

ASVAB Extra Sample Test 2

Word Knowledge

1. **Cajole** most nearly means:

- A. Prevent
- B. Coax
- C. Evade
- D. Console

2. **Enervate** most nearly means:

- A. Object
- B. Prod
- C. Order
- D. Weaken

3. **Ruminate** most nearly means:

- A. Tremble
- B. Destroy
- C. Meditate
- D. Struggle

4. **Hapless** most nearly means:

- A. Sneaky
- B. Sickly
- C. Unlucky
- D. Poor

5. **Debacle** most nearly means:

- A. Disaster
- B. Temper
- C. Yearning
- D. Boundary

6. **Spurn** most nearly means:

- A. Heal
- B. Consume
- C. Reject
- D. Recover

For questions 7 to 11, choose the word that has nearly the same meaning as the underlined word.

7. At this critical **junction** in the affairs of our country, we must move forward most carefully.

- A. Burden
- B. Mistake
- C. Moment
- D. Object

8. The boss questioned the **veracity** of the worker's account of the events.

- A. Truthfulness
- B. Necessity
- C. Position
- D. Creativity

9. The overpowering odor from the paper mill permeates the whole city.

- A. Risks
- B. Inhabits
- C. Previews
- D. Penetrates

10. She is a very astute shopper, looking carefully for the best buy and never paying more than something is worth.

- A. Fearful
- B. Sharp
- C. Rich
- D. Friendly

11. After several days of protests, the mayor decided to rescind the order.

- A. Repeal
- B. Volunteer
- C. Praise
- D. Command

12. The word most opposite in meaning to paucity is:

- A. Abundance
- B. Burden
- C. Question
- D. Argument

13. The word most opposite in meaning to delectable is:

- A. Distasteful
- B. Difficult
- C. Tiring
- D. Civil

14. The word most opposite in meaning to gregarious is:

- A. Accurate
- B. Favorable
- C. Shy
- D. Weak

15. The word most opposite in meaning to perfunctory is:

- A. Thorough
- B. Expensive
- C. Forgettable
- D. Ordinary

16. The word most opposite in meaning to decorous is:

- A. Outstanding
- B. Improper
- C. Lighthearted
- D. Genuine

Paragraph Comprehension

Read the passage below and answer questions 1 to 6.

With both eloquence and power, Barbara Jordan's voice stirred a nation. Using her voice, her passion, and her political skill, Jordan strove for justice. She became the first African American to be elected to the Texas Senate and the first African American elected to Congress from Texas since Reconstruction. She was also the first African American woman to deliver a keynote address at the Democratic National Convention.

To say that Jordan's life was a struggle might be an understatement. She was born into a poor Houston neighborhood and attended segregated public schools. She graduated, however, with debating honors from the all-black Texas Southern University. Her father, a minister, had to hold down two jobs to pay for her college. Jordan also suffered from multiple sclerosis and was confined to a wheel chair during her later years. Even from her wheelchair, however, Jordan continued her public speaking, never losing her powerful and impassioned voice.

Jordan used her extraordinary oratorical skills to rally the people of the United States around the ideals set forth in the Constitution. She spoke for justice for all. One of her most memorable speeches was given while arguing for the impeachment of President Nixon. She said, "I felt somehow for many

years that George Washington and Alexander Hamilton just left me out by mistake. But through the process of amendment, interpretation and court decision I have finally been included in 'We, the people.'" Then addressing the nearing constitutional crisis, she added, "My faith in the Constitution is whole, it is complete, it is total, and I am not going to sit here and be an idle spectator to the diminution, the subversion, the destruction of the Constitution."

After three terms in Congress, Jordan retired. She went on to teach ethics at the University of Texas in Austin. Again, her voice captivated her listeners, this time her students. Her students remembered Jordan as always having a copy of the Constitution in her purse. She died at the age of 59.

1. **According to this passage, Barbara Jordan cherished:**

- A. Her students
- B. Her family
- C. The U.S. Congress
- D. The Constitution

2. **What would be a good title for this passage?**

- A. Barbara Jordan: An American Hero
- B. Barbara Jordan: Overcoming Hardships
- C. Barbara Jordan: A Voice that Stirred a Nation
- D. Barbara Jordan: An African American Politician

3. **What would be a good title for the third paragraph of the passage?**

- A. Jordan Speaks to a Nation
- B. Jordan's Faith in the Constitution
- C. Jordan Never Gives Up
- D. Jordan Argues for Impeachment

4. **According to the passage, after retiring from Congress, Jordan became a:**

- A. Professor
- B. Lawyer
- C. Governor
- D. Writer

5. **Based on the passage, the author would agree that:**

- A. Jordan's health prevented her from achieving her goals
- B. Jordan showed amazing strength throughout her life
- C. Jordan made many political enemies while serving in Congress
- D. Jordan was a better politician than teacher

6. **According to the passage, Jordan was the first African American to be elected to the:**

- A. Supreme Court
- B. President's Cabinet
- C. U.S. Senate
- D. Texas Senate

Read the passage below and answer questions 7 to 11.

Color blindness is a common disorder. In fact, one out of 10 men suffer from color blindness. Only one out of about 200 women is colorblind. But what is it?

Colorblindness is the inability to see certain color in the usual way. People who are colorblind often have the inability to tell the difference between shades of the same or similar colors. For some, color blindness is very mild, and they may not even know they have some color blindness. For others it can be quite severe.

The most common type of color blindness is the inability to tell the difference between red and green. However, some people have trouble seeing blue-yellow colors. Colorblindness is inherited.

The cones in the eyes are responsible for seeing color. People have “red,” “blue,” and “green” cones which are sensitive to these colors and combinations of them. Cones are cells on the retina that are located at the back of the eye. The cones contain a light sensitive pigment which is sensitive over a range of wavelengths. Each visible color is a different wavelength. Genes contain the coding instructions for these pigments. However, if the coding instructions are wrong, then the wrong pigment will be produced. The cones will then be sensitive to different wavelengths of light. A person will “see” a different color or shade of color.

7. According to this passage, what contains the coding instructions for seeing color?

- A. Pigment
- B. Light
- C. Genes
- D. Cone

8. What would be a good title for this passage?

- A. Understanding Colorblindness
- B. Causes of Colorblindness
- C. Common Types of Colorblindness
- D. The Effects of Colorblindness

9. What would be a good title for the third paragraph of the passage?

- A. Common Types of Colorblindness
- B. Causes of Colorblindness
- C. Who Suffers Most from Colorblindness?
- D. What are Some Limitations of Colorblindness?

10. According to the passage, the most common type of color blindness is:

- A. Red-green
- B. Blue-green
- C. Blue-yellow
- D. Red-yellow

11. According to the passage, color blindness is:

- A. More common in women
- B. Able to be cured
- C. Always severe
- D. Passed down from our parents

Arithmetic Reasoning

1. In 10 seconds, Sharon can run 71 yards, Mary can run 83 yards, and Nancy can run 18 yards more than Sharon. How many more yards can Nancy run than Mary in 10 seconds?

- A. 6
- B. 9
- C. 12
- D. 18

2. Manuel joined the Stay Fit Gym for a special rate of \$19.95 per month. He also had to pay the yearly registration fee of \$30.65. What is the total payment that Manuel made to the gym for the first year?

- A. \$239.40
- B. \$270.65
- C. \$270.05
- D. \$2,700.50

3. Mark bought a set of 5 ballpoint pens for \$4.25, and Sarah bought 7 ballpoint pens for \$5.60. Who got the better deal, and what was the difference in price per pen?

- A. Mark; \$0.05
- B. Sarah; \$0.05
- C. Mark; \$0.10
- D. Sarah; \$0.10

4. Three friends went on vacation together. Lori drove three times as many miles as Lorna. Lauren drove 300 miles more than Lorna. Together, they drove 1100 miles. How many miles did Lori drive?
- A. 200
B. 300
C. 420
D. 600
5. Scott and Mike share a pizza. Scott eats $\frac{3}{8}$ of the pizza while Mike eats $\frac{1}{2}$ of it. How much of the pizza is left?
- A. $\frac{5}{8}$
B. $\frac{2}{5}$
C. $\frac{1}{8}$
D. $\frac{7}{8}$
6. Matt needs $\frac{3}{4}$ m long pieces of wood for a project. He cuts the pieces out of a 9 m long plank. How many $\frac{3}{4}$ m pieces of wood can he get out of the plank?
- A. 12
B. 7
C. 15
D. 4
7. In 2007 the number of students enrolled at Warren Middle School was 450. In 2008 the number increased by 8%. What was the enrollment in 2008?
- A. 36
B. 486
C. 458
D. 482
8. In 2009 there were 255 girls and 153 boys at Warren Middle School. What percent of the students were girls?
- A. 37.5%
B. 62.5%
C. 54%
D. 65%
9. A winter coat that costs \$155.00 is marked up. The new price is \$186.00. What is the percent increase?
- A. 31%
B. 20%
C. 16.7%
D. 25%
10. Mercedes deposits \$550.00 into a savings account that earns an annual interest rate of 3.5%. What is the balance after one year?
- A. \$19.25
B. \$553.50
C. \$569.25
D. \$585.00

11. Jose's class library has 220 non-fiction books and 363 fiction books. What is the ratio of non-fiction books to fiction books?
- A. 22:36
B. 20:33
C. 22:58
D. 36:58
12. If Sam can deliver 24 newspapers in 2 hours, how many newspapers can he deliver in 5 hours?
- A. 65
B. 62
C. 60
D. 52
13. The front of the scale model of a building is 2.5 ft wide. The scale of the model is 1:35. What is the actual width of the front of the building?
- A. 35 ft
B. 37.5 ft
C. 87.5 ft
D. 105 ft
14. Miranda reaches into her sock drawer and pulls out a sock. There are 10 black socks, 6 white socks, and 4 blue socks. What is the probability that she will pull out a white sock?
- A. $\frac{1}{2}$
B. $\frac{1}{5}$
C. $\frac{3}{10}$
D. $\frac{7}{10}$
15. Arman is paid \$2.25 an hour for pet-sitting in his neighborhood. If he cares for pets three hours a day, how much can he earn in a seven-day week?
- A. \$47.25
B. \$15.75
C. \$6.75
D. \$45.00
16. Ovidiu mows a 450 square feet lawn. If he is paid \$0.45 per square yard, how much does he earn?
- A. \$202.50
B. \$22.50
C. \$67.50
D. \$93.00

Mathematics Knowledge

1. **6! is equal to:**

- A. 6
- B. 61
- C. 120
- D. 720

2. $\frac{2^7 \times 2^8}{2^3} = ?$

- A. 2^4
- B. 2^6
- C. 2^{12}
- D. 2^{18}

3. $\sqrt[4]{81} = ?$

- A. 9
- B. 3
- C. 6
- D. 8

4. $2(5 + 3 \times \sqrt{25}) \div (14 - 9) \times 4 = ?$

- A. 32
- B. 20
- C. 25
- D. 40

5. **Solve for x:**

$$7 - 5x = 7x - 11 - 3x$$

- A. -2
- B. 2
- C. $-1\frac{1}{2}$
- D. $3\frac{1}{4}$

6. **Solve for x:**

$$3(2x - 1) + 6 = 23$$

- A. $\frac{1}{6}$
- B. $3\frac{1}{3}$
- C. 2
- D. 3

7. **Evaluate the expression**

$$5a + 2b \times (3a - b^2),$$

if a = -1 and b = 2.

