JROTC Virtual Learning

LET 3 & 4/ ASVAB Practice Test 3

April 21, 2020

Lesson: April 21, 2020

Objective/Learning Target:

Students take the practice ASVAB pretests Electronics Information, Auto & Shop Information, Mechanical Comprehension and Assembling Objects in order to evaluate test results to better understand the test and the areas for more intense future should study.

ASVAB Practice Test

- Today you will take the sixth through the ninth subtests of the ASVAB (Electronics Information, Auto & Shop Information, Mechanical Comprehension and Assembling Objects)

- During the previous lessons we have learned how important practicing the ASVAB is for improving your score.

- You can print the answer sheets in this lesson or you can number your paper and write the answer letter next to the number.

- Check the time allowed in the instructions then keep track of your time. This is good practice for the actual test because time management is important for getting the most correct answers as possible.

- After you finish the four tests check your answers with those provided at the end of this lesson. Study each answer to better understand why it is correct.

PART 6: ELECTRONICS INFORMATION

Time: 9 Minutes—20 Questions

Directions: This is a test of your knowledge of electrical, radio, and electronics information. There are 20 questions. You are to select the correct response from the choices given. Then mark the space on your answer sheet that has the same number and letter as your choice.

Now look at the two sample questions below.

1. What does the abbreviation AC stand for? Ⓐ Ⓑ Ⓒ Ⓓ
   A. Additional charge
   B. Alternating coil
   C. Alternating current
   D. Ampere current

   The correct answer is alternating current, so choice C is the correct response.

2. Which of the following has the LEAST resistance? Ⓐ Ⓑ Ⓒ Ⓓ
   A. Wood
   B. Silver
   C. Rubber
   D. Iron

   The correct answer is silver, so choice B is the correct response.

Your score on this test will be based on the number of questions you answer correctly. You should try to answer every question. Do not spend too much time on any one question.

When you are told to begin, be sure to start with question number 1 in Part 6 in your test booklet and number 1 in Part 6 on your answer sheet.

1. The core of an electromagnet is usually
   A. aluminum.
   B. brass.
   C. lead.
   D. iron.

2. An electrician should consider all electrical equipment "live" unless he or she definitely knows otherwise. The main reason for this practice is to avoid
   A. doing unnecessary work.
   B. energizing the wrong circuit.
   C. personal injury.
   D. de-energizing a live circuit.

3. If *voltage* is represented by V, current by I, and *resistance* by R, then the one of the following that correctly states Ohm's Law is
   A. $R = V \times I$
   B. $R = \frac{I}{V}$
   C. $V = IR$
   D. $V = \frac{I}{R}$

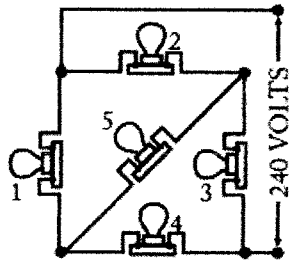
4. The device used to change AC to DC is a
   A. frequency changer.
   B. transformer.
   C. regulator.
   D. rectifier.

5. A "centi" measures a(n)
   A. eighth.
   B. millionth.
   C. hundredth.
   D. ten-thousandth.

6. The device that is often used to change the voltage in alternating current circuits is the
   A. contactor.
   B. converter.
   C. rectifier.
   D. transformer.

7. What does LED stand for?
   A. Light Emitting Display
   B. Low Energy Display
   C. Light Emitting Diode
   D. Light Emitting Detector

8. To determine directly whether finished wire installations possess resistance between conductors and ground, use
   A. clamps.
   B. set screws.
   C. shields.
   D. a megger.



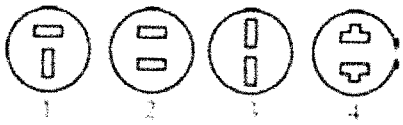
9. The five lamps shown above are each rated at 120 volts, 60 watts. If all are good lamps, lamp 5 will be
   A. much brighter than normal.
   B. about its normal brightness.
   C. much dimmer than normal.
   D. completely dark.

10. Microfarads are units of measurement usually associated with
    A. sockets.
    B. switches.
    C. capacitors.
    D. connectors.

11. What are the three leads of a common transistor?
    A. Collector, Base, Emitter
    B. Base, Collector, Case
    C. Emitter, Collector, Bias
    D. Collector, Bias, Omiter

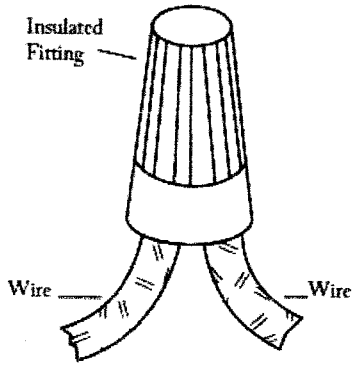
12. Is it proper procedure to ground the frame of a portable motor?
    A. No.
    B. No, if it is AC.
    C. Yes, unless the tool is specifically designed for use without a ground.
    D. Yes, if the operation takes place only at less than 150 volts.

13. In comparing Nos. 00, 8, 12, and 6 A.W.G. wires, the smallest of the group is
    A. No. 00
    B. No. 8
    C. No. 12
    D. No. 6



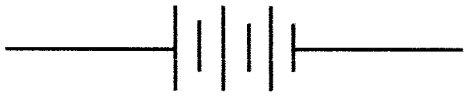
14. The convenience outlet above that is known as a *polarized* outlet is number
    A. 1
    B. 2
    C. 3
    D. 4

15. In a house bell circuit, the push button for ringing the bell is generally connected in the secondary of the transformer feeding the bell. One reason for doing this is to
    A. save power.
    B. keep line voltage out of the push button circuit.
    C. prevent the bell from burning out.
    D. prevent arcing of the vibrator contact points in the bell.



16. Wires are often spliced by the use of a fitting like the one shown above. The use of this fitting does away with the need for
    A. skinning.
    B. cleaning.
    C. twisting.
    D. soldering.

17. To control a lamp from two different positions, it is necessary to use
    A. two single-pole switches.
    B. one single-pole switch and one four-way switch.
    C. two three-way switches.
    D. one single-pole switch and two four-way switches.



