

SAT Chemistry Practice Paper 6

SET 1

Which hydrocarbon will undergo a substitution reaction with a halogen?

- A. Pentyne
- B. Ethene
- C. Propyne
- D. Butane
- E. Propene

2. Which type of organic reaction is represented by the equation  $C_3H_6 + H_2 \rightarrow C_3H_8$ ?

- A. Addition
- B. Substitution
- C. Condensation
- D. Polymerization
- E. Dehydration synthesis

3. When the amine group of one amino acid reacts with the carboxylic acid group of another amino acid, the resulting functional group formed is called

- A. an amine
- B. an amide
- C. an ester
- D. a plastic
- E. a polymer

4. Which one of the following polymers is synthetic?

- A. Nucleic acids
- B. Plastic
- C. Proteins
- D. Cellulose
- E. Starch

5. Which two compounds are not isomers of each other?

- A. n-pentane and 2-methylbutane

- B.  $\text{CH}_3\text{CH}_2\text{OH}$  and  $\text{CH}_3\text{OCH}_3$
- C.  $\text{CH}_3\text{COOH}$  and  $\text{CH}_3\text{CH}_2\text{COOH}$
- D.  $\text{CH}_3\text{COCH}_3$  and  $\text{CH}_3\text{CH}_2\text{CHO}$
- E.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$  and  $\text{CH}_3\text{CHClCH}_3$

6. A carbonyl group is present in all of these functional groups except:

- A. ketones
- B. aldehydes
- C. esters
- D. amides
- E. ethers

7. An organic compound has a molecular formula of  $\text{C}_3\text{H}_4$ . Which compound below belongs to the same class of hydrocarbons?

- A.  $\text{C}_2\text{H}_6$
- B.  $\text{C}_3\text{H}_6$
- C.  $\text{C}_4\text{H}_8$
- D.  $\text{C}_2\text{H}_2$
- E.  $\text{CH}_4$

8. Which statement is false?

- A.  $\text{CH}_3\text{CH}_2\text{NH}_2$  is ethanamine.
- B.  $\text{CH}_3\text{CHBrCHBrCH}_3$  is 2,3-dibromobutane.
- C.  $\text{CH}_3\text{CH}_2\text{OH}$  is an ether.
- D. Cyclopentane and 2-pentene have a molecular formula of  $\text{C}_5\text{H}_{10}$ .
- E. Alkenes and alkynes are unsaturated.

## SET 2

As a nucleus of a particular isotope disintegrates, another nuclide is formed. This change in the nucleus to form a new nuclide is called

- A. binding energy
- B. transmutation

- C. stability
- D. generation
- E. synthesis

2. Which element has no known stable isotope?

- A. Carbon
- B. Silver
- C. Radon
- D. Phosphorus
- E. Lead

3. In the artificial transmutation  ${}^9_4\text{Be} + X \rightarrow {}^6_3\text{Li} + {}^4_2\text{He}$ , the particle represented by the letter X is a(n)

- A. beta particle
- B. positron
- C. deuteron
- D. proton
- E. alpha particle

4. Which pair below would not be deflected or attracted by the charged plates in an electric field?

- A. An alpha particle and a neutron
- B. A beta particle and a positron
- C. A quark and a deuteron
- D. A proton and gamma radiation
- E. Gamma radiation and a neutron

5. After 62.0 hours, 1.0 gram remained unchanged from a sample of  ${}^{42}\text{K}$  (half-life is 12.4 hours). What was the mass of  ${}^{42}\text{K}$  in the original sample?

- A. 64 grams
- B. 32 grams
- C. 16 grams
- D. 8 grams
- E. 4 grams

6. The energy released by the detonation of an atomic bomb is NOT related to

- A. fission of the atom's nucleus
- B. fusion of the atom's nucleus
- C. a chain reaction
- D. the release of many neutrons
- E. the uncontrolled speed of many neutrons

7. The joining of many hydrogen nuclei in the nuclear reaction that occurs in stars is called a

- A. mass defect
- B. sunburn
- C. fusion reaction
- D. fission reaction
- E. helium reaction

8. Iodine-131 is an excellent radioisotope for diagnosing health problems of the

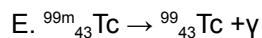
- A. kidneys
- B. heart
- C. lungs
- D. thyroid
- E. bone marrow

9. In determining the age of an artifact, an archaeologist is most likely to examine the percentage of

- A. carbon-14
- B. phosphorus-31
- C. hydrogen-3
- D. chlorine-37
- E. bromine-81