- A. -33
- B. 3
- C. 84
- D. -8

8. **Solve:** $2 + 5(x - 1) \leq 9$

- A. $x \geq \frac{12}{7}$
- B. $x \leq \frac{12}{5}$
- C. $x \leq 12$
- D. $x \geq 7$

9. **What is the name of a quadrilateral that has two sets of parallel sides?**

- A. Trapezoid
- B. Parallelogram
- C. Rhombus
- D. Pentagon

10. **A 90° angle is called:**
- A. A right angle
 - B. An acute angle
 - C. An obtuse angle
 - D. An exterior angle
11. **Which of the following is *not* true? An equilateral triangle:**
- A. has three equal sides
 - B. has three equal angles
 - C. has three acute angles
 - D. has three obtuse angles
12. **The perimeter of a square is 28 cm. What is the area of the square?**
- A. 64 sq. cm
 - B. 62 sq. cm
 - C. 49 sq. cm
 - D. 52 sq. cm
13. **The base of a triangle is 8 in. and its height is 5 in. What is the area of the triangle?**
- A. 40 sq. in.
 - B. 26 sq. in.
 - C. 20 sq. in.
 - D. 65 sq. in.
14. **A circular running track has a diameter of 10m. Four laps around the track equals a distance of:**
- A. 32 m
 - B. 63 m
 - C. 126 m
 - D. 252 m
15. **A 50 ft by 30 ft rectangular garden has a circular fountain in the center. If the radius of the fountain is 6 ft, what is the area of the garden outside the fountain?**
- A. 1387 sq. ft
 - B. 1575 sq. ft
 - C. 675 sq. ft
 - D. 1472 sq. ft
16. **A cylindrical popcorn tin has a diameter of 12 in. and a height of 15 in. What is the volume of popcorn it can hold?**
- A. 6786 in^3
 - B. 1696 in^3
 - C. 113 in^3
 - D. 3123 in^3

General Science

1. **Which of the following is an example of a chemical change?**
 - A. A ball breaks a glass window
 - B. Aluminum cans are crushed for recycling
 - C. A pond freezes over in winter
 - D. Logs burn in a fireplace

2. **The periodic table is arranged in rows that are called:**
 - A. Groups
 - B. Periods
 - C. Families
 - D. Categories

3. **The atomic number of Hydrogen is:**
 - A. 1
 - B. 2
 - C. 3
 - D. 4

4. **An object that is going round and round in a circle at a constant speed has:**
 - A. A constant acceleration
 - B. Zero acceleration
 - C. A constant velocity
 - D. Zero velocity

5. **A climber is standing at the summit of a mountain. He now has:**
 - A. More kinetic energy than he did at the bottom of the mountain
 - B. Less kinetic energy than he did at the bottom of the mountain
 - C. More potential energy than he did at the bottom of the mountain
 - D. Less potential energy than he did at the bottom of the mountain

6. **Which of the following is a good conductor of heat?**
 - A. Iron rod
 - B. Wooden stake
 - C. Cotton cloth
 - D. Writing paper

7. **The asteroid belt in the solar system is found:**
 - A. Between Mercury and Venus
 - B. Between Jupiter and Saturn
 - C. Between Mars and Jupiter
 - D. Outside the orbits of all the planets

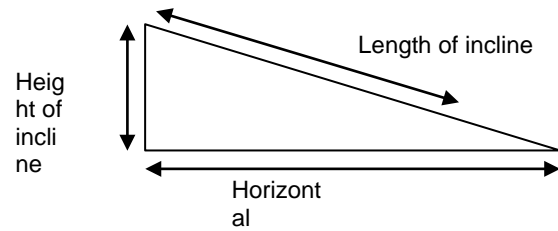
8. **The big bang theory is a theory about:**
- A. The origin of the universe
 - B. The formation of the solar system
 - C. The origin of the earth
 - D. The origin of the milky way galaxy
9. **The shape of the Milky Way galaxy is:**
- A. Irregular
 - B. Elliptical
 - C. Circular
 - D. Spiral
10. **What is the outermost layer of the earth?**
- A. Mantle
 - B. Crust
 - C. Outer core
 - D. Plate
11. **Rocks formed by the cooling of magma are known as:**
- A. Sedimentary rocks
 - B. Metamorphic rocks
 - C. Igneous rocks
 - D. Crystallized rocks

12. **A thunderstorm is about to begin. The kind of clouds you see in the sky are most likely:**
- A. Cirrus
 - B. Cumulus
 - C. Nimbus
 - D. Stratus
13. **Atmospheric pressure is measured using a:**
- A. Anemometer
 - B. Ammeter
 - C. Altimeter
 - D. Barometer
14. **The following is found in an animal cell but not a plant cell:**
- A. Nucleus
 - B. Chloroplast
 - C. Cytoplasm
 - D. Lysosome
15. **Urine is formed in the:**
- A. Liver
 - B. Kidney
 - C. Stomach
 - D. Pancreas
16. **Animals that eat both plants and other animals are called:**
- A. Omnivores
 - B. Carnivores
 - C. Herbivores
 - D. Predators

Mechanical Comprehension

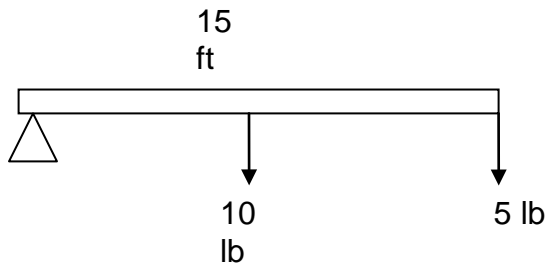
1. **The actual mechanical advantage of a system is:**
- A. Always larger than the ideal mechanical advantage
 - B. Always smaller than the ideal mechanical advantage
 - C. Always equal to the ideal mechanical advantage
 - D. Sometimes larger than the ideal mechanical advantage
2. **A garden hoe is a compound machine made up of a:**
- A. Lever and screw
 - B. Lever and wedge
 - C. Wedge and pulley
 - D. Inclined plane and pulley

3. **The mechanical advantage of the inclined plane shown below is:**



- A. $\frac{\text{Length of incline}}{\text{Height of incline}}$
 - B. $\frac{\text{Length of incline}}{\text{Horizontal distance}}$
 - C. $\frac{\text{Horizontal distance}}{\text{Height of incline}}$
 - D. $\frac{\text{Height of incline}}{\text{Horizontal distance}}$
4. **What class of lever is a broom?**
- A. First class
 - B. Second class
 - C. Third class
 - D. Not a lever
5. **A bevel gear is different from a spur gear because:**
- A. It has teeth
 - B. It can drive other gears
 - C. It can be meshed at different angles
 - D. It can rotate

6. For the third class lever shown below, an effort of 10 lbs is exerted to lift a load of 5 lbs which is applied 15 ft from the fulcrum. How far from the fulcrum is the effort applied?

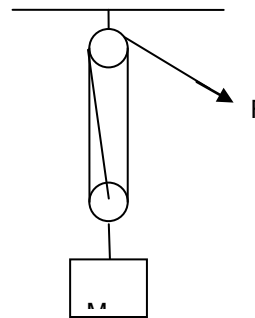


- A. 5 ft
B. 10 ft
C. 6.5 ft
D. 7.5 ft
7. A force of 5N is applied to the hinge of a door. What is the torque on the door?
- A. 0 Nm
B. 5 Nm
C. 10 Nm
D. 15 Nm
8. A force of 100N is used to push a crate 40m across a warehouse floor. How much work is done?
- A. 400 Joules
B. 4000 Joules
C. 140 Joules
D. 100 Joules

9. If the crate in the previous problem is moved in 10 seconds, what is the power used?

- A. 400 Watts
B. 4000 Watts
C. 40,000 Watts
D. 400,000 Watts

10. The mechanical advantage of the block and tackle system shown below is:



- A. 1
B. 2
C. 3
D. 4
11. The mechanical advantage of a wheel and axle system is 3. The radius of the wheel is:
- A. 3 times the radius of the axle
B. 1/3 the radius of the axle
C. 9 times the radius of the axle
D. Equal to the radius of the axle

12. Which simple machine is essentially an inclined plane wrapped around a cylinder?

- A. Lever
- B. Screw
- C. Wheel and axle
- D. Wedge

13. In a gear train, the gears in between the first and the last one are called

- A. Drivers
- B. Driven gears
- C. Spurs
- D. Idlers

14. An anti-reversal valve:

- A. Closes or opens the path of a fluid
- B. Allows fluid to flow in one direction only
- C. Allows fluid to flow in two directions
- D. Controls the amount of fluid flow by widening or narrowing the pathway

15. A piece of cork has density less than water. It will:

- A. Sink in water
- B. Float fully submerged in water
- C. Float partly submerged in water
- D. Disintegrate in water

16. A hydraulic jack is based on:

- A. Pascal's principle
- B. Archimedes' principle
- C. Bernoulli's principle
- D. Boyle's Law

Electronics Information

1. **A circuit segment contains only two resistors of equal value, connected in parallel. If the total resistance of the circuit segment is 100 Ohms, what is the value of each resistor?**
 - A. 50 Ohms
 - B. 100 Ohms
 - C. 200 Ohms
 - D. 400 Ohms

2. **A tank circuit is a type of:**
 - A. Resonator
 - B. Oscillator
 - C. Rectifier
 - D. Modulator

3. **An LED is a type of:**
 - A. Diode
 - B. Resistor
 - C. Capacitor
 - D. Inductor

4. **A 9-volt battery contains:**
 - A. Nine 1-volt cells
 - B. Six 1.5-volt cells
 - C. Three 3-volt cells
 - D. One 9-volt cell

5. **Which type of battery is best suited for rechargeable digital devices?**
 - A. Lithium-ion
 - B. Nickel-cadmium
 - C. Led-acid
 - D. Alkaline

6. **Which type of capacitor is best suited for high voltage applications?**
 - A. Mylar
 - B. Mica
 - C. Tantalum
 - D. Electrolytic

7. **Turbines are used to convert:**
 - A. Radiant energy to electrical energy
 - B. Electrical energy to radiant energy
 - C. Mechanical energy to electrical energy
 - D. Electrical energy to mechanical energy

8. **The basic unit of electrical charge is the:**
 - A. Coulomb
 - B. Volt
 - C. Ampere
 - D. Watt

9. In an AC circuit, capacitors behave like:

- A. Frequency-dependent voltage sources
- B. Frequency-dependent resistors
- C. Frequency-independent voltage sources
- D. Frequency-independent resistors

10. In which band of the electromagnetic spectrum is 600 MHz?

- A. ULF
- B. VLF
- C. VHF
- D. UHF

11. What type of mechanical switch will connect exactly one circuit to one of two positions?

- A. SPST
- B. SPDT
- C. DPST
- D. DPDT

12. What is the frequency of the AC voltage delivered to a typical household outlet?

- A. 60 Hz
- B. 120 Hz
- C. 180 Hz
- D. 240 Hz

13. In an AC circuit, the term Z refers to:

- A. Resistance
- B. Reactance
- C. Impedance
- D. Inductance

14. Microwaves are a type of:

- A. Conductor
- B. Insulator
- C. Conservation
- D. Radiation

15. Which is the best electrical conductor?

- A. Gold
- B. Silver
- C. Copper
- D. Iron

16. How many diodes are required to make a full-wave rectifier?

- A. 1
- B. 2
- C. 4
- D. 8

Shop Information

1. **What type of sledges are used to drive fence posts into the earth?**
 - A. Drive sledges
 - B. Post sledges
 - C. Fence sledges
 - D. Spike sledges

2. **A claw hammer is used primarily for working with:**
 - A. Metal
 - B. Concrete
 - C. Tile
 - D. Wood

3. **How is the Frearson screw head an improvement over the Phillips screw head?**
 - A. It is designed to cam the screwdriver out of the screw when the screw stalls.
 - B. It allows one tip to fit a variety of screw sizes.
 - C. It is designed to be used with both wood and metal screws.
 - D. It is designed to be used with socket wrenches.