18. In electronic circuits, the symbol shown above usually represents a
    A. resistor.
    B. battery.
    C. capacitor.
    D. transformer.

19. The sketch above shows a head-on view of a three-pronged plug used with portable electrical power tools. Considering the danger of shock when using such tools, it is evident that the function of the U-shaped prong is to
    A. ensure that the other two prongs enter the outlet with the proper polarity.
    B. provide a half-voltage connection when doing light work.
    C. prevent accidental pulling of the plug from the outlet.
    D. connect the metallic shell of the tool motor to ground.

20. Connecting a lead for the anode to the cathode of a battery will produce
    A. a high resistance circuit.
    B. a short circuit.
    C. a low current path.
    D. an open circuit.

STOP!
IF YOU FINISH BEFORE THE TIME IS UP,
YOU MAY CHECK OVER YOUR WORK ON THIS PART ONLY.

PART 7: AUTO & SHOP INFORMATION

Time: 11 Minutes—25 Questions

Directions: This test has 25 questions about automobiles, shop practices, and the use of tools. Pick the best answer for each question, then blacken the space on your answer sheet that has the same number and letter as your choice.

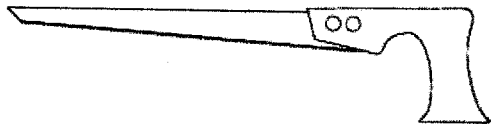
Here are four sample questions.

1. The most commonly used fuel for running automobile engines is
   A. kerosene. Ⓐ Ⓑ Ⓒ Ⓓ
   B. benzene.
   C. crude oil.
   D. gasoline.

   Gasoline is the most commonly used fuel, so choice D is the correct answer.

2. A car uses too much oil when which parts are worn?
   A. Pistons Ⓐ Ⓑ Ⓒ Ⓓ
   B. Piston rings
   C. Main bearings
   D. Connecting rods

   Worn piston rings cause the use of too much oil, so choice B is the correct answer.



3. The saw shown above is used mainly to cut Ⓐ Ⓑ Ⓒ Ⓓ
   A. plywood.
   B. odd-shaped holes in wood.
   C. along the grain of the wood.
   D. across the grain of the wood.

   The compass saw is used to cut odd-shaped holes in wood, so choice B is the correct answer.

4. Thin sheet metal should be cut with
   A. ordinary scissors. Ⓐ Ⓑ Ⓒ Ⓓ
   B. a hacksaw.
   C. tin shears.
   D. a jigsaw.

   Tin shears are used to cut thin sheet metal, so choice C is the correct answer.

Your score on this test will be based on the number of questions you answer correctly. You should try to answer every question. Do not spend too much time on any one question.

When you are told to begin, be sure to start with question number 1 in Part 7 in your test booklet and number 1 in Part 7 on your answer sheet.

1. Most automobile engines run according to the
   A. rotary cycle.
   B. intake-exhaust cycle.
   C. four-stroke cycle.
   D. two-stroke cycle.

2. When referring to engine configuration, an automobile with a V6 engine means
   A. the engine is connected to a 6-speed transmission.
   B. the engine has 6 valves.
   C. the engine operates on 6 volts.
   D. the engine has 6 cylinders arranged in a V configuration.

3. A torque wrench measures torque in
   A. centimeters.
   B. foot-pounds.
   C. pounds-per-square-inch.
   D. millimeters.

4. A governor is used on an automobile primarily to limit its
   A. rate of acceleration.
   B. maximum speed.
   C. fuel consumption.
   D. stopping distance.

5. Automobile headlights are ordinarily connected in
   A. parallel.
   B. series.
   C. diagonal.
   D. perpendicular.

6. The most commonly used engine in an automobile is called a(an)
   A. external-combustion engine.
   B. diesel engine.
   C. two-cycle engine.
   D. internal combustion engine.

7. A mechanic sets the proper electrode gap on a spark plug most accurately if he or she uses a
   A. dial gauge.
   B. round wire feeler gauge.
   C. square wire feeler gauge.
   D. conventional flat feeler gauge.

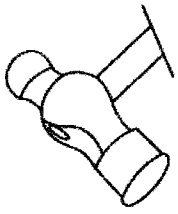
8. When reference is made to the "compression ratio" of an automotive gasoline engine, this is best described as the
   A. volume above the piston at top dead center.
   B. displacement volume as the piston moves down to bottom dead center.
   C. total volume of a cylinder divided by its clearance volume.
   D. displacement volume of a cylinder divided by its clearance volume.

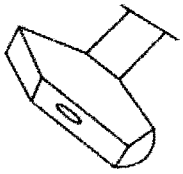
9. Reverse flushing of a clogged gasoline engine block and radiator cooling system is done properly by
   A. not removing the thermostat from the engine block.
   B. connecting the flushing gun at the bottom of the engine block.
   C. using air and water.
   D. using low-pressure steam.

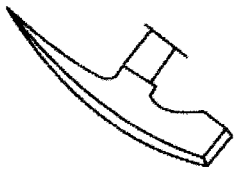
10. Ethylene glycol is put into the radiator of an automobile in cold weather because it
    A. lowers the boiling point of the mixture.
    B. lowers the freezing point of the mixture.
    C. raises the boiling point of the mixture.
    D. raises the freezing point of the mixture.

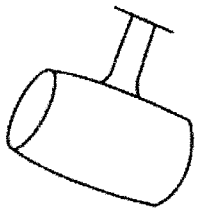
11. If the "alternator," or charging system light comes on while the car is in normal operation, it is best to
    A. stop the car immediately and have it towed in for repairs.
    B. stop immediately and have a new battery installed.
    C. drive as usual and wait to see if the light goes out.
    D. drive to the nearest auto repair shop to have the problem checked out.

12. The tool that is best suited for use with a wood chisel is

A. 

B. 

C. 

D. 

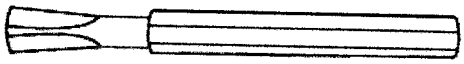
13. An expansion bolt is used to
    A. enlarge a hole.
    B. fasten into hollow tile.
    C. allow for expansion and contraction.
    D. fasten into solid masonry.

14. The length of a 10-penny nail, in inches, is
    A. $2\frac{1}{2}$
    B. 3
    C. $3\frac{1}{2}$
    D. 4

15. Glazier's points are used to
    A. hold glass in a wooden window sash.
    B. scratch glass so that it can be broken to size.
    C. force putty into narrow spaces between glass and sash.
    D. remove broken glass from a pane.