10. Which equation is an example of an artificial transmutation?

- A.  $^{238}\text{U} \rightarrow ^4\text{He} + ^{234}\text{Th}$
- B.  $^{27}\text{Al} + ^4\text{He} \rightarrow ^{30}\text{P} + ^1_0\text{n}$
- C.  $^{14}\text{C} \rightarrow ^{14}\text{N} + ^0_{-1}\text{e}$
- D.  $^{226}\text{Ra} \rightarrow ^4\text{He} + ^{222}\text{Rn}$



11. When Li-7 is bombarded with a proton, two alpha particles are released along with energy. It turns out that the mass of the two alpha particles actually weighs less than the original products in the reaction. The mass that was converted to energy is called the

- A. Einstein conversion
- B. mass defect
- C. Theory of Relativity
- D. natural transmutation
- E. chain reaction

12. Radioactive emanations can be detected by using

- A. a person's DNA
- B. a block of lead
- C. a Geiger Counter
- D. an x-ray machine
- E. graphite and heavy water

13. One reason why certain isotopes have an unstable nucleus is because the number of

- A. protons outweigh the number of neutrons
- B. electrons outweigh the number of protons
- C. neutrons outweigh the number of electrons
- D. protons outweigh the number of electrons
- E. neutrons outweigh the number of protons

### SET 3

1. May be used in combination with a calorimeter to compare the specific heats of two substances

- A. Thermometer
- B. Conductivity tester
- C. Salt bridge
- D. Buret
- E. Graduated cylinder

2. Is used to measure the volume of a solid by water displacement

- A. Thermometer
- B. Conductivity tester
- C. Salt bridge
- D. Buret
- E. Graduated cylinder

**3.** Useful for adding small quantities of acid into a base

- A. Thermometer
- B. Conductivity tester
- C. Salt bridge
- D. Buret
- E. Graduated cylinder

**4.** Completes the circuit of an electrochemical cell

- A. Thermometer
- B. Conductivity tester
- C. Salt bridge
- D. Buret
- E. Graduated cylinder

**5.** Always amphoteric in nature

- A. Nucleic acids
- B. Proteins
- C. Carbohydrates
- D. Lipids
- E. Electrolytes

**6.** Found as both straight-chained and branched polymers

- A. Nucleic acids
- B. Proteins
- C. Carbohydrates
- D. Lipids

E. Electrolytes

7. Deoxyribose in DNA nucleotides belongs to this family of biologically important molecules

A. Nucleic acids

B. Proteins

C. Carbohydrates

D. Lipids

E. Electrolytes

8. Always ionic in nature

A. Nucleic acids

B. Proteins

C. Carbohydrates

D. Lipids

E. Electrolytes

9. Tend not to be water soluble, and aggregate into droplets or molecular bilayers

A. Nucleic acids

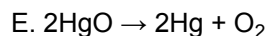
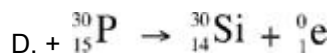
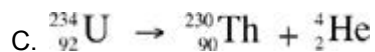
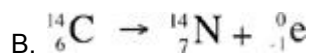
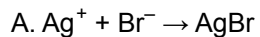
B. Proteins

C. Carbohydrates

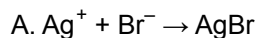
D. Lipids

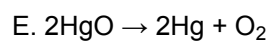
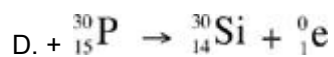
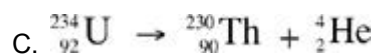
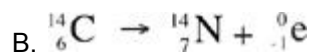
E. Electrolytes

10. Represents the decomposition of a compound into its constituent elements

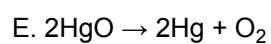
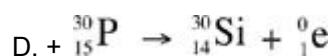
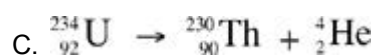
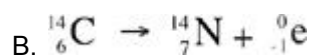


11. Represents alpha decay

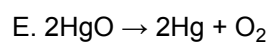
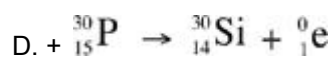
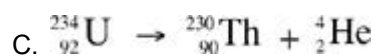
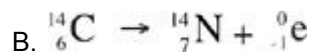




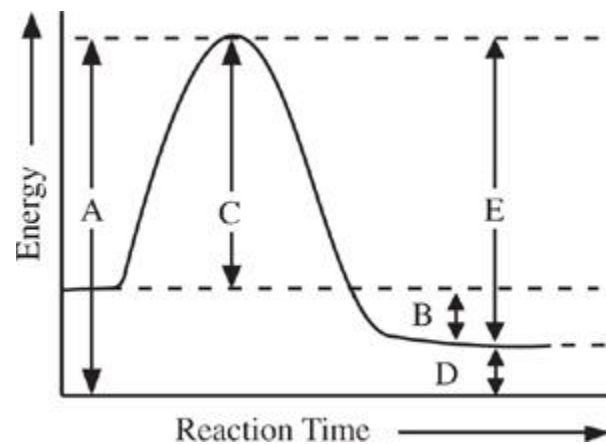
12. Represents an oxidation-reduction reaction