4. **Which tool is millions of years old?**
 - A. Screwdriver
 - B. Level
 - C. Wrench
 - D. Hammer

5. **A manual screwdriver that allows the user to turn the screwdriver in both directions without removing the tip from the screw is called a:**
 - A. Hex nut driver
 - B. Frearson screwdriver
 - C. Ratcheting screwdriver
 - D. Slotted screwdriver

6. **Which of the following tools contains a chisel?**
 - A. Crowbar
 - B. Hammer
 - C. Wrench
 - D. Caliper

7. **A wrench that features an enclosed circle that encloses a nut or bolt on all sides is called:**
 - A. A pipe wrench
 - B. An adjustable-end wrench
 - C. A box-end wrench
 - D. An open-end wrench

8. **Carol measures the length of a pipe with a tape measure. The length is 57". What is this length in feet and inches?**
 - A. 5 feet 7 inches
 - B. 4 feet 75 inches
 - C. 4 feet 9 inches
 - D. 4 feet 7 inches

9. Which type of saw is *not* mechanically powered?
- A. Jigsaw
 - B. Table saw
 - C. Hacksaw
 - D. Circular saw
10. Which device is used to measure length?
- A. Multimeter
 - B. Caliper
 - C. Tachometer
 - D. Barometer
11. Sean bought sand paper with a grit size of 1,000. What type of sandpaper did he buy?
- A. Micro
 - B. Fine
 - C. Medium
 - D. Coarse

Auto Information

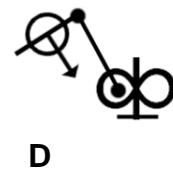
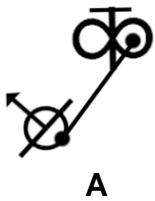
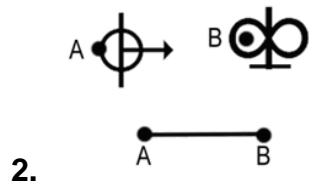
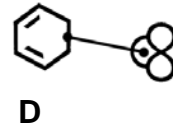
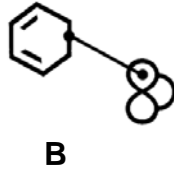
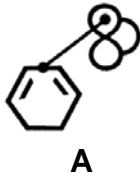
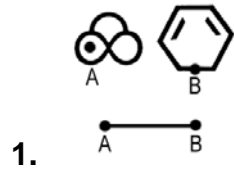
1. The part that connects the engine block to the exhaust is the:
- A. Exhaust manifold
 - B. Intake manifold
 - C. Flex pipe
 - D. Muffler
2. The constant velocity joint is part of what system?
- A. The drive train
 - B. The cooling system
 - C. The emission system
 - D. The suspension system
3. Which system has the catalytic converter as one of its parts?
- A. The cooling system
 - B. The electrical system
 - C. The exhaust system
 - D. The drive train
4. With disk brakes, which parts do the actual braking?
- A. The pedal and master cylinder
 - B. The caliper and flex line
 - C. The shoes and drum
 - D. The disk and pads

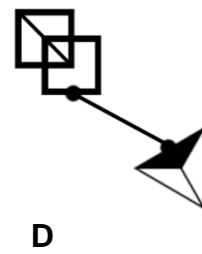
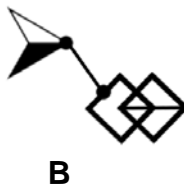
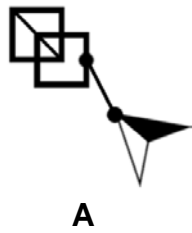
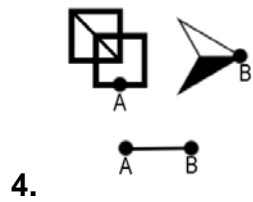
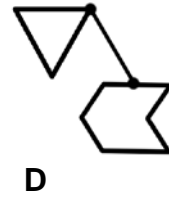
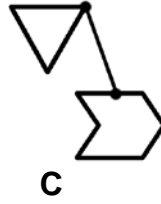
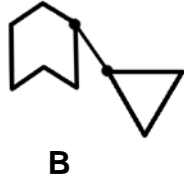
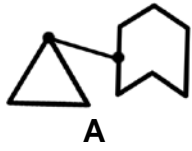
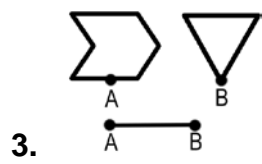
5. **Valve seals do which of these?**
- A. Reduce wear and tear on the engine valves
 - B. Restrict the speed of the exhaust, reducing engine noise
 - C. Prevent oil from leaking into the combustion chamber
 - D. Seal the cooling system
6. **What is a "torque spec" in reference to nuts and bolts?**
- A. How much torque a nut and bolt will take before breaking
 - B. The correct amount of pressure to apply when tightening a nut
 - C. The point at which a bolt will break if you over tighten it
 - D. The point at which the threads will strip if you over tighten
7. **The timing chain is part of the:**
- A. Engine
 - B. Transmission
 - C. Exhaust system
 - D. Speedometer

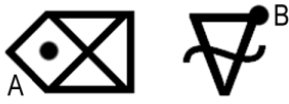
8. **The cotter pin does what?**
- A. Attaches fabric and cushion to seat frames
 - B. Is used to check small tolerances when assembling an engine
 - C. Secures a nut or castle nut
 - D. Secures a cylindrical shaft and sleeve
9. **When measuring tolerances, 0.030" is equal to:**
- A. Three thousandths of an inch
 - B. Thirty thousandths of a millimeter
 - C. Three hundredths of a millimeter
 - D. Thirty thousandths of an inch
10. **What system contains the master cylinder?**
- A. The braking system
 - B. The cooling system
 - C. The drive train
 - D. The electrical system
11. **How many connecting rods does a four cylinder engine have?**
- A. Four
 - B. Eight
 - C. Twelve
 - D. Sixteen

Assembling Objects

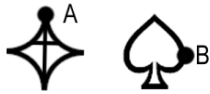
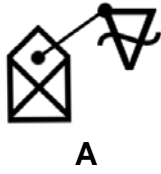
For each pair of labeled shapes in questions 1 to 8, choose the figure that shows the shapes connected correctly.




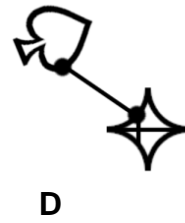
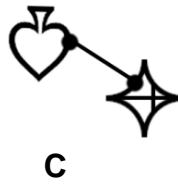
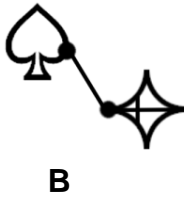
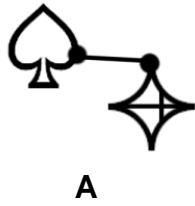




5. 

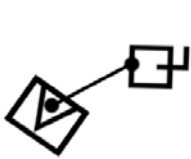


6. 

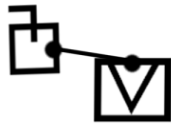




7.



A



B



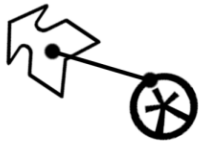
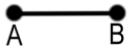
C



D



8.



A



B

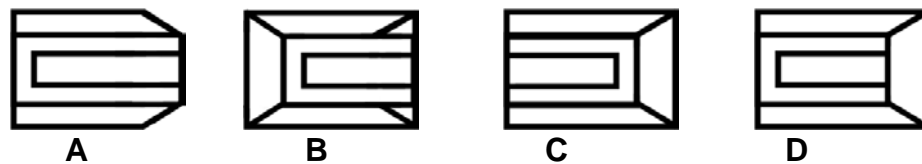
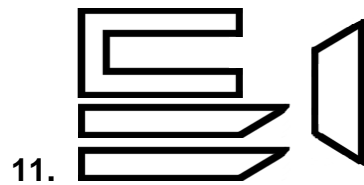
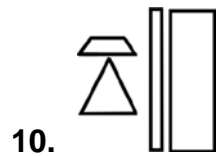
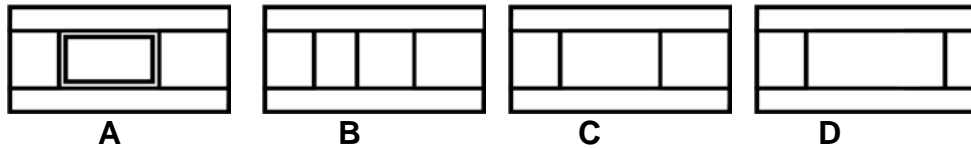
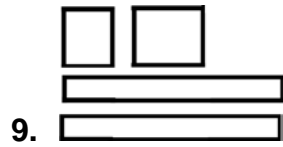


C

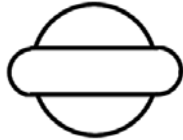
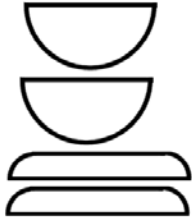


D

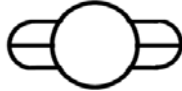
For each set of shapes in questions 9 to 16, choose the figure that shows the shapes assembled into an object.



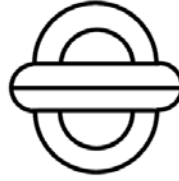
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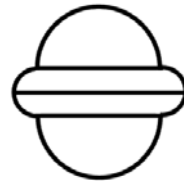
A



B

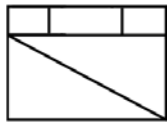
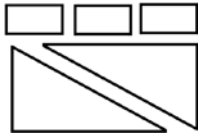


C

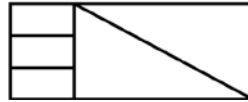


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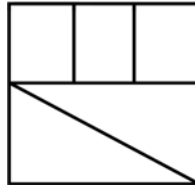
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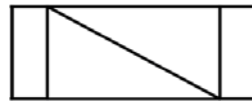
A



B

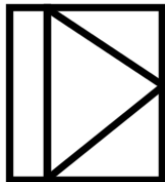
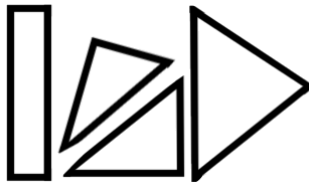


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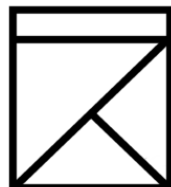


D

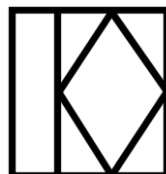
14.



A



B

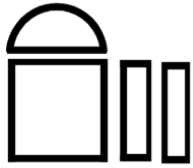


C



D

15.



A



B

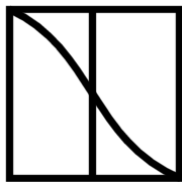
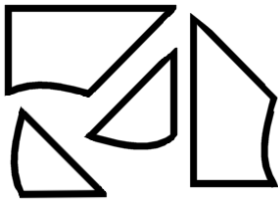


C

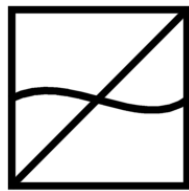


D

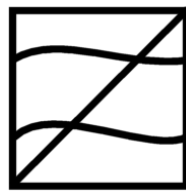
16.