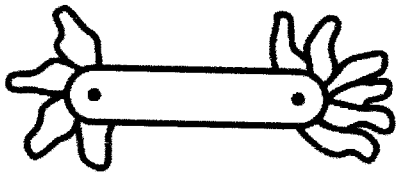
16. The most likely reason for a total loss of oil pressure while driving is
    A. an oil level that is too high.
    B. the use oil whose viscosity is too thick.
    C. an oil level that is too low.
    D. dirty oil.

17. The reason that a lubricant prevents rubbing surfaces from becoming hot is that the oil
    A. is cold and cools off the rubbing metal surfaces.
    B. is sticky, preventing the surfaces from moving over each other too rapidly.
    C. forms a smooth layer between the two surfaces, preventing their coming into contact.
    D. makes the surfaces smooth so that they move easily over each other.



18. The tool above is used to
    A. set nails.
    B. drill holes in concrete.
    C. cut a brick accurately.
    D. centerpunch for holes.

19. Wood ladders should not be painted because
    A. paint will wear off rapidly due to the conditions under which ladders are used.
    B. ladders are slippery when painted.
    C. it is easier to store an unpainted ladder.
    D. paint will hide defects in the ladder.



20. The tool shown above is used to measure
    A. clearances.
    B. wire thickness.
    C. inside slots.
    D. screw pitch.

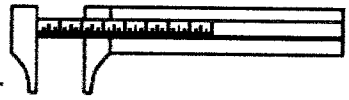
21. A finishing nail is similar in shape to a
    A. tack.
    B. brad.
    C. box nail.
    D. common nail.

22. The term *whipping* when applied to rope means
    A. binding the ends with cord to prevent unraveling.
    B. coiling the rope in as tight a ball as possible.
    C. lubricating the strands with tallow.
    D. wetting the rope with water to cure it.

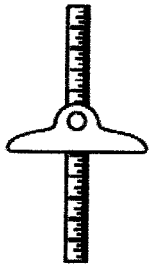
23. The set in the teeth of a hand saw primarily
    A. prevents the saw from binding.
    B. makes the saw cut true.
    C. gives the saw a sharper edge.
    D. removes the sawdust.

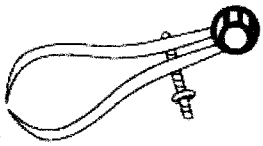
24. Lacquer thinner would most likely be used to
    A. clean oil paint from a brush immediately after use.
    B. rinse a new paint brush before using it.
    C. clean a paint brush on which paint has hardened.
    D. remove paint from the hands.

25. The tool used to measure the depth of a hole is

A. 

B. 

C. 

D. 

STOP!
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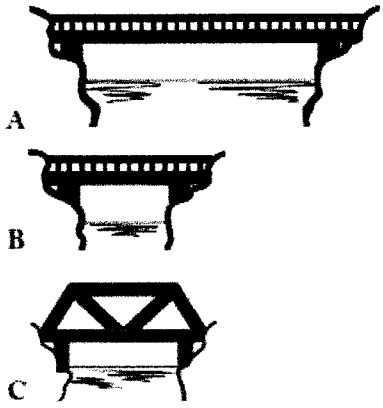
PART 8: MECHANICAL COMPREHENSION

Time: 19 Minutes—25 Questions

Directions: This test has 25 questions about mechanical principles. Most of the questions use drawings to illustrate specific principles. Decide which answer is correct and mark the space on your answer sheet that has the same number and letter as your choice.

Here are two sample questions.

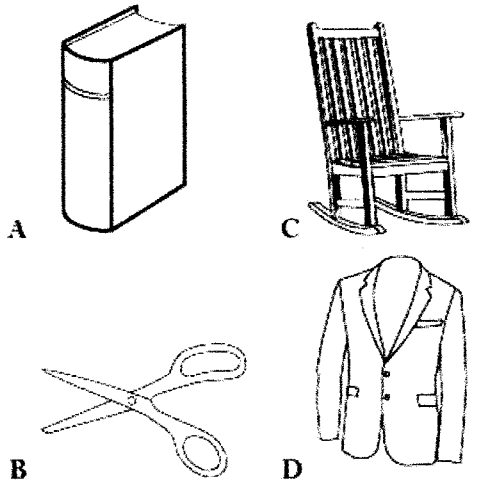
1. Which bridge is the strongest?



A. A Ⓐ Ⓑ Ⓒ Ⓓ
B. B
C. C
D. All are equally strong.

Choice C is correct.

2. If all of the objects below are the same temperature, and your temperature is higher than the item's temperature, which will feel coldest?

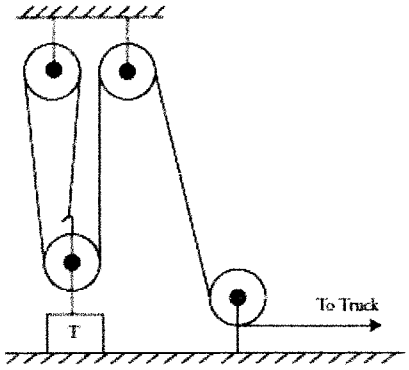


A. A Ⓐ Ⓑ Ⓒ Ⓓ
B. B
C. C
D. D

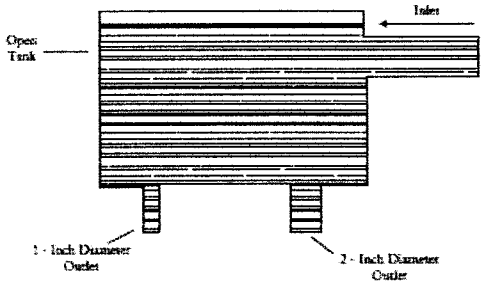
Choice B is correct.

Your score on this test will be based on the number of questions you answer correctly. You should try to answer every question. Do not spend too much time on any one question.

