114 Fl Flerovium [289]	115 Mc Moscovium [289]	116 Lv Livermorium [293]	117 Ts Tennessine [294]	118 Og Oganesson [294]
57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.243	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967			
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]			

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