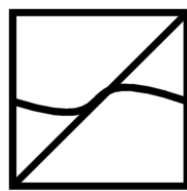
A



B



C



D

ASVAB Extra Sample Test 2

Answer Key

| WK | PC | AR | MK | GS | MC | EI | SI | AI | AO |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. B | 1. D | 1. A | 1. D | 1. D | 1. B | 1. C | 1. B | 1. A | 1. B |
| 2. D | 2. C | 2. C | 2. C | 2. B | 2. B | 2. B | 2. D | 2. A | 2. A |
| 3. C | 3. B | 3. B | 3. B | 3. A | 3. A | 3. A | 3. B | 3. C | 3. D |
| 4. C | 4. A | 4. D | 4. A | 4. A | 4. C | 4. B | 4. D | 4. D | 4. B |
| 5. A | 5. B | 5. C | 5. B | 5. C | 5. C | 5. A | 5. C | 5. C | 5. B |
| 6. C | 6. D | 6. A | 6. B | 6. A | 6. D | 6. D | 6. A | 6. B | 6. B |
| 7. C | 7. C | 7. B | 7. A | 7. C | 7. A | 7. C | 7. C | 7. A | 7. D |
| 8. A | 8. A | 8. B | 8. B | 8. A | 8. B | 8. A | 8. C | 8. C | 8. D |
| 9. D | 9. B | 9. B | 9. B | 9. D | 9. A | 9. B | 9. C | 9. D | 9. C |
| 10. B | 10. A | 10. C | 10. A | 10. B | 10. C | 10. D | 10. C | 10. A | 10. A |
| 11. A | 11. D | 11. B | 11. D | 11. C | 11. A | 11. B | 11. A | 11. A | 11. D |
| 12. A | | 12. C | 12. C | 12. C | 12. B | 12. A | | | 12. D |
| 13. A | | 13. C | 13. C | 13. D | 13. D | 13. C | | | 13. B |
| 14. C | | 14. C | 14. C | 14. D | 14. B | 14. D | | | 14. A |
| 15. A | | 15. A | 15. A | 15. B | 15. C | 15. B | | | 15. C |
| 16. B | | 16. B | 16. B | 16. A | 16. A | 16. C | | | 16. B |

ASVAB Extra Sample Test 2 with Rationales

Word Knowledge

1. **Cajole** most nearly means:

- A. Prevent
- B. Coax
- C. Evade
- D. Console

Answer: B. Coax

The word *cajole* has nearly the same meaning as the word *coax*. They both mean *to persuade someone to do something*.

2. **Enervate** most nearly means:

- A. Object
- B. Prod
- C. Order
- D. Weaken

Answer: D. Weaken

The word *enervate* has nearly the same meaning as the word *weaken*. They both mean *to cause someone to feel drained of energy*.

3. **Ruminate** most nearly means:

- A. Tremble
- B. Destroy
- C. Meditate
- D. Struggle

Answer: C. Meditate

The word *ruminate* has nearly the same meaning as the word *meditate*. They both mean *to think deeply about something*.

4. **Hapless most nearly means:**

- A. Sneaky
- B. Sickly
- C. Unlucky
- D. Poor

Answer: C. Unlucky

The word *hapless* has nearly the same meaning as the word *unlucky*. They both mean *unfortunate or having an absence of good luck*.

5. **Debacle most nearly means:**

- A. Disaster
- B. Temper
- C. Yearning
- D. Boundary

Answer: A. Disaster

The word *debacle* has nearly the same meaning as the word *disaster*. They both mean *an overwhelming defeat or complete failure*.

6. **Spurn most nearly means:**

- A. Heal
- B. Consume
- C. Reject
- D. Recover

Answer: C. Reject

The word *spurn* has nearly the same meaning as the word *reject*. They both mean *to refuse with scorn; turn down; decline*.

For questions 7 to 11, choose the word that has nearly the same meaning as the underlined word.

7. At this critical junction in the affairs of our country, we must move forward most carefully.

- A. Burden
- B. Mistake
- C. Moment
- D. Object

Answer: C. Moment

The word *junction* has nearly the same meaning as the word *moment*. They both mean *a particular point in time or events*.

8. The boss questioned the veracity of the worker's account of the events.

- A. Truthfulness
- B. Necessity
- C. Position
- D. Creativity

Answer: A. Truthfulness

The word *veracity* has nearly the same meaning as the word *truthfulness*. They both mean *conformity to the facts; accuracy*.

9. The overpowering odor from the paper mill permeates the whole city.

- A. Risks
- B. Inhabits
- C. Previews
- D. Penetrates

Answer: D. Penetrates

The word *permeates* has nearly the same meaning as the word *penetrates*. They both mean *to spread throughout something*.

10. She is a very astute shopper, looking carefully for the best buy and never paying more than something is worth.

- A. Fearful
- B. Sharp
- C. Rich
- D. Friendly

Answer: B. Sharp

The word *astute* has nearly the same meaning as the word *sharp*. They both mean *having the ability to accurately assess a situation*.

11. After several days of protests, the mayor decided to rescind the order.

- A. Repeal
- B. Volunteer
- C. Praise
- D. Command

Answer: A. Repeal

The word *rescind* has nearly the same meaning as the word *repeal*. They both mean *to revoke or to cancel*.

12. The word most opposite in meaning to paucity is:

- A. Abundance
- B. Burden
- C. Question
- D. Argument

Answer: A. Abundance

The word *paucity* is most opposite in meaning to the word *abundance*. *Paucity* means *an inadequate amount, a scarcity or lack of*.

13. The word most opposite in meaning to delectable is:

- A. Distasteful
- B. Difficult
- C. Tiring
- D. Civil

Answer: A. Distasteful

The word *delectable* is most opposite in meaning to the word *distasteful*. *Delectable* means *delightful; appetizing*.

14. The word most opposite in meaning to gregarious is:

- A. Accurate
- B. Favorable
- C. Shy
- D. Weak

Answer: C. Shy

The word *gregarious* is most opposite in meaning to the word *shy*. *Gregarious* means *outgoing; sociable*.

15. The word most opposite in meaning to perfunctory is:

- A. Thorough
- B. Expensive
- C. Forgettable
- D. Ordinary

Answer: A. Thorough

The word *perfunctory* is most opposite in meaning to the word *thorough*. *Perfunctory* means *done in a superficial or halfhearted manner*.

16. The word most opposite in meaning to decorous is:

- A. Outstanding
- B. Improper
- C. Lighthearted
- D. Genuine

Answer: B. Improper

The word *decorous* is most opposite in meaning to the word *improper*. *Decorous* means *well behaved; dignified*.

Paragraph Comprehension

Read the passage below and answer questions 1 to 6.

With both eloquence and power, Barbara Jordan's voice stirred a nation. Using her voice, her passion, and her political skill, Jordan strove for justice. She became the first African American to be elected to the Texas Senate and the first African American elected to Congress from Texas since Reconstruction. She was also the first African American woman to deliver a keynote address at the Democratic National Convention.

To say that Jordan's life was a struggle might be an understatement. She was born into a poor Houston neighborhood and attended segregated public schools. She graduated, however, with debating honors from the all-black Texas Southern University. Her father, a minister, had to hold down two jobs to pay for her college. Jordan also suffered from multiple sclerosis and was confined to a wheel chair during her later years. Even from her wheelchair, however, Jordan continued her public speaking, never losing her powerful and impassioned voice.

Jordan used her extraordinary oratorical skills to rally the people of the United States around the ideals set forth in the Constitution. She spoke for justice for all. One of her most memorable speeches was given while arguing for the impeachment of President Nixon. She said, "I felt somehow for many years that George Washington and Alexander Hamilton just left me out by mistake. But through the process of amendment, interpretation and court decision I have finally been included in 'We, the people.'" Then addressing the nearing constitutional crisis, she added, "My faith in the Constitution is whole, it is complete, it is total, and I am not going to sit here and be an idle spectator to the diminution, the subversion, the destruction of the Constitution."

After three terms in Congress, Jordan retired. She went on to teach ethics at the University of Texas in Austin. Again, her voice captivated her listeners, this time her students. Her students remembered Jordan as always having a copy of the Constitution in her purse. She died at the age of 59.

1. **According to this passage, Barbara Jordan cherished:**

- A. Her students
- B. Her family
- C. The U.S. Congress
- D. The Constitution

Answer: D. The Constitution

Choice A, B, and C may be true, but there is no evidence presented in the passage. Choice D is supported by both her quotes and the fact that she appeared to always carry a copy of the Constitution in her purse.

2. **What would be a good title for this passage?**

- A. Barbara Jordan: An American Hero
- B. Barbara Jordan: Overcoming Hardships
- C. Barbara Jordan: A Voice that Stirred a Nation
- D. Barbara Jordan: An African American Politician

Answer: C. Barbara Jordan: A Voice that Stirred a Nation

Choice A is too broad. Choice B addresses only one section of the passage. The title should state what the entire passage is mainly about. Choice D is too narrow. Choice C is the best title because it reflects a theme that runs throughout the passage: Jordan's powerful voice.

3. **What would be a good title for the third paragraph of the passage?**

- A. Jordan Speaks to a Nation
- B. Jordan's Faith in the Constitution
- C. Jordan Never Gives Up
- D. Jordan Argues for Impeachment

Answer: B. Jordan's Faith in the Constitution

Choice A is too broad. Choice C is inaccurate. The paragraph does not address Jordan refusing to give up. Choice D is a detail in the paragraph rather than what the paragraph is mostly about. Choice B is the best title because it reflects what the paragraph is mostly about – Jordan speaking out for the ideals in the Constitution.

4. **According to the passage, after retiring from Congress, Jordan became a:**
- A. Professor
 - B. Lawyer
 - C. Governor
 - D. Writer

Answer: A. Professor

Choices B, C and D are incorrect. There is no evidence in the passage to support these answers. Choice A is found in the final paragraph of the passage. Jordan taught at the University of Texas in Austin.

5. **Based on the passage, the author would agree that:**

- A. Jordan's health prevented her from achieving her goals
- B. Jordan showed amazing strength throughout her life
- C. Jordan made many political enemies while serving in Congress
- D. Jordan was a better politician than teacher

Answer: B. Jordan showed amazing strength throughout her life

Choice A is not correct because the passage states that even while confined to a wheelchair, Jordan continued speaking. Choices C and D are not correct. There is no evidence in the passage to support either. Choice B is correct. The passage illustrates how Jordan overcomes many difficulties to be a successful and powerful politician and teacher, even while confined to a wheelchair.

6. **According to the passage, Jordan was the first African American to be elected to the:**

- A. Supreme Court
- B. President's Cabinet
- C. U.S. Senate
- D. Texas Senate

Answer: D. Texas Senate

This detail is found in the first paragraph of the passage.

Read the passage below and answer questions 7 to 11.

Color blindness is a common disorder. In fact, one out of 10 men suffer from color blindness. Only one out of about 200 women is colorblind. But what is it?

Colorblindness is the inability to see certain color in the usual way. People who are colorblind often have the inability to tell the difference between shades of the same or similar colors. For some, color blindness is very mild, and they may not even know they have some color blindness. For others it can be quite severe.

The most common type of color blindness is the inability to tell the difference between red and green. However, some people have trouble seeing blue-yellow colors. Colorblindness is inherited.

The cones in the eyes are responsible for seeing color. People have “red,” “blue,” and “green” cones which are sensitive to these colors and combinations of them. Cones are cells on the retina that are located at the back of the eye. The cones contain a light sensitive pigment which is sensitive over a range of wavelengths. Each visible color is a different wavelength. Genes contain the coding instructions for these pigments. However, if the coding instructions are wrong, then the wrong pigment will be produced. The cones will then be sensitive to different wavelengths of light. A person will “see” a different color or shade of color.

7. According to this passage, what contains the coding instructions for seeing color?

- A. Pigment
- B. Light
- C. Genes
- D. Cone

Answer: C. Genes

Choice A, B, and D are related terms, but Choice C is correct as stated in the third paragraph.

8. What would be a good title for this passage?

- A. Understanding Colorblindness
- B. Causes of Colorblindness
- C. Common Types of Colorblindness
- D. The Effects of Colorblindness

Answer: A. Understanding Colorblindness

Choice B, C, and D reflect only one part of the passage. Choice A reflects what the passage is mostly about. It is the best title.

9. **What would be a good title for the third paragraph of the passage?**

- A. Common Types of Colorblindness
- B. Causes of Colorblindness
- C. Who Suffers Most from Colorblindness?
- D. What are Some Limitations of Colorblindness?

Answer: B. Causes of Colorblindness

Choice A is not addressed in the third paragraph. It is discussed in the second paragraph. Choice C is discussed in the first paragraph. Choice D is not discussed in this passage. Choice B is what the third paragraph is mostly about.

10. **According to the passage, the most common type of color blindness is:**

- A. Red-green
- B. Blue-green
- C. Blue-yellow
- D. Red-yellow

Answer: A. Red-green

Choices B, C, and D are incorrect. The second paragraph states that the inability to tell the difference between red and green is the most common type of color blindness—choice A.