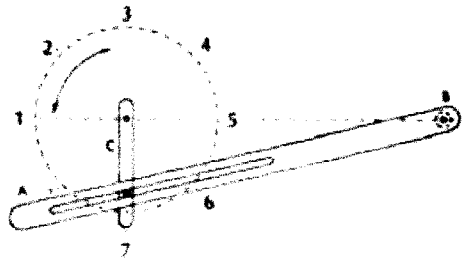
When you are told to begin, be sure to start with question number 1 in Part 8 in your test booklet and number 1 in Part 8 on your answer sheet.



1. The tank, T, is to be raised as shown, in the above figure, by attaching the pull rope to a truck. If the tank is to be raised 10 feet, the truck will have to move
   A. 10 feet.
   B. 30 feet.
   C. 40 feet.
   D. 20 feet.

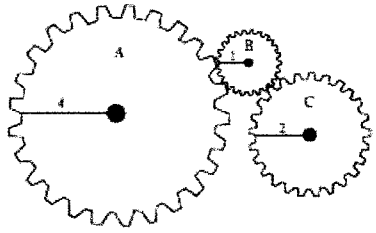


2. Eight gallons of water per minute are flowing at a given time from the 1-inch outlet in the tank shown above. What is the amount of water flowing at that time from the 2-inch outlet?
   A. 64 gallons per minute
   B. 32 gallons per minute
   C. 16 gallons per minute
   D. 2 gallons per minute

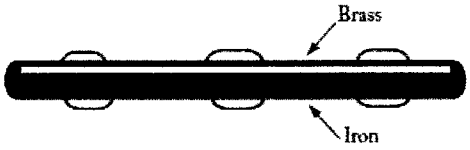


3. In the above illustration, crank arm C revolves at a constant speed of 400 rpm and drives the lever AB. When lever AB is moving the fastest, arm C will be in position
   A. 5.
   B. 6.
   C. 7.
   D. 1.

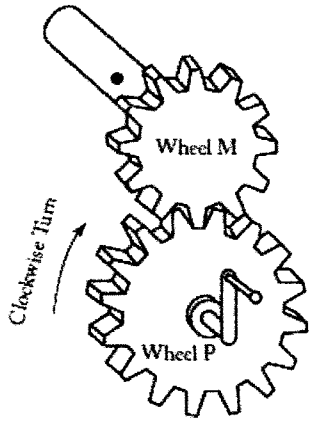
4. Assume that the color of the flame from a gas stove is bright yellow. To correct this, you should
   A. close the air flap.
   B. increase the size of the gas opening.
   C. increase the gas pressure.
   D. open the air flap.



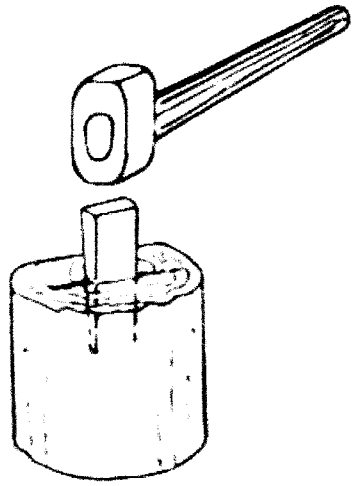
5. In the above illustration, if gear A makes one clockwise revolution per minute, which of the following is correct?
   A. Gear B makes four clockwise revolutions every minute.
   B. Gear C makes one counterclockwise revolution every 8 minutes.
   C. Gear B makes one counterclockwise revolution every 4 minutes.
   D. Gear C makes two clockwise revolutions every minute.



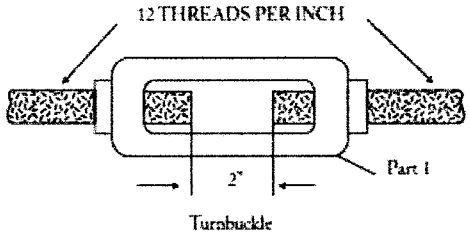
6. The figure above shows a brass and an iron strip continuously riveted together. High temperatures would probably
   A. have no effect at all.
   B. bend the strips.
   C. separate the strips.
   D. shorten the strips.



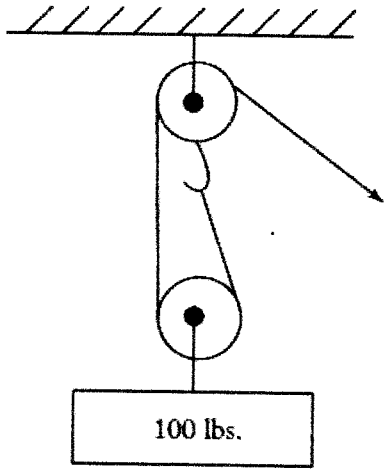
7. Study the gear wheels in the figure above, then determine which of the following statements is true.
   A. If you turn wheel M clockwise by means of the handle, wheel P will also turn clockwise.
   B. It will take the same time for a tooth of wheel P to make a full turn as it will for a tooth of wheel M.
   C. It will take less time for a tooth of wheel P to make a full turn than it will take a tooth of wheel M.
   D. It will take more time for a tooth of wheel P to make a full turn than it will for a tooth of wheel M.



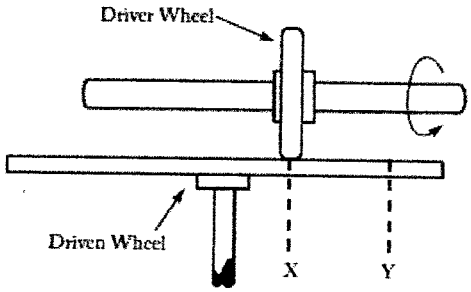
8. The simple machine pictured above is a form of
   A. pulley.
   B. spur gear.
   C. inclined plane.
   D. worm gear.



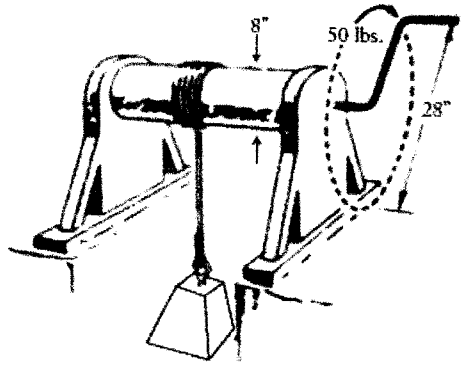
9. For the turnbuckle shown above, the number of complete turns of Part 1 required to make the ends of the threaded rods meet is
   A. 6
   B. 18
   C. 12
   D. 24



10. When the 100-pound weight is being slowly hoisted up by the pulley, as shown in the figure above, the downward pull on the ceiling to which the pulley is attached is
    A. 50 pounds.
    B. 100 pounds.
    C. 150 pounds.
    D. 200 pounds.

