

This print-out should have 31 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

ChemPrin3e T17 19

001 10.0 points

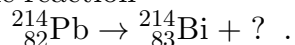
Bombarding ^{54}Fe with a neutron results in emission of a proton and formation of

1. ^{54}Cr .
2. ^{49}Ti .
3. ^{55}Fe .
4. ^{54}Mn .
5. ^{54}Co .

Mlib 11 6135

002 10.0 points

Consider the reaction



What is the identity of “?”?

1. α particle
2. neutron
3. γ ray
4. β particle

Holt da 22 rev 25

003 10.0 points

The mass of a $^{20}_{10}\text{Ne}$ atom is 19.992 44 amu.

Calculate the mass defect.

1. 0.172 46 amu
2. 10 amu
3. 0.0086 amu
4. 19.992 44 amu
5. None of these

6. 20 amu

7. 0.0172 amu

ChemPrin3e T17 49

004 10.0 points

The half-life of strontium-90 is 28.1 years. Calculate the percent of a strontium sample left after 100 years.

1. 63%
2. 8.5%
3. 0.34%
4. 82%
5. 76%

ChemPrin3e T17 46

005 10.0 points

Radioactive decay is a

1. temperature-dependent process.
2. non-spontaneous process.
3. zero-order process.
4. first-order process.
5. second-order process.

Sparks nuc 08

006 10.0 points

Ar-37 undergoes electron capture. What is the product?

1. None of these
2. $^{37}_{17}\text{Cl}$
3. $^{38}_{18}\text{Ar}$
4. $^{36}_{18}\text{Ar}$
5. $^{37}_{19}\text{K}$

Natural Radiation 001**007 10.0 points**

In a typical year, the average person is exposed to an effective dose of approximately 350 mrem of radiation. By far the largest portion of this dosage comes from

1. cosmic rays
2. radiation from C-14 in organic materials
3. radon gas
4. medical procedures
5. radiation from building materials
6. naturally occurring isotopes of Ca and Sr that are in bones
7. nuclear power plants

Nuclear Decay Type 001**008 10.0 points**

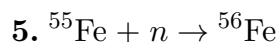
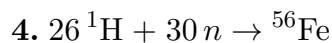
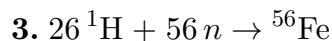
The In-116 decays radioactively to produce Sn-116. This process is likely to occur via

1. alpha decay
2. negative beta decay in which an electron is emitted
3. positive beta decay in which a positron is emitted
4. either positive beta decay or electron capture since they will yield the same products
5. electron capture

ChemPrin3e T17 58**009 10.0 points**

The nuclear binding energy for iron-56 is the energy released in the nuclear reaction

1. $26\ ^1\text{H} + 30\ \beta \rightarrow\ ^{56}\text{Fe}$
2. $56\ ^1\text{H} \rightarrow\ ^{56}\text{Fe}$



Half-life**010 10.0 points**

The half-life of P-32 is 14 days. How long after a sample is delivered can a laboratory wait to use a sample in an experiment if they need at least 10 percent of the original radioactivity?

1. 28 days
2. 56 days
3. 70 days
4. 42 days
5. 14 days

Mlib 76 0078**011 10.0 points**

The process of beta emission can be envisioned as the

1. conversion of a neutron to a proton and electron. The proton is emitted.
2. conversion of a neutron to a proton and electron. The electron is emitted.
3. conversion of a proton to a neutron and electron. The proton is emitted.
4. conversion of a proton to a neutron and electron. The electron is emitted.

ChemPrin3e T17 30**012 10.0 points**

If a nuclide lies above the *band of stability*, it should decay by

1. It does not decay.
2. neutron emission.

- β particle emission.
- positron emission.
- α particle emission.

Nuclear Radiation Type 002

013 10.0 points

Most forms of nuclear decay lead to the emission of gamma rays because

- they generate electrons in excited states that subsequently decay by emission of gamma rays.
- they generate nuclei in excited states that subsequently decay by emission of gamma rays.
- they generate beta particles which ionize other atoms leading to the emission of gamma rays.
- the statement is false. Alpha and beta decay never result in gamma rays.
- they generate nuclei that undergo further fission into smaller nuclei along with the emission of gamma rays.