11. **According to the passage, color blindness is:**

- A. More common in women
- B. Able to be cured
- C. Always severe
- D. Passed down from our parents

Answer: D. Passed down from our parents

Choice A is not correct. It is more common in men than women. Choice B is not correct. This answer choice is not discussed in the passage. Choice C is incorrect because the passage states that some people have mild cases and may not even know they are colorblind. Choice D is correct. The passage tells us that colorblindness is inherited, or passed down from our parents.

Arithmetic Reasoning

1. In 10 seconds, Sharon can run 71 yards, Mary can run 83 yards, and Nancy can run 18 yards more than Sharon. How many more yards can Nancy run than Mary in 10 seconds?

- A. 6
- B. 9
- C. 12
- D. 18

Answer: A. 6

This is a two-step problem. First find out how many yards Nancy runs. Then how many more yards she runs than Mary. Since Nancy runs 18 more yards than Sharon and Sharon runs 71 yards in 10 seconds, Nancy runs $71 + 18 = 89$ yards in 10 seconds. Mary runs 83 yards and Nancy runs 89 yards in 10 seconds. So Nancy runs $89 - 83 = 6$ yards more than Mary in 10 seconds.

2. Manuel joined the Stay Fit Gym for a special rate of \$19.95 per month. He also had to pay the yearly registration fee of \$30.65. What is the total payment that Manuel made to the gym for the first year?

- A. \$239.40
- B. \$270.65
- C. \$270.05
- D. \$2,700.50

Answer: C. \$270.05

The monthly fee for 12 months = $\$19.95 \times 12 = \239.40 . (Check for reasonableness: Since 19.95 is almost 20, you would expect this answer to be close to $20 \times 12 = 240$.) Total payment with registration added = $\$239.40 + \$30.65 = \$270.05$.

3. **Mark bought a set of 5 ballpoint pens for \$4.25, and Sarah bought 7 ballpoint pens for \$5.60. Who got the better deal, and what was the difference in price per pen?**
- A. Mark; \$0.05
 - B. Sarah; \$0.05
 - C. Mark; \$0.10
 - D. Sarah; \$0.10

Answer: B. Sarah; \$0.05

To find out who got the better deal, you need to find the price per pen. $\$4.25 \div 5$ is $\$0.85$, and $\$5.60 \div 7$ is $\$0.80$, so Sarah got the better deal. The difference between $\$0.85$ and $\$0.80$ is $\$0.85 - \0.80 or $\$0.05$.

4. **Three friends went on vacation together. Lori drove three times as many miles as Lorna. Lauren drove 300 miles more than Lorna. Together, they drove 1100 miles. How many miles did Lori drive?**
- A. 200
 - B. 300
 - C. 420
 - D. 600

Answer: D. 600

Let x = the number of miles Lorna drove. Then $3x$ = the number of miles Lori drove. $x + 300$ = the number of miles Lauren drove. The sum of these is 1100. $x + 3x + x + 300 = 1100$; $4x + 300 = 1100$; $4x = 800$; $x = 200$. So Lorna drove 200 miles. Since Lori drove 3 times as much, she drove 600 miles.

5. **Scott and Mike share a pizza. Scott eats $\frac{3}{8}$ of the pizza while Mike eats $\frac{1}{2}$ of it. How much of the pizza is left?**
- A. $\frac{5}{8}$
 - B. $\frac{2}{5}$
 - C. $\frac{1}{8}$
 - D. $\frac{7}{8}$

Answer: C. $\frac{1}{8}$

The fraction of pizza eaten = $\frac{3}{8} + \frac{1}{2}$. Expressing the two fractions using the common denominator 8, we can write the sum as $\frac{3}{8} + \frac{4}{8} = \frac{7}{8}$. So the fraction of pizza left = $1 - \frac{7}{8} = \frac{1}{8}$.

6. **Matt needs $\frac{3}{4}$ m long pieces of wood for a project. He cuts the pieces out of a 9 m long plank. How many $\frac{3}{4}$ m pieces of wood can he get out of the plank?**

A. 12
B. 7
C. 15
D. 4

Answer: A. 12

He's going to divide 9 m into $\frac{3}{4}$ m pieces, so you need to divide 9 by $\frac{3}{4}$. To divide by $\frac{3}{4}$, flip the fraction, and then multiply. $9 \times (\frac{4}{3}) = 12$.

7. **In 2007 the number of students enrolled at Warren Middle School was 450. In 2008 the number increased by 8%. What was the enrollment in 2008?**

A. 36
B. 486
C. 458
D. 482

Answer: B. 486

To find 8% of 450, multiply 0.08 by 450. The result, 36, is the increase. To find the total enrollment in 2008, add 36 and 450: $450 + 36 = 486$.

8. **In 2009 there were 255 girls and 153 boys at Warren Middle School. What percent of the students were girls?**

A. 37.5%
B. 62.5%
C. 54%
D. 65%

Answer: B. 62.5%

The total number of students = $255 + 153 = 408$. The percentage of girls = $(\frac{255}{408}) \times 100 = 62.5$.

9. A winter coat that costs \$155.00 is marked up. The new price is \$186.00. What is the percent increase?

- A. 31%
- B. 20%
- C. 16.7%
- D. 25%

Answer: B. 20%

First find the amount that the price changed, and then divide by the original price. The price increased by \$31.00. Divide \$31.00 by \$155.00. The result is 0.2, or 20%.

10. Mercedes deposits \$550.00 into a savings account that earns an annual interest rate of 3.5%. What is the balance after one year?

- A. \$19.25
- B. \$553.50
- C. \$569.25
- D. \$585.00

Answer: C. \$569.25

First find the interest earned; then add the interest to the amount invested. The interest is 3.5% of \$550.00, or 0.035×550 , which equals 19.25. To find the balance, add the interest, \$19.25, to the amount invested, \$550. The answer is \$569.25.

11. Jose's class library has 220 non-fiction books and 363 fiction books. What is the ratio of non-fiction books to fiction books?

- A. 22:36
- B. 20:33
- C. 22:58
- D. 36:58

Answer: B. 20:33

The ratio of non-fiction books to fiction books is 220:363. A common factor of both numbers is 11. Divide each number by 11, and the reduced ratio is 20:33.

12. If Sam can deliver 24 newspapers in 2 hours, how many newspapers can he deliver in 5 hours?

- A. 65
- B. 62
- C. 60
- D. 52

Answer: C. 60

Set up the proportion $24/2 = x/5$. To solve for x , multiply both sides of the equation by 10 to get $120 = 2x$. So $x = 60$.

13. The front of the scale model of a building is 2.5 ft wide. The scale of the model is 1:35. What is the actual width of the front of the building?

- A. 35 ft
- B. 37.5 ft
- C. 87.5 ft
- D. 105 ft

Answer: C. 87.5 feet

Set up the proportion $2.5/x = 1/35$. To solve for x , multiply both sides of the equation by x to get $2.5 = x/35$. Then multiply both sides of the equation by 35 to get $x = 2.5 \times 35 = 87.5$.

14. Miranda reaches into her sock drawer and pulls out a sock. There are 10 black socks, 6 white socks, and 4 blue socks. What is the probability that she will pull out a white sock?

- A. $1/2$
- B. $1/5$
- C. $3/10$
- D. $7/10$

Answer: C. 3/10

To find the probability, divide the number of acceptable outcomes, in this case, the number of white socks, by the total number of possible outcomes. There are 6 white socks and a total of 20 socks. So the probability of getting a white sock is $6/20$ which reduces to $3/10$.

15. Arman is paid \$2.25 an hour for pet-sitting in his neighborhood. If he cares for pets three hours a day, how much can he earn in a seven-day week?
- A. \$47.25
 - B. \$15.75
 - C. \$6.75
 - D. \$45.00

Answer: A. \$47.25

The number of hours Arman works in a week = $7 \times 3 = 21$. Since he is paid \$2.25 an hour, the total amount of money he makes in a week = $21 \times \$2.25 = \47.25 .

16. Ovidiu mows a 450 square feet lawn. If he is paid \$0.45 per square yard, how much does he earn?
- A. \$202.50
 - B. \$22.50
 - C. \$67.50
 - D. \$93.00

Answer: B. \$22.50

Since the rate of Ovidiu's payment is given in square yards, first convert 450 square feet to square yards. 1 yard = 3 feet; 1 square yard = 9 square feet. So 450 square feet = $450/9 = 50$ square yards. Ovidiu is paid $50 \times \$0.45 = \22.50 .

Mathematics Knowledge

1. **6!** is equal to:

- A. 6
- B. 61
- C. 120
- D. 720

Answer: D. 720

6! is 6 factorial which is defined as $6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$.

2. $\frac{2^7 \times 2^8}{2^3} = ?$

- A. 2^4
- B. 2^6
- C. 2^{12}
- D. 2^{18}

Answer: C. 2^{12}

The rules for multiplying and dividing terms with exponents are:

$$a^m \times a^n = a^{m+n}; \frac{a^m}{a^n} = a^{m-n}.$$

$$\text{So } \frac{2^7 \times 2^8}{2^3} = \frac{2^{7+8}}{2^3} = \frac{2^{15}}{2^3} = 2^{15-3} = 2^{12}.$$

3. $\sqrt[4]{81} = ?$

- A. 9
- B. 3
- C. 6
- D. 8

Answer: B. 3

$3 \times 3 \times 3 \times 3 = 81$. Therefore, $\sqrt[4]{81} = 3$.

4. $2(5 + 3 \times \sqrt{25}) \div (14 - 9) \times 4 = ?$

- A. 32
- B. 20
- C. 25
- D. 40

Answer: A. 32

First perform the operation inside parentheses, doing multiplication before addition:

$$5 + 3 \times \sqrt{25} = 5 + 3 \times 5 = 5 + 15 = 20 \text{ and } 14 - 9 = 5. \text{ This gives}$$

$$2(5 + 3 \times \sqrt{25}) \div (14 - 9) \times 4 = 2(20) \div 5 \times 4.$$

Now do the multiplications and divisions from left to right:

$$2(20) \div 5 \times 4 = 40 \div 5 \times 4 = 8 \times 4 = 32.$$

5. **Solve for x:** $7 - 5x = 7x - 11 - 3x$

- A. -2
- B. 2
- C. $-1\frac{1}{2}$
- D. $3\frac{1}{4}$

Answer: B. 2

First add $5x$ to both sides to get all the x terms on one side. Then $7 = 7x - 11 - 3x + 5x$. Combine all the x terms: $7 = 9x - 11$. Add 11 to both sides to get $18 = 9x$.

Dividing both sides by 9, $x = 2$.

6. Solve for x : $3(2x - 1) + 6 = 23$

- A. $\frac{1}{6}$
- B. $3\frac{1}{3}$
- C. 2
- D. 3

Answer: B. $3\frac{1}{3}$

First use the distributive law to write $3(2x - 1)$ as $6x - 3$. This makes the equation $6x - 3 + 6 = 23$. Simplifying further, $6x + 3 = 23$. Subtracting 3 from both sides, $6x = 20$. Dividing both sides by 6, $x = 20/6 = 10/3 = 3\frac{1}{3}$.

7. Evaluate the expression $5a + 2b \times (3a - b^2)$, if $a = -1$ and $b = 2$.

- A. -33
- B. 3
- C. 84
- D. -8

Answer: A. -33

First substitute the variable values in the expression. Then use order of operations to evaluate the expression. Substituting variable values,

$$5a + 2b \times (3a - b^2) = 5(-1) + 2(2) \times (3(-1) - 2^2) = -5 + 4 \times (-3 - 4).$$

Performing parentheses first, then the multiplication, and then addition:

$$-5 + 4 \times (-3 - 4) = -5 + 4 \times (-7) = -5 - 28 = -33.$$

8. **Solve:** $2 + 5(x - 1) \leq 9$

- A. $x \geq \frac{12}{7}$
- B. $x \leq \frac{12}{5}$
- C. $x \leq 12$
- D. $x \geq 7$

Answer: B. $x \leq \frac{12}{5}$

Distribute and simplify the left hand side to get $2 + 5x - 5 = 5x - 3$. So the inequality becomes $5x - 3 \leq 9$. Adding 3 to both sides, $5x \leq 12$. Dividing both sides by 5,

$$x \leq \frac{12}{5}.$$

9. **What is the name of a quadrilateral that has two sets of parallel sides?**

- A. Trapezoid
- B. Parallelogram
- C. Rhombus
- D. Pentagon

Answer: B. Parallelogram

A parallelogram is a quadrilateral (two-dimensional shape with 4 straight sides) in which the opposite sides are parallel.