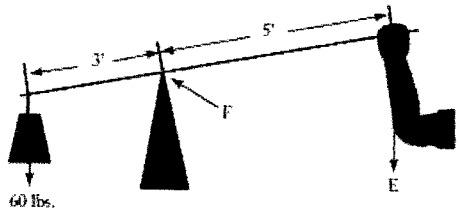


11. When the driver wheel in the figure above is moved from location X to location Y, the driven wheel will
    A. reverse its direction of rotation.
    B. turn slower.
    C. not change its speed of rotation.
    D. turn faster.

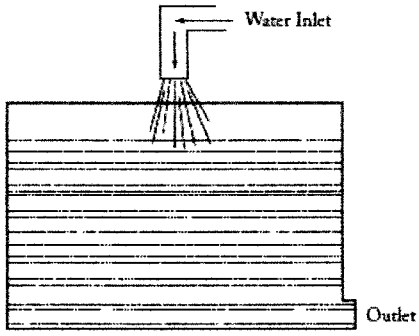


12. In the diagram above, the axle 8 inches in diameter has attached a handle 28 inches in diameter. If a force of 50 pounds is applied to the handle, the axle will lift a weight of
    A. 224 pounds.
    B. 175 pounds.
    C. 200 pounds.
    D. 88 pounds.

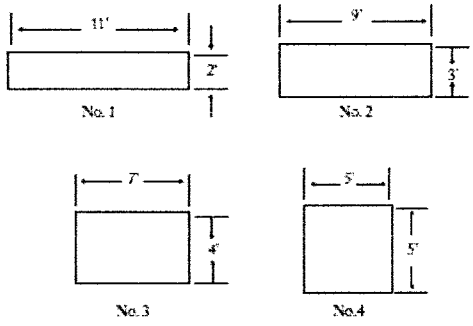
13. The main purpose of expansion joints in steam lines is to
    A. provide for changes in length of heated pipe.
    B. allow for connection of additional radiators.
    C. provide locations for valves.
    D. reduce breakage of pipe due to minor movement of the building frame.



14. What effort must be exerted to lift a 60-pound weight in the figure of a first-class lever shown above (disregard the weight of the lever in your computation)?
    A. 30 pounds
    B. 36 pounds
    C. 45 pounds
    D. 60 pounds

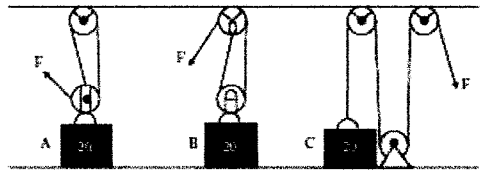


15. If water is flowing into the tank shown above at the rate of 120 gallons per hour and flowing out of the tank at a constant rate of 1 gallon per minute, the water level in the tank will
    A. rise 1 gallon per minute.
    B. rise 2 gallons per minute.
    C. fall 2 gallons per minute.
    D. fall 1 gallon per minute.

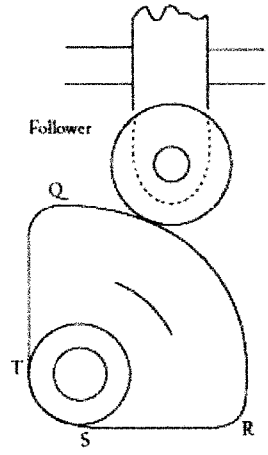


16. Shown above are the bottoms of four bins for storing materials. If the bins are all capable of holding the same amount of any particular material, then the bin whose sides have the least height is the one whose bottom is shown as
    A. No. 1.
    B. No. 2.
    C. No. 3.
    D. No. 4.

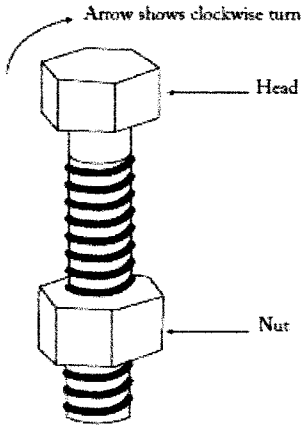
17. If the flush tank of a toilet fixture overflows, the fault is likely to be
    A. failure of the ball to seat properly.
    B. excessive water pressure.
    C. defective trap in the toilet bowl.
    D. waterlogged float.



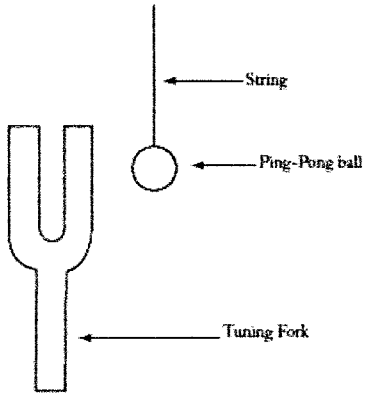
18. Which pulley arrangement shown above requires the LEAST force at F to lift the weight?
    A. A
    B. B
    C. C
    D. All three require the same force.



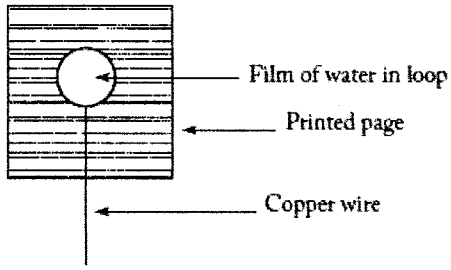
19. In the figure above, the follower is at its highest position between points
    A. Q and R.
    B. R and S.
    C. S and T.
    D. T and Q.



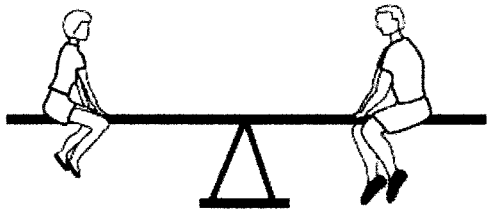
20. Which of the following statements is true about the figure above?
    A. If the nut is held stationary and the head turned clockwise, the bolt will move up.
    B. If the head of the bolt is held stationary and the nut is turned clockwise, the nut will move down.
    C. If the head of the bolt is held stationary and the nut is turned clockwise, the nut will move up.
    D. If the nut is held stationary and the bolt is turned counterclockwise, the nut will move up.