13. Causes the neutron-to-proton ratio in a nucleus to be lowered



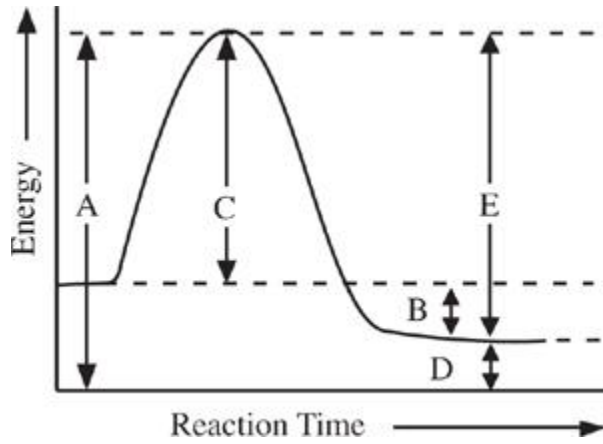
14. Is the activation energy of the reverse reaction





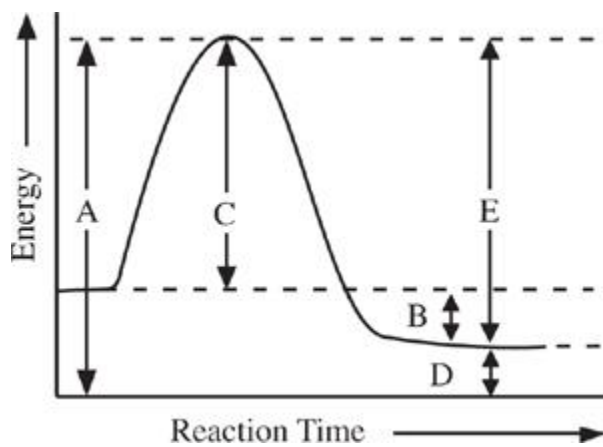
- A.
- B.
- C.
- D.
- E.

15. Is the enthalpy change of the forward reaction



- A.
- B.
- C.
- D.
- E.

16. Represents energy of the activated complex



- A.

- B.
- C.
- D.
- E.

**17.** Holds a sample of barium iodide,  $\text{BaI}_2$ , together

- A. Hydrogen bonding
- B. Ionic bonding
- C. Metallic bonding
- D. Nonpolar covalent bonding
- E. Polar covalent bonding

**18.** Allows solids to conduct electricity

- A. Hydrogen bonding
- B. Ionic bonding
- C. Metallic bonding
- D. Nonpolar covalent bonding
- E. Polar covalent bonding

**19.** Attracts atoms of hydrogen to each other in an  $\text{H}_2$  molecule

- A. Hydrogen bonding
- B. Ionic bonding
- C. Metallic bonding
- D. Nonpolar covalent bonding
- E. Polar covalent bonding

**20.** Responsible for relatively low vapor pressure of water

- A. Hydrogen bonding
- B. Ionic bonding
- C. Metallic bonding
- D. Nonpolar covalent bonding
- E. Polar covalent bonding

**21.** Gives off a purplish vapor as it sublimes

A. Iron(III) chloride,  $\text{FeCl}_3(\text{s})$

B. Iodine,  $\text{I}_2(\text{s})$

C. Sodium hydroxide,  $\text{NaOH}(\text{s})$

D. Sucrose,  $\text{C}_{12}\text{H}_{22}\text{O}_{11}(\text{s})$

E. Graphite,  $\text{C}(\text{s})$

**22.** Can conduct electricity in the solid state

A. Iron(III) chloride,  $\text{FeCl}_3(\text{s})$

B. Iodine,  $\text{I}_2(\text{s})$

C. Sodium hydroxide,  $\text{NaOH}(\text{s})$

D. Sucrose,  $\text{C}_{12}\text{H}_{22}\text{O}_{11}(\text{s})$

E. Graphite,  $\text{C}(\text{s})$

**23.** Its dissolution in water is highly exothermic

A. Iron(III) chloride,  $\text{FeCl}_3(\text{s})$

B. Iodine,  $\text{I}_2(\text{s})$

C. Sodium hydroxide,  $\text{NaOH}(\text{s})$

D. Sucrose,  $\text{C}_{12}\text{H}_{22}\text{O}_{11}(\text{s})$

E. Graphite,  $\text{C}(\text{s})$