10. **A 90° angle is called:**

- A. A right angle
- B. An acute angle
- C. An obtuse angle
- D. An exterior angle

Answer: A. A right angle

A 90° angle formed by the intersection of two lines that are perpendicular to each other is called a right angle.

11. Which of the following is *not* true? An equilateral triangle:

- A. has three equal sides
- B. has three equal angles
- C. has three acute angles
- D. has three obtuse angles

Answer: D. has three obtuse angles

An equilateral triangle, by definition, has three equal sides. So the three angles are equal as well and each is an acute angle equal to 60° .

12. The perimeter of a square is 28 cm. What is the area of the square?

- A. 64 sq. cm
- B. 62 sq. cm
- C. 49 sq. cm
- D. 52 sq. cm

Answer: C. 49 sq. cm

Since all four sides of a square are equal, the perimeter of a square is four times its side. So the side of the square = $28/4 = 7$ cm. The area of a square = side \times side = $7 \times 7 = 49$ sq. cm.

13. The base of a triangle is 8 in. and its height is 5 in. What is the area of the triangle?

- A. 40 sq. in.
- B. 26 sq. in.
- C. 20 sq. in.
- D. 65 sq. in.

Answer: C. 20 sq. in.

The area of a triangle = $(1/2) \times$ base \times height. The area of the given triangle = $(1/2) \times 8 \times 5 = (1/2) \times 40 = 20$ sq. in.

14. A circular running track has a diameter of 10m. Four laps around the track equals a distance of:

- A. 32 m
- B. 63 m
- C. 126 m
- D. 252 m

Answer: C. 126 m

One lap around the track is equal to the circumference of the circle = $\pi \times \text{diameter} = 10\pi$ m. Four laps around the track = $4 \times 10\pi = 40\pi = 126$ m.

15. A 50 ft by 30 ft rectangular garden has a circular fountain in the center. If the radius of the fountain is 6 ft, what is the area of the garden outside the fountain?

- A. 1387 sq. ft
- B. 1575 sq. ft
- C. 675 sq. ft
- D. 1472 sq. ft

Answer: A. 1387 sq. ft

The area of the rectangular garden including the fountain = length \times width = $50 \text{ ft} \times 30 \text{ ft} = 1500$ sq. ft.

The area of the fountain = $\pi r^2 = \pi(6^2) = 36\pi = 113$ sq. ft.

So the area of the garden outside the fountain = $1500 - 113 = 1387$ sq. ft.

16. A cylindrical popcorn tin has a diameter of 12 in. and a height of 15 in. What is the volume of popcorn it can hold?

- A. 6786 in³
- B. 1696 in³
- C. 113 in³
- D. 3123 in³

Answer: B. 1696 in³

The volume of a cylinder = $\pi \times (\text{radius})^2 \times \text{height}$. The radius of the popcorn tin is $12/2 = 6$ in. The height of the tin = 15 in. So its volume = $\pi \times (6)^2 \times 15 = 1696$ in³.

General Science

1. Which of the following is an example of a chemical change?

- A. A ball breaks a glass window
- B. Aluminum cans are crushed for recycling
- C. A pond freezes over in winter
- D. Logs burn in a fireplace

Answer: D. Logs burn in a fireplace

When logs burn, the wood changes into ashes and gases are released along with light and heat energy. The other choices are all physical changes since broken glass is still glass and crushed aluminum is not transformed into anything else. The molecules of ice are the same as the molecules of water.

2. The periodic table is arranged in rows that are called:

- A. Groups
- B. Periods
- C. Families
- D. Categories

Answer: B. Periods

The periodic table of elements is an arrangement of the elements in rows and columns so that it is easy to locate elements with similar properties. The rows are known as periods.

3. The atomic number of Hydrogen is:

- A. 1
- B. 2
- C. 3
- D. 4

Answer: A. 1

A Hydrogen atom has 1 proton in its nucleus. So its atomic number is 1 and it is the first element in the periodic table.

4. **An object that is going round and round in a circle at a constant speed has:**

- A. A constant acceleration
- B. Zero acceleration
- C. A constant velocity
- D. Zero velocity

Answer: A. A constant acceleration

Even though the speed of the object is constant, its velocity is not constant since the object changes direction. So the object has a non-zero constant acceleration.

5. **A climber is standing at the summit of a mountain. He now has:**

- A. More kinetic energy than he did at the bottom of the mountain
- B. Less kinetic energy than he did at the bottom of the mountain
- C. More potential energy than he did at the bottom of the mountain
- D. Less potential energy than he did at the bottom of the mountain

Answer: C. More potential energy than he did at the bottom of the mountain

As an object moves higher and higher it gains more gravitational potential energy. Since the climber is standing still, his kinetic energy is zero, the same as it would be if he were standing still at the bottom of the mountain.

6. **Which of the following is a good conductor of heat?**

- A. Iron rod
- B. Wooden stake
- C. Cotton cloth
- D. Writing paper

Answer: A. Iron rod

Metals are, in general, good conductors of heat. Wood, cotton, and paper are poor heat conductors.

7. The asteroid belt in the solar system is found:

- A. Between Mercury and Venus
- B. Between Jupiter and Saturn
- C. Between Mars and Jupiter
- D. Outside the orbits of all the planets

Answer: C. Between Mars and Jupiter

The asteroid belt that consists of thousands of asteroids or rocky fragments is found in the area of the solar system between the small solid inner planets and the large gaseous outer planets, i.e., between the orbits of Mars and Jupiter.

8. The big bang theory is a theory about:

- A. The origin of the universe
- B. The formation of the solar system
- C. The origin of the earth
- D. The origin of the milky way galaxy

Answer: A. The origin of the universe

The big bang theory is a theory of the origin of the universe according to which the universe originated from a massive explosion about 15 billion years ago.

9. The shape of the Milky Way galaxy is:

- A. Irregular
- B. Elliptical
- C. Circular
- D. Spiral

Answer: D. Spiral

Galaxies are classified as irregular, elliptical, and spiral. The Milky Way galaxy that includes our solar system is spiral in shape.

10. What is the outermost layer of the earth?

- A. Mantle
- B. Crust
- C. Outer core
- D. Plate

Answer: B. Crust

The crust of the Earth is the outermost layer and is between 5 and 70 km thick.

11. Rocks formed by the cooling of magma are known as:

- A. Sedimentary rocks
- B. Metamorphic rocks
- C. Igneous rocks
- D. Crystallized rocks

Answer: C. Igneous rocks

Igneous rocks are formed when magma (molten rock inside the earth) or lava from a volcanic explosion cools down and is solidified.

12. A thunderstorm is about to begin. The kind of clouds you see in the sky are most likely:

- A. Cirrus
- B. Cumulus
- C. Nimbus
- D. Stratus

Answer: C. Nimbus

Nimbus clouds are heavy, dark, water-laden clouds.

13. Atmospheric pressure is measured using a:

- A. Anemometer
- B. Ammeter
- C. Altimeter
- D. Barometer

Answer: D. Barometer

A barometer is an instrument used to measure atmospheric pressure. In the past barometers mostly used columns of mercury. Many kinds of digital barometers are now available.

14. The following is found in an animal cell but not a plant cell:

- A. Nucleus
- B. Chloroplast
- C. Cytoplasm
- D. Lysosome

Answer: D. Lysosome

Lysosomes are organelles found in animal cells. They contain enzymes used to break down food and other materials.

15. Urine is formed in the:

- A. Liver
- B. Kidney
- C. Stomach
- D. Pancreas

Answer: B. Kidney

The kidneys filter urea from the blood and form urine with water and other waste substances.

16. Animals that eat both plants and other animals are called:

- A. Omnivores
- B. Carnivores
- C. Herbivores
- D. Predators

Answer: A. Omnivores

Animals that eat both plants and other animals are called omnivores. Carnivores eat only meat while herbivores eat only plants.

Mechanical Comprehension

1. The actual mechanical advantage of a system is:

- A. Always larger than the ideal mechanical advantage
- B. Always smaller than the ideal mechanical advantage
- C. Always equal to the ideal mechanical advantage
- D. Sometimes larger than the ideal mechanical advantage

Answer: B. Always smaller than the ideal mechanical advantage

Ideal mechanical advantage (IMA) is the mechanical advantage of a system assuming there is no energy loss to friction or any other dissipative force. In the real world there is always friction, air resistance or some other force that steals part of the energy. So the actual mechanical advantage (AMA) is typically smaller than the IMA.

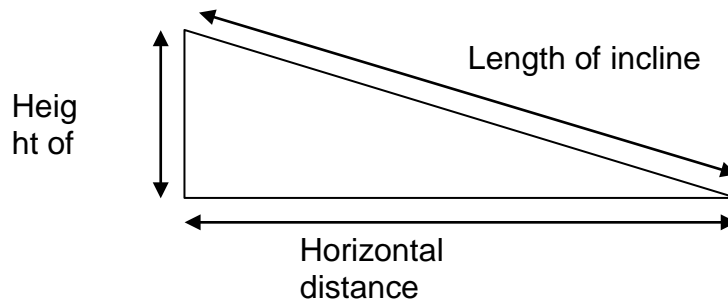
2. A garden hoe is a compound machine made up of a:

- A. Lever and screw
- B. Lever and wedge
- C. Wedge and pulley
- D. Inclined plane and pulley

Answer: B. Lever and wedge

The handle of the garden hoe is a lever while the blade is a wedge.

3. The mechanical advantage of the inclined plane shown below is:



- A. $\frac{\text{Length of incline}}{\text{Height of incline}}$
- B. $\frac{\text{Length of incline}}{\text{Horizontal distance}}$
- C. $\frac{\text{Horizontal distance}}{\text{Height of incline}}$
- D. $\frac{\text{Height of incline}}{\text{Horizontal distance}}$

Answer: A. $\frac{\text{Length of incline}}{\text{Height of incline}}$

The inclined plane affords an advantage by letting a load be lifted along the slope of the incline instead of directly upward. The longer the incline, the gentler the slope and the higher the mechanical advantage.

4. What class of lever is a broom?

- A. First class
- B. Second class
- C. Third class
- D. Not a lever

Answer: C. Third class

The broom turns about one end, while the load (the dirt) is at the other end. The effort is applied in the middle.

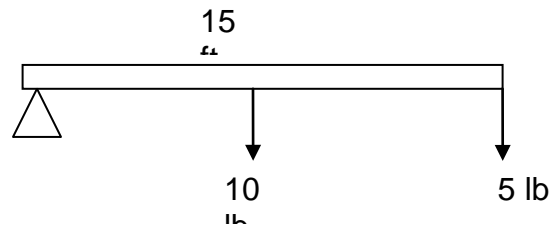
5. A bevel gear is different from a spur gear because:

- A. It has teeth
- B. It can drive other gears
- C. It can be meshed at different angles
- D. It can rotate

Answer: C. It can be meshed at different angles

Bevel gears have teeth that are cut on the slant of a cone and they are typically meshed at a right angle to each other. They can also be meshed at other angles. The direction of rotation is therefore changed when a bevel gear is used.

6. For the third class lever shown below, an effort of 10 lbs is exerted to lift a load of 5 lbs which is applied 15 ft from the fulcrum. How far from the fulcrum is the effort applied?