21. When the tuning fork shown above is struck, the ping-pong ball will
    A. remain stationary.
    B. bounce up and down.
    C. hit the tuning fork.
    D. swing away from the tuning fork.

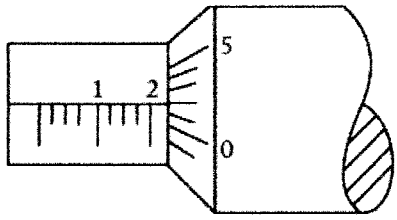


22. The print in the figure above looked at through the film of water will
    A. be too blurred to read.
    B. look the same as the surrounding print.
    C. be enlarged.
    D. appear smaller.



23. In the illustration above, if the man backs to the end of the seesaw, the woman will
    A. remain stationary.
    B. rise in the air.
    C. hit the ground hard.
    D. slide to her end of the seesaw.

24. Condensation on cold water pipes is frequently prevented by
    A. insulating the pipe.
    B. keeping the temperature of cold water at least 10° above the freezing point.
    C. keeping the cold water lines near the hot water lines.
    D. oiling or greasing the outside of the pipe.



25. The micrometer above reads
    A. 0.2270
    B. 0.2120
    C. 0.2252
    D. 0.2020

STOP!
IF YOU FINISH BEFORE THE TIME IS UP,
YOU MAY CHECK OVER YOUR WORK ON THIS PART ONLY.

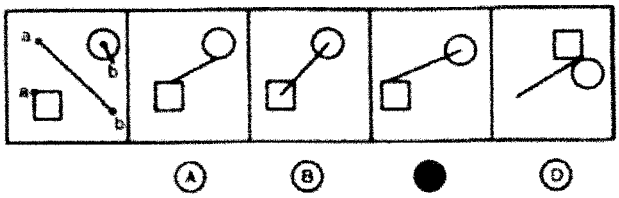
PART 9: ASSEMBLING OBJECTS*

Time: 9 Minutes—16 Questions

Directions: This test contains 16 items measuring your ability to determine how an object will look when its parts are mentally assembled. Each item consists of five drawings. The problem is presented in the first drawing. Each problem is followed by four answers, only one of which is correct. Decide which answer is correct, then blacken the space on your answer sheet that has the same number and letter as your choice.

Now look at the two sample problems below.

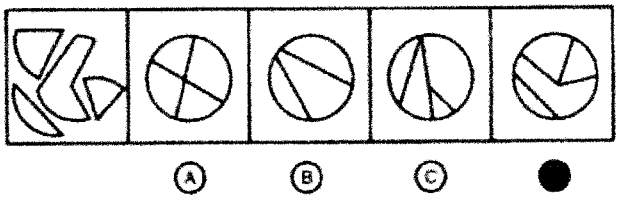
1.



In the previous figure, the parts to be assembled are simple geometric figures (lines, squares, rectangles, etc.) that are labeled at one or more points with small letters. By matching corresponding letters on the different parts, you can see where the parts touch when the object is put together, or connected, properly.

Choice C is the correct answer.

2.



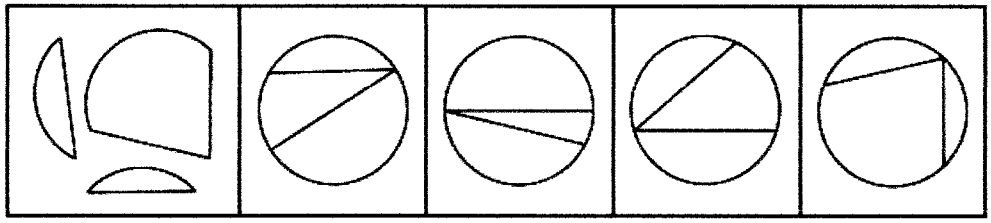
In this figure, the parts are not labeled. Instead, they fit together like pieces of a puzzle. Choice D is the correct answer.

Your score on this test will be based on the number of questions you answer correctly. You should try to answer every question. Do not spend too much time on any one question.

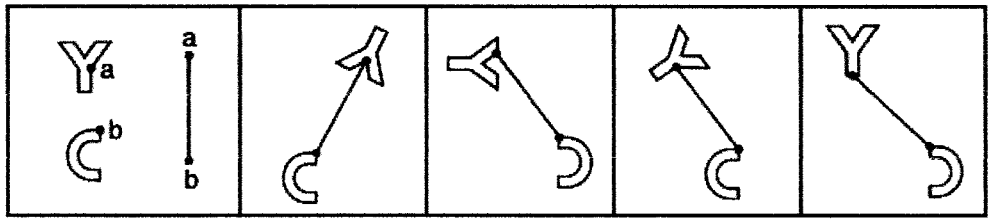
When you are told to begin, be sure to start with question number 1 in Part 9 in your test booklet and number 1 in Part 9 on your answer sheet.

*NOTE: This section is not included on paper-and-pencil versions of the ASVAB. It is included on the ASVAB computer-adaptive test (CAT) but may be eliminated in the future. Check with your recruiter for details.

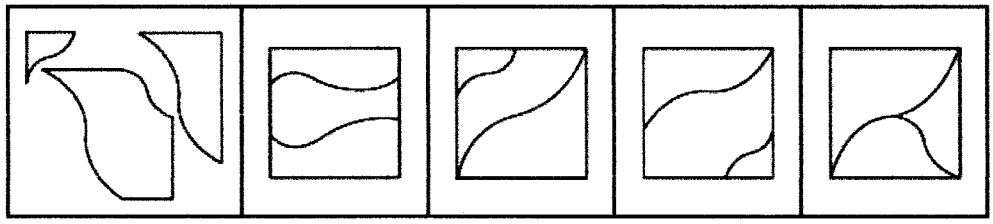
1.