Nuclear Radiation Type 001

014 10.0 points

Gamma radiation is typically considered the most dangerous form of radiation because

- it is not actually considered to be very dangerous when compared to other forms of radiation
- it is the only form of radiation that can affect organic molecules
- it typically generates further nuclear decay
- it is the only form of ionizing radiation
- it can penetrate most substances and

therefore is very difficult to shield against

Nuclear Binding Energy 001

015 10.0 points

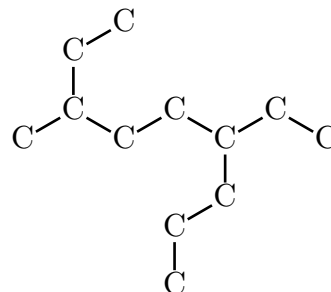
The mass of a ${}^7_3\text{Li}$ atom is 7.016 amu. Given that the mass of an electron is 0.00055 amu, the mass of a neutron is 1.0087 amu, and the mass of a proton is 1.0073 amu, calculate the binding energy of a ${}^7_3\text{Li}$ nucleus.

- 1.89×10^{-11} J
- 1.1×10^{-10} J
- 4.8×10^{-11} J
- 4.8×10^{12} J
- 6.30×10^{-12} J
- 2.6×10^{13} J
- 1.1×10^{11} J

Sparks alkane 001

016 10.0 points

What is the name of the following structure?



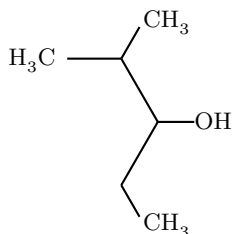
- 7-ethyl-4-propylnonane
- 4-ethyl-7-methylnonane
- 6-ethyl-3-methylnonane
- 2,5-dipropyloctane
- 2-ethyl-5-propylheptane
- 3-butyl-2-propylheptane
- 6-ethyl-4-propylheptane

8. 2,5-diethyloctane

9. 3-ethyl-6-propylnonane

LDE Organic Nomenclature 002
017 10.0 points

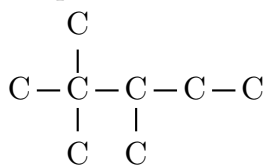
What is the name of the following molecule?



1. 2-methyl-3-pentanal
2. 1,2 dimethyl-2-butanol
3. 2-methyl-3-pentanone
4. 2-methyl-3-pentanol
5. 2-methyl-3-hexanol

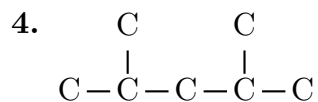
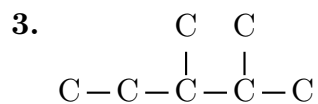
CIC T10 07
018 10.0 points

Consider the compound



Which skeleton below is a structural isomer of this compound?

1.
$$\begin{array}{ccccccc}
 & & \text{C} & & \text{C} & & \\
 & & | & & | & & \\
 \text{C} & - & \text{C} & - & \text{C} & - & \text{C} \\
 & & | & & | & & \\
 & & \text{C} & & \text{C} & &
 \end{array}$$
2.
$$\begin{array}{ccccccc}
 & & \text{C} & & & & \\
 & & | & & & & \\
 \text{C} & - & \text{C} & - & \text{C} & - & \text{C} \\
 & & & & | & & | \\
 & & & & \text{C} & & \text{C}
 \end{array}$$



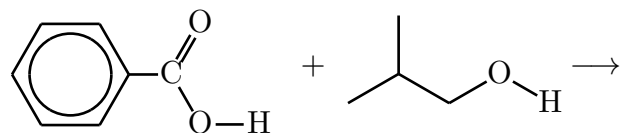
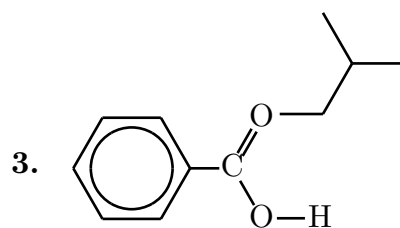
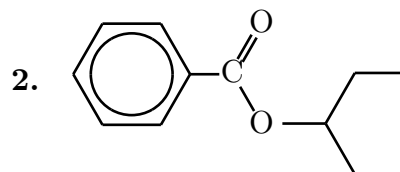
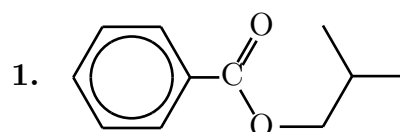
ChemPrin3e T19 19
019 10.0 points

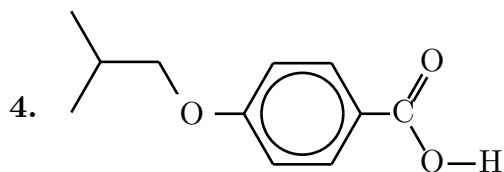
The —OH group occurs in

1. alcohols, phenols, and carboxylic acids.
2. aldehydes and alcohols.
3. phenols and ketones.
4. alcohols only.
5. ketones and carboxylic acids.