- A. 5 ft
- B. 10 ft
- C. 6.5 ft
- D. 7.5 ft

Answer: D. 7.5 ft

Ideal mechanical advantage of a lever = $\frac{\text{Load}}{\text{Effort}}$ =

$\frac{\text{Length of effort arm (distance from fulcrum to effort point)}}{\text{Length of load arm (distance from fulcrum to load point)}}$

So length of the effort arm = $\frac{\text{Load}}{\text{Effort}} \times \text{length of the load arm} = (5/10) \times 15 \text{ ft} = 7.5 \text{ ft}$.

7. **A force of 5N is applied to the hinge of a door. What is the torque on the door?**

- A. 0 Nm
- B. 5 Nm
- C. 10 Nm
- D. 15 Nm

Answer: A. 0 Nm

Torque = Force \times Distance of force from pivot point. Since the force is applied at the hinge which is the pivot point, its distance from the pivot point is zero. So the torque is zero.

8. **A force of 100N is used to push a crate 40m across a warehouse floor. How much work is done?**

- A. 400 Joules
- B. 4000 Joules
- C. 140 Joules
- D. 100 Joules

Answer: B. 4000 Joules

Work done on an object = Force applied on object \times distance through which force is applied. In this case, work done = 100 N \times 40 m = 4000 Joules.

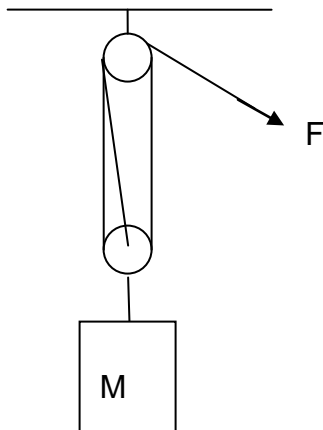
9. **If the crate in the previous problem is moved in 10 seconds, what is the power used?**

- A. 400 Watts
- B. 4000 Watts
- C. 40,000 Watts
- D. 400,000 Watts

Answer: A. 400 Watts

Power is the rate of doing work. Power = $\frac{\text{Work}}{\text{Time}}$ = 4000 Joules/ 10 seconds = 400 Watts.

10. The mechanical advantage of the block and tackle system shown below is:



- A. 1
- B. 2
- C. 3
- D. 4

Answer: C. 3

The mechanical advantage of a block and tackle system is equal to the number of ropes holding up the moveable block. Here there are three ropes holding up the moveable block, so the mechanical advantage of the system shown is 3.

11. The mechanical advantage of a wheel and axle system is 3. The radius of the wheel is:

- A. 3 times the radius of the axle
- B. $\frac{1}{3}$ the radius of the axle
- C. 9 times the radius of the axle
- D. Equal to the radius of the axle

Answer: A. 3 times the radius of the axle

The mechanical advantage of a wheel and axle = $\frac{\text{Radius of wheel}}{\text{Radius of axle}}$. So the radius of the wheel is 3 times the radius of the axle.

12. Which simple machine is essentially an inclined plane wrapped around a cylinder?

- A. Lever
- B. Screw
- C. Wheel and axle
- D. Wedge

Answer: B. Screw

Notice that the thread of the screw is at an angle to the direction in which the screw moves. So it is essentially an inclined plane.

13. In a gear train, the gears in between the first and the last one are called

- A. Drivers
- B. Driven gears
- C. Spurs
- D. Idlers

Answer: D. Idlers

In a gear train, the first gear to which force is applied is called the driver. The last gear in the train is called the driven gear. The ones in between are called idlers.

14. An anti-reversal valve:

- A. Closes or opens the path of a fluid
- B. Allows fluid to flow in one direction only
- C. Allows fluid to flow in two directions
- D. Controls the amount of fluid flow by widening or narrowing the pathway

Answer: B. Allows fluid to flow in one direction only

An anti-reversal valve allows fluid to flow in one direction only. This is useful in devices such as vacuum pumps where you want the air to come out but not go back in again.

15. A piece of cork has density less than water. It will:

- A. Sink in water
- B. Float fully submerged in water
- C. Float partly submerged in water
- D. Disintegrate in water

Answer: C. Float partly submerged in water

According to Archimedes' principle, the buoyant force on a body immersed in a fluid is equal to the weight of the fluid displaced by the object. Since the cork is lighter than water, the volume of water that must be displaced to supply the buoyant force on the cork is less than the volume of the cork. So the cork will only be partially submerged.

16. A hydraulic jack is based on:

- A. Pascal's principle
- B. Archimedes' principle
- C. Bernoulli's principle
- D. Boyle's Law

Answer: A. Pascal's principle

According to Pascal's principle, when pressure is applied to a confined fluid it is transmitted undiminished in all directions. This is used to magnify force in a hydraulic jack. A pressure is applied to a narrow cylinder to lift a load placed on a wide cylinder. Since the pressure is transmitted unchanged, and $\text{force} = \text{pressure} \times \text{area}$, the force on the wide cylinder is larger than the force applied to the narrow cylinder.

Electronics Information

1. **A circuit segment contains only two resistors of equal value, connected in parallel. If the total resistance of the circuit segment is 100 Ohms, what is the value of each resistor?**

- A. 50 Ohms
- B. 100 Ohms
- C. 200 Ohms
- D. 400 Ohms

Answer: C. 200 Ohms

The total value of two resistors connected in parallel can be calculated using the formula

$$1/R = 1/R1 + 1/R2$$

Since the two resistors have the same value, R must be 200 Ohms.

2. **A tank circuit is a type of:**

- A. Resonator
- B. Oscillator
- C. Rectifier
- D. Modulator

Answer: B. Oscillator

A tank circuit causes an electrical current to pass back and forth between a capacitor and an inductor, creating an AC current. A circuit that creates a stable, uniform AC current is called an oscillator.

3. **An LED is a type of:**

- A. Diode
- B. Resistor
- C. Capacitor
- D. Inductor

Answer: A. Diode

LED is an abbreviation for Light Emitting Diode. An LED passes current in only one direction and converts electrical energy to light.

4. A 9-volt battery contains:

- A. Nine 1-volt cells
- B. Six 1.5-volt cells
- C. Three 3-volt cells
- D. One 9-volt cell

Answer: B. Six 1.5-volt cells

A standard alkaline battery cell is 1.5 volt. A 9-volt battery is comprised of six 1.5-volt cells.

5. Which type of battery is best suited for rechargeable digital devices?

- A. Lithium-ion
- B. Nickel-cadmium
- C. Lead-acid
- D. Alkaline

Answer: A. Lithium-ion

Lithium-ion is best suited for digital devices because it can sustain quick voltage drops.

6. Which type of capacitor is best suited for high voltage applications?

- A. Mylar
- B. Mica
- C. Tantalum
- D. Electrolytic

Answer: D. Electrolytic

Dielectric plates in electrolytic capacitors are capable of storing very large electrical charges.

7. Turbines are used to convert:

- A. Radiant energy to electrical energy
- B. Electrical energy to radiant energy
- C. Mechanical energy to electrical energy
- D. Electrical energy to mechanical energy

Answer: C. Mechanical energy to electrical energy

Turbines are used to generate electrical energy from a mechanical energy source, such as a waterfall.

8. The basic unit of electrical charge is the:

- A. Coulomb
- B. Volt
- C. Ampere
- D. Watt

Answer: A. Coulomb

A Coulomb is the basic unit of electrical charge equal to approximately 6.2×10^{18} electrons.

9. In an AC circuit, capacitors behave like:

- A. Frequency-dependent voltage sources
- B. Frequency-dependent resistors
- C. Frequency-independent voltage sources
- D. Frequency-independent resistors

Answer: B. Frequency-dependent resistors

In an AC circuit, capacitive reactance goes down as frequency goes up and capacitive reactance goes up as frequency goes down.

10. In which band of the electromagnetic spectrum is 600 MHz?

- A. ULF
- B. VLF
- C. VHF
- D. UHF

Answer: D. UHF

Ultra High Frequency (UHF) band ranges from 300 MHz to 3 GHz.

11. What type of mechanical switch will connect exactly one circuit to one of two positions?

- A. SPST
- B. SPDT
- C. DPST
- D. DPDT

Answer: B. SPDT

SPDT is an acronym for single-pole, double-throw, also known as a two-way switch.

12. What is the frequency of the AC voltage delivered to a typical household outlet?

- A. 60 Hz
- B. 120 Hz
- C. 180 Hz
- D. 240 Hz

Answer: A. 60 Hz

The frequency required by a typical household appliance, such as a toaster or vacuum cleaner, is 60 Hz.

13. In an AC circuit, the term Z refers to:

- A. Resistance
- B. Reactance
- C. Impedance
- D. Inductance

Answer: C. Impedance

Impedance (Z) is comprised of resistance and reactance in an AC circuit.

14. Microwaves are a type of:

- A. Conductor
- B. Insulator
- C. Conservation
- D. Radiation

Answer: D. Radiation

Microwaves are a type of electromagnetic radiation.

15. Which is the best electrical conductor?

- A. Gold
- B. Silver
- C. Copper
- D. Iron

Answer: B. Silver

Silver is the most conductive metal, but only slightly more so than copper which is far less expensive.

16. How many diodes are required to make a full-wave rectifier?

- A. 1
- B. 2
- C. 4
- D. 8

Answer: C. 4

A full-wave rectifier requires four diodes, two for positive and two for negative.

Shop Information

1. **What type of sledges are used to drive fence posts into the earth?**

- A. Drive sledges
- B. Post sledges
- C. Fence sledges
- D. Spike sledges

Answer: B. Post sledges

Post sledges are sledges used to drive fence posts into the earth.

2. **A claw hammer is used primarily for working with:**

- A. Metal
- B. Concrete
- C. Tile
- D. Wood

Answer: D. Wood

Claw hammers are used for pounding nails into and removing nails from wood.

3. **How is the Frearson screw head an improvement over the Phillips screw head?**

- A. It is designed to cam the screwdriver out of the screw when the screw stalls.
- B. It allows one tip to fit a variety of screw sizes.
- C. It is designed to be used with both wood and metal screws.
- D. It is designed to be used with socket wrenches.

Answer: B. It allows one tip to fit a variety of screw sizes.

The Frearson screw head improves upon the Phillips by allowing one tip to fit a variety of screw sizes.

4. Which tool is millions of years old?

- A. Screwdriver
- B. Level
- C. Wrench
- D. Hammer

Answer: D. Hammer

The hammer is probably the oldest tool used by humans, and archaeological samples have been found that are millions of years old. Modified hammers have been used as tools of war for at least thousands of years.

5. A manual screwdriver that allows the user to turn the screwdriver in both directions without removing the tip from the screw is called a:

- A. Hex nut driver
- B. Frearson screwdriver
- C. Ratcheting screwdriver
- D. Slotted screwdriver

Answer: C. Ratcheting screwdriver

A ratcheting screwdriver is a manual screwdriver that allows the user to turn the screwdriver in both directions without removing the tip from the screw.

6. Which of the following tools contains a chisel?

- A. Crowbar
- B. Hammer
- C. Wrench
- D. Caliper

Answer: A. Crowbar

Common crowbars feature a chisel end.

7. **A wrench that features an enclosed circle that encloses a nut or bolt on all sides is called:**

- A. A pipe wrench
- B. An adjustable-end wrench
- C. A box-end wrench
- D. An open-end wrench

Answer: C. A box-end wrench

The most common type of wrench is a box-end wrench, which features a fully enclosed circle that encloses a nut or bolt on all sides.

8. **Carol measures the length of a pipe with a tape measure. The length is 57". What is this length in feet and inches?**

- A. 5 feet 7 inches
- B. 4 feet 75 inches
- C. 4 feet 9 inches
- D. 4 feet 7 inches

Answer: C. 4 feet 9 inches

There are 12 inches in 1 foot., so begin by dividing 57 by 12 to convert from inches to feet.