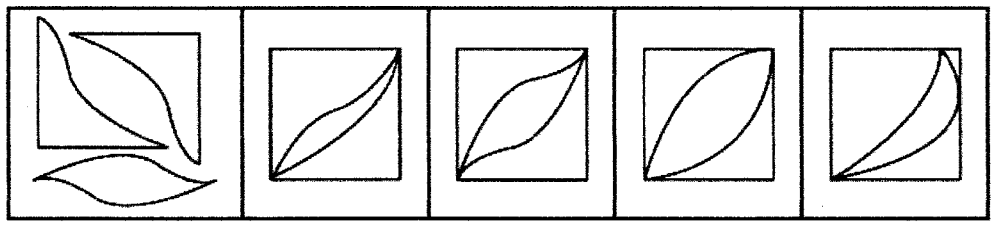
2.



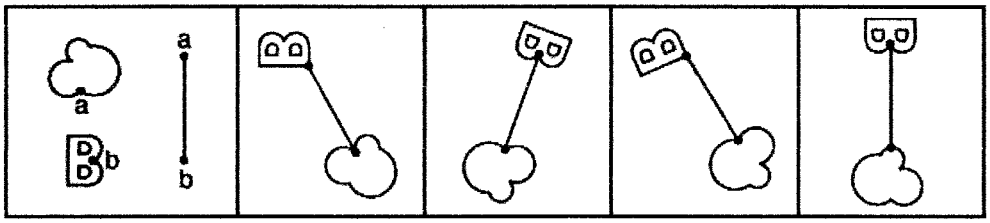
3.



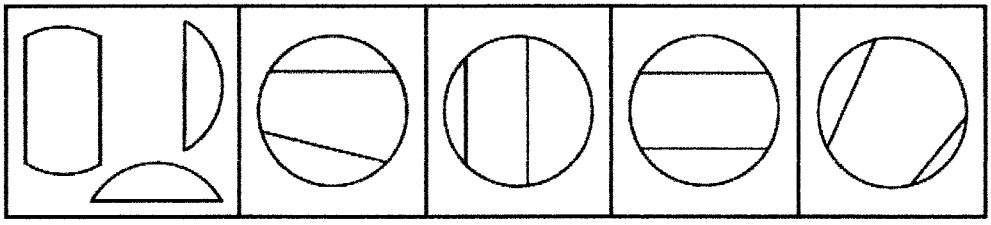
4.



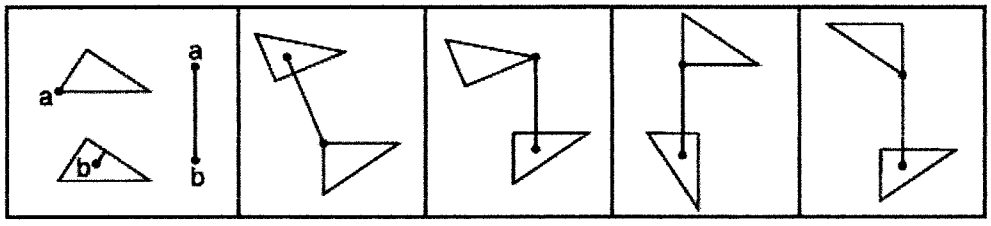
5.



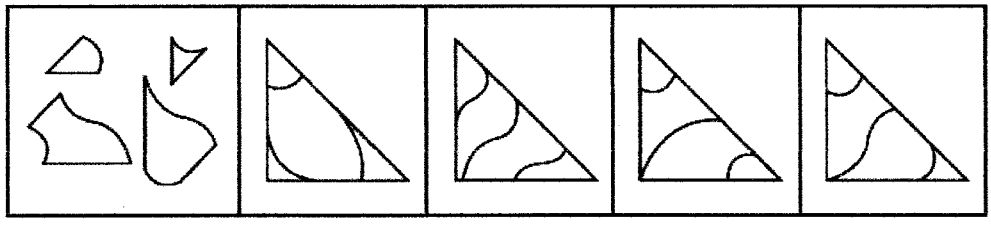
6.



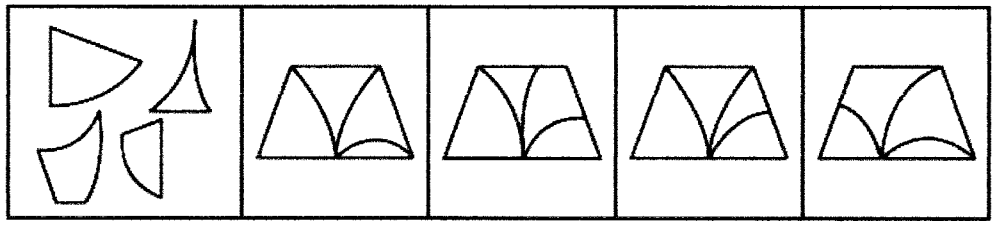
7.



8.

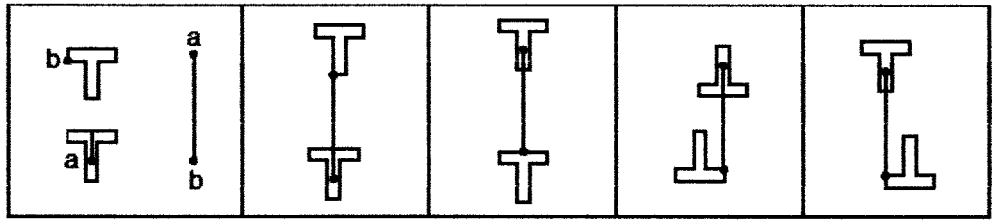


9.



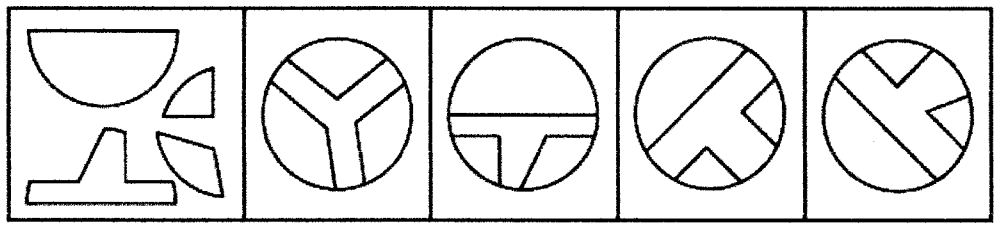
A B C D

10.