CIC T10 19
020 10.0 points

What is the structure of the ester that is formed in the following reaction?

? + H₂O



Msci 31 0320

021 10.0 points

The molecule 1,3-butadiene contains how many H atoms?

1. 8
2. 10
3. 9
4. 12
5. 6

STIER FE3 23

022 10.0 points

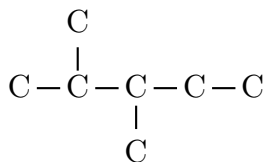
Which of the following is NOT a structural isomer of 2-methylpentane?

1. 3-methylpentane
2. 2,2-dimethylpropane
3. 2,2-dimethylbutane
4. hexane
5. 2,3-dimethylbutane

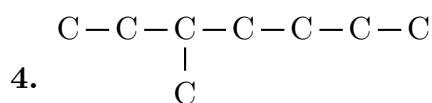
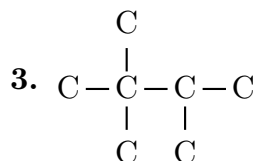
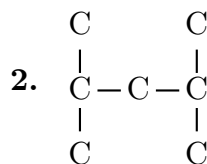
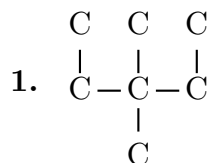
CIC T10 08

023 10.0 points

This structure



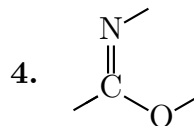
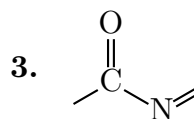
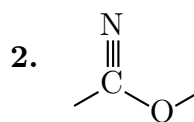
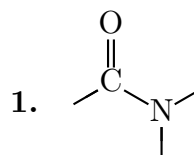
is the carbon skeleton for one of the isomers of heptane (C_7H_{16}) with the hydrogen atoms omitted. Which structure is NOT an isomer of this one?



CIC T09 40 protein

024 10.0 points

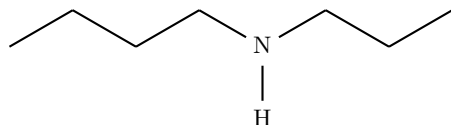
Proteins are classified as polyamides because they contain which of the following linkages?



Organic Nomenclature DVB 004

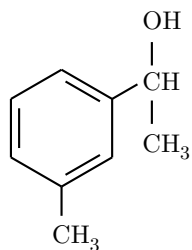
025 10.0 points

The following molecule is a



1. primary amine
2. tertiary amide
3. primary amide
4. secondary amide
5. tertiary amine
6. secondary amine

Chiral Centers 001
026 10.0 points

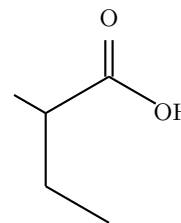


How many chiral centers does this molecule have?

1. 2
2. 4
3. 3
4. 0
5. 1

Organic Nomenclature DVB 001
027 10.0 points

What is the name of the following molecule?



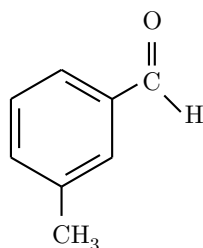
1. 2-ethylpropanone
2. 1-hydroxy 2-methylbutanone
3. 2-methylbutanoic acid
4. 2-methylbutanol
5. 3-methylpentanol
6. 2-ethylpropanoic acid

Organic Nomenclature DVB 005
028 10.0 points

The molecular formula for ethyl propyl ether is

1. $C_6H_{12}O_2$
2. $C_5H_{11}O_2$
3. $C_6H_{12}O$
4. $C_5H_{12}O$
5. $C_5H_{11}O$
6. $C_6H_{11}O$

Organic Nomenclature DVB 007
029 10.0 points



This molecule is a

1. carboxylic acid
2. alcohol
3. ketone
4. aldehyde
5. amine
6. phenol
7. ester
8. ether

Polysaccharide 001
030 10.0 points

Polysaccharides are polymers composed of sugar molecules joined together by bonds that could be described by what type of functional group?

1. alkene
2. ester
3. carboxylic acid
4. ether
5. amine
6. amide

Extra credit
031 0.0 points

If more points are awarded on this assignment, would you like them added to your

score?

1. NO, leave my score alone, I prefer the lower score
2. YES, I would like the points and the higher score.