9. **Which type of saw is *not* mechanically powered?**

- A. Jigsaw
- B. Table saw
- C. Hacksaw
- D. Circular saw

Answer: C. Hacksaw

A hacksaw is a hand tool that uses a fine-toothed blade to cut metal and other hard materials.

10. Which device is used to measure length?

- A. Multimeter
- B. Caliper
- C. Tachometer
- D. Barometer

Answer: C. Caliper

A caliper is a measuring device that measures length, traditionally by using two arms and a mechanical adjustment that drives an indicator along a measuring scale.

11. Sean bought sand paper with a grit size of 1,000. What type of sandpaper did he buy?

- A. Micro
- B. Fine
- C. Medium
- D. Coarse

Answer: A. Micro

Micro grit sizes run from 240 to 1,000. These types of grits will result in polishing of wood or other finished surfaces.

Auto Information

1. The part that connects the engine block to the exhaust is the:

- A. Exhaust manifold
- B. Intake manifold
- C. Flex pipe
- D. Muffler

Answer: A. Exhaust manifold

The exhaust manifold takes the exhaust gasses from the individual cylinders and feeds them all to a single exhaust pipe.

2. The constant velocity joint is part of what system?

- A. The drive train
- B. The cooling system
- C. The emission system
- D. The suspension system

Answer: A. The drive train

The constant velocity joint connects the drive axle with the wheel.

3. Which system has the catalytic converter as one of its parts?

- A. The cooling system
- B. The electrical system
- C. The exhaust system
- D. The drive train

Answer: C. The exhaust system

The catalytic converter helps to remove pollutants from the car's exhaust.

4. With disk brakes, which parts do the actual braking?

- A. The pedal and master cylinder
- B. The caliper and flex line
- C. The shoes and drum
- D. The disk and pads

Answer: D. The disk and pads

With a disk brake system, the pads have a friction material which rubs against the disk to produce friction and stop the vehicle.

5. Valve seals do which of these?

- A. Reduce wear and tear on the engine valves
- B. Restrict the speed of the exhaust, reducing engine noise
- C. Prevent oil from leaking into the combustion chamber
- D. Seal the cooling system

Answer: C. Prevent oil from leaking into the combustion chamber

Moving parts like valves in an engine need to be lubricated. The lubricating oil is kept out of the combustion chamber with valve seals, piston rings and gaskets.

6. What is a “torque spec” in reference to nuts and bolts?

- A. How much torque a nut and bolt will take before breaking
- B. The correct amount of pressure to apply when tightening a nut
- C. The point at which a bolt will break if you over tighten it
- D. The point at which the threads will strip if you over tighten

Answer: B. The correct amount of pressure to apply when tightening a nut

Some threaded fasteners need to be tightened to a specific tension so they won't break or loosen.

7. The timing chain is part of the:

- A. Engine
- B. Transmission
- C. Exhaust system
- D. Speedometer

Answer: A. Engine

The timing chain maintains the timing of the pistons and valves so they don't impact.

8. The cotter pin does what?

- A. Attaches fabric and cushion to seat frames
- B. Is used to check small tolerances when assembling an engine
- C. Secures a nut or castle nut
- D. Secures a cylindrical shaft and sleeve

Answer: C. Secures a nut or castle nut

A cotter pin is placed through a hole in a nut or threaded rod and stops a nut from turning. Castle nuts are shaped like the top of a castle wall (a battlement), and the cotter pin passes through the slots.

9. When measuring tolerances, 0.030" is equal to:

- A. Three thousandths of an inch
- B. Thirty thousandths of a millimeter
- C. Three hundredths of a millimeter
- D. Thirty thousandths of an inch

Answer: D. Thirty thousandths of an inch

Some engine and transmission measurements are very small. They are typically measured in hundredths or thousandths of an inch.

10. What system contains the master cylinder?

- A. The braking system
- B. The cooling system
- C. The drive train
- D. The electrical system

Answer: A. The braking system

The master cylinder produces the hydraulic pressure which is sent to the calipers and brake cylinders

11. How many connecting rods does a four cylinder engine have?

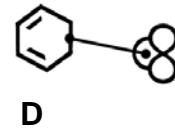
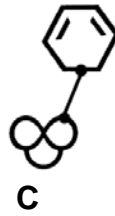
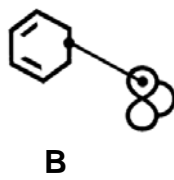
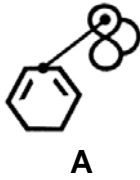
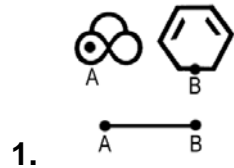
- A. Four
- B. Eight
- C. Twelve
- D. Sixteen

Answer: A. Four

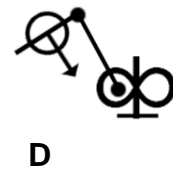
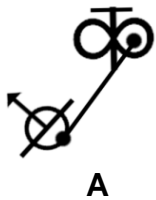
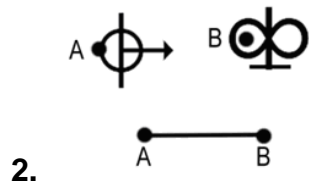
The connecting rod connects the piston to the crank shaft, so there is one for each cylinder

Assembling Objects

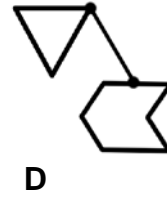
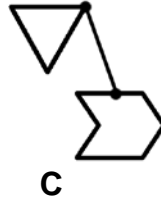
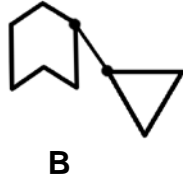
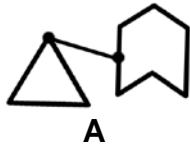
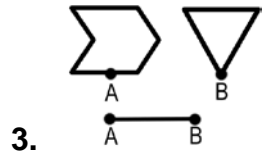
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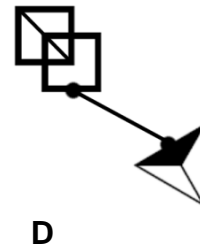
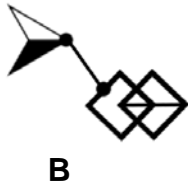
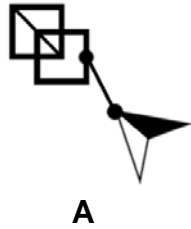
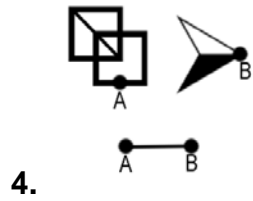
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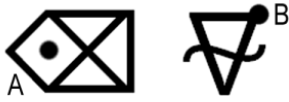
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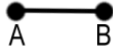
Answer: D



Answer: B



5.



A



B

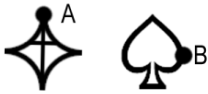


C

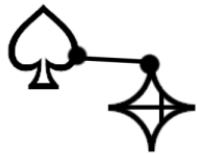


D

Answer: B



6.



A



B



C

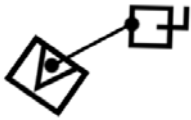


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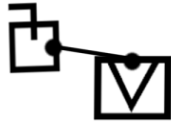
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7.



A



B



C

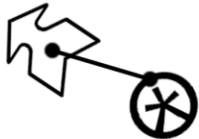
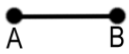


D

Answer: D



8.



A



B



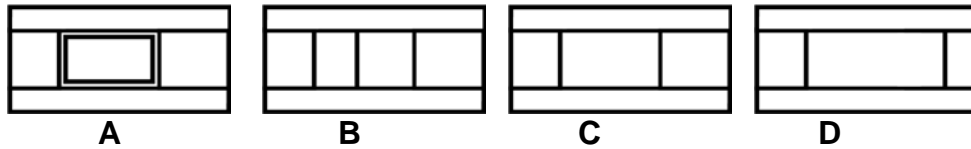
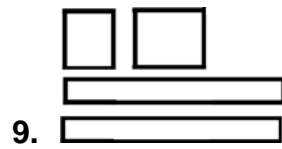
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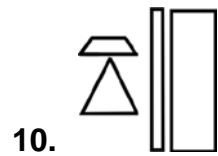
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Answer: D

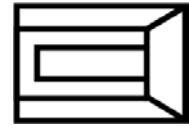
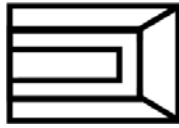
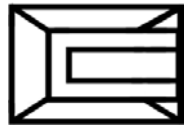
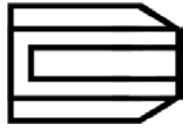
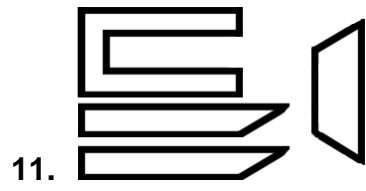
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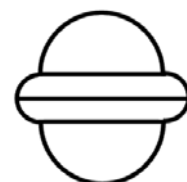
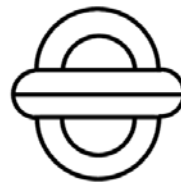
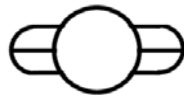
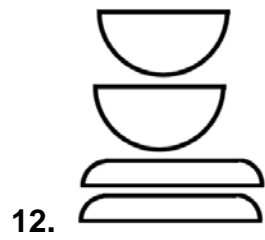
Answer: C



Answer: A

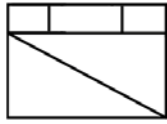
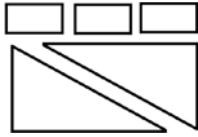


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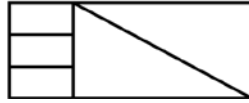


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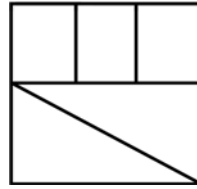
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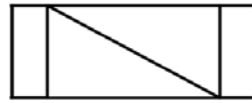
A



B



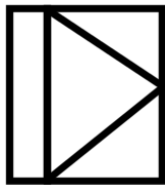
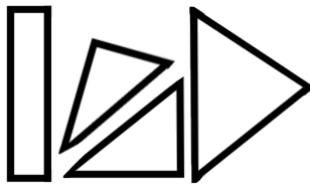
C



D

Answer: B

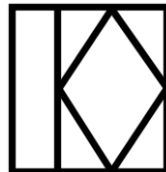
14.



A



B

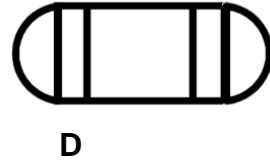
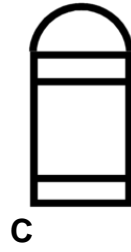
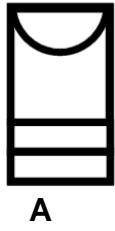
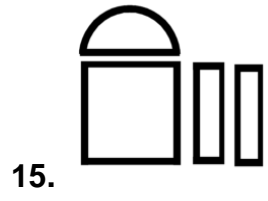


C

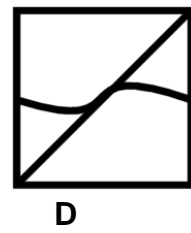
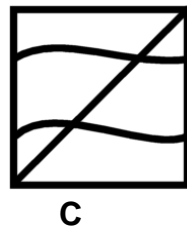
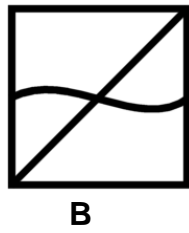
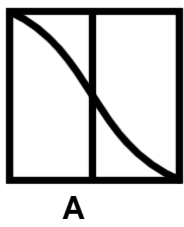
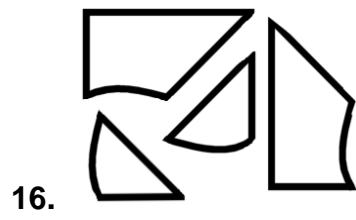


D

Answer: A



Answer: C



Answer: B