SAT Chemistry Practice Test 13

Nuclear Chemistry

1. 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 $^{9}_{4}Be + X \rightarrow {}^{6}_{3}Li + {}^{4}_{2}He$, 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 grams remained unchanged from a sample of ^{42}K (half-life is 12.4 hours). What was the mass of b ^{42}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. $^{238}U \rightarrow {}^{4}He + {}^{234}Th$

B. $^{27}Al + {}^{4}He \rightarrow {}^{30}P + {}^{1}_{0}n$

C. $^{14}C \rightarrow {}^{14}N + {}^{0}_{-1}e$

D. $^{226}Ra \rightarrow {}^{4}He + {}^{222}Rn$

E. $^{99m}_{43}Tc \rightarrow {}^{99}_{43}Tc + \gamma$

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 that 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

SAT Chemistry Practice Test 1: Part A

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

A. $Ag^{+} + Br^{-} \rightarrow AgBr$

B. $^{14}_{6}C \rightarrow {}^{14}_{7}N + {}^{0}_{-1}e$

C. $^{234}_{92}U \rightarrow {}^{230}_{90}Th + {}^{4}_{2}He$

D. $+ {}^{30}_{15}P \rightarrow {}^{30}_{14}Si + {}^{0}_{1}e$

E. $2HgO \rightarrow 2Hg + O_2$

11. Represents alpha decay

A. $Ag^+ + Br^- \rightarrow AgBr$

B. $^{14}_{6}C \rightarrow {}^{14}_{7}N + {}^{0}_{-1}e$

C. $^{234}_{92}U \rightarrow {}^{230}_{90}Th + {}^{4}_{2}He$

D. $+ {}^{30}_{15}P \rightarrow {}^{30}_{14}Si + {}^{0}_{1}e$

E. $2HgO \rightarrow 2Hg + O_2$

12. Represents an oxidation-reduction reaction

A. $Ag^+ + Br^- \rightarrow AgBr$

B. $^{14}_{6}C \rightarrow {}^{14}_{7}N + {}^{0}_{-1}e$

C. $^{234}_{92}U \rightarrow {}^{230}_{90}Th + {}^{4}_{2}He$

D. $+ {}^{30}_{15}P \rightarrow {}^{30}_{14}Si + {}^{0}_{1}e$

E. $2HgO \rightarrow 2Hg + O_2$

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

A. $Ag^+ + Br^- \rightarrow AgBr$

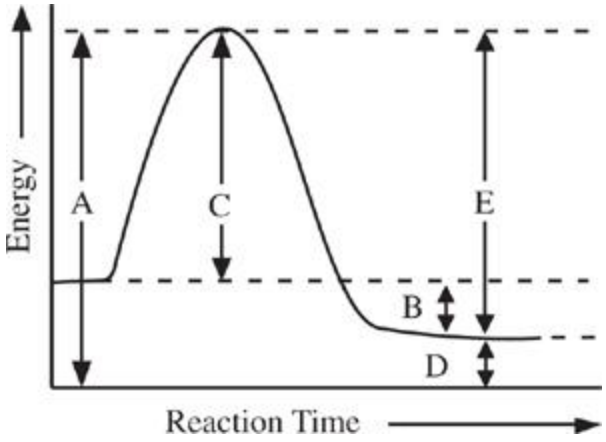
B. $^{14}_{6}C \rightarrow {}^{14}_{7}N + {}^{0}_{-1}e$

C. $^{234}_{92}U \rightarrow {}^{230}_{90}Th + {}^{4}_{2}He$

D. $+ {}^{30}_{15}P \rightarrow {}^{30}_{14}Si + {}^{0}_{1}e$

E. $2HgO \rightarrow 2Hg + O_2$

14. Is the activation energy of the reverse reaction



A.

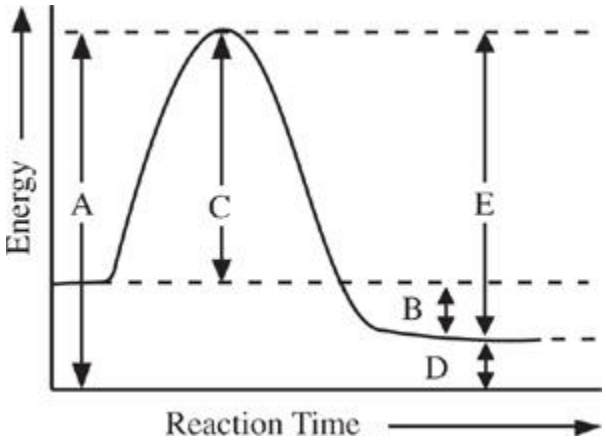
B.

C.

D.

E.

15. Is the enthalpy change of the forward reaction



A.

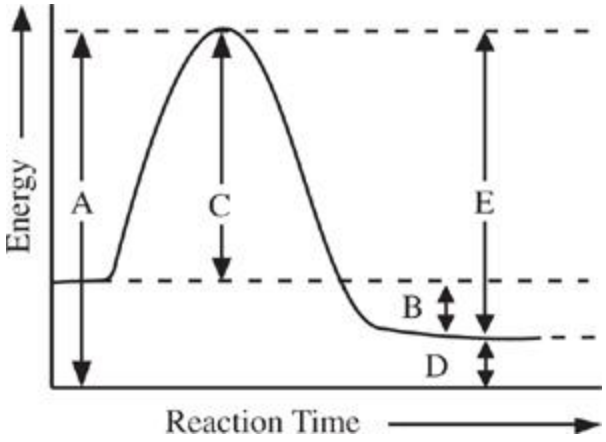
B.

C.

D.

E.

16. Represents energy of the activated complex



A.

B.

C.

D.

E.

17. Holds a sample of barium iodide, 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 H_2 molecule

A. Hydrogen bonding

B. Ionic bonding

C. Metallic bonding

D. Nonpolar covalent bonding

E. Polar covalent bonding

20. Responsible for the 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, $FeCl^3(s)$

B. Iodine, $I_2(s)$

C. Sodium hydroxide, $NaOH(s)$

D. Sucrose, $C_{12}H_{22}O_{11}(s)$

E. Graphite, $C(s)$

22. Can conduct electricity in the solid-state

A. Iron(III) chloride, $FeCl^3(s)$

B. Iodine, $I_2(s)$

C. Sodium hydroxide, $NaOH(s)$

D. Sucrose, $C_{12}H_{22}O_{11}(s)$

E. Graphite, $C(s)$

23. Its dissolution in water is highly exothermic

A. Iron(III) chloride, $FeCl^3(s)$

B. Iodine, $I_2(s)$

C. Sodium hydroxide, $NaOH(s)$

D. Sucrose, $C_{12}H_{22}O_{11}(s)$

E. Graphite, $C(s)$