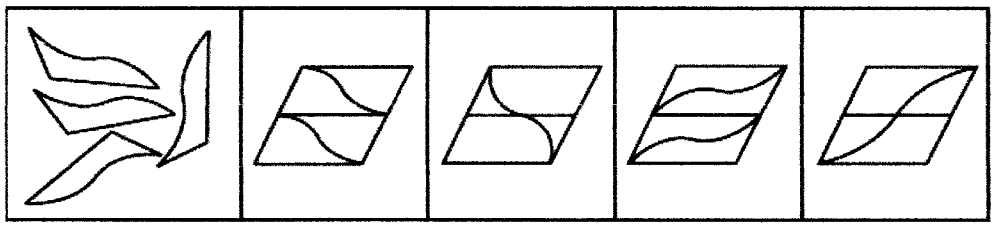
A B C D

11.



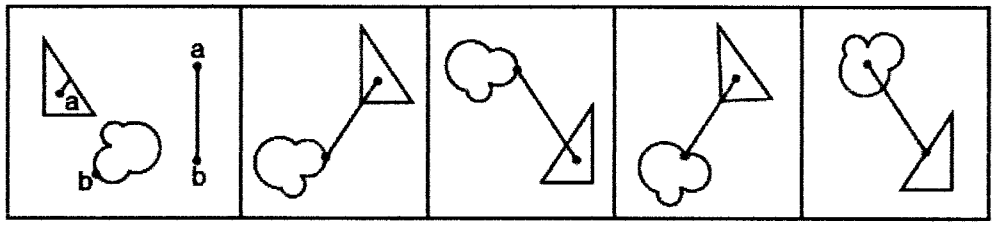
A B C D

12.



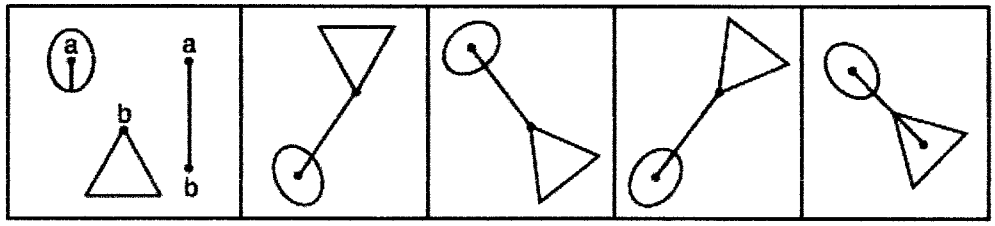
A B C D

13.



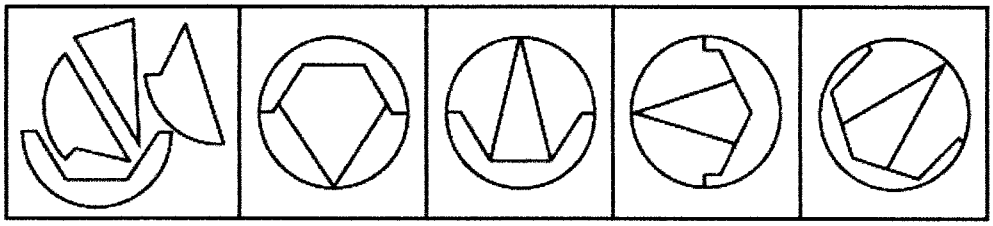
A B C D

14.



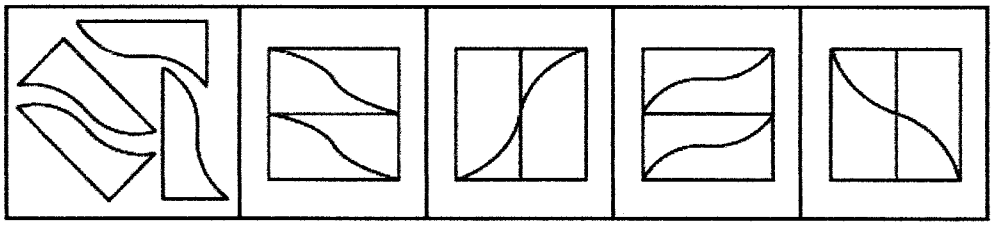
A B C D

15.



A B C D

16.



A B C D

ENF OF THE EXAMINATION.

IF YOU FINISH BEFORE THE TIME IS UP,
YOU MAY CHECK OVER YOUR WORK ON THIS PART ONLY.

PART 6: ELECTRONICS INFORMATION

1. D	5. A	9. D	13. C	17. C
2. C	6. D	10. C	14. A	18. B
3. C	7. C	11. A	15. B	19. D
4. D	8. D	12. C	16. D	20. B

1. **The correct answer is D.** Soft iron has the property of being easily magnetized or demagnetized. When the current is turned on in an electromagnet, it becomes magnetized. When the current is turned off, the iron loses its magnetism.

2. **The correct answer is C.** This is a general safety question. Never assume that there is no current in a piece of electrical equipment; the results could be shocking.

3. **The correct answer is C.** Using algebraic rules, Ohm's Law can be written in three equivalent ways:

$$R = \frac{V}{I};\ I = \frac{V}{R};\ V = IR$$

4. **The correct answer is D.** A rectifier is a device that changes AC to DC and often includes one or more diodes.

5. **The correct answer is A.** The prefix *centi* refers to 100.

6. **The correct answer is D.** Converters change DC to AC. Rectifiers change AC to DC. Contactors are remote controlled switches frequently used as part of elevator controls. Transformers change voltages in AC circuits in accordance with the ratio of the number of turns in the secondary winding to the number of turns in the primary winding.

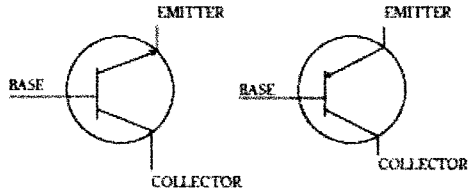
7. **The correct answer is C.** LED stands for Light Emitting Diode.

8. **The correct answer is D.** A megger (megohmmeter) is a portable device that produces a voltage. It is used to check for high-voltage breakdown of insulation. In this case, it uses a resistance measurement to determine continuity.

9. **The correct answer is D.** This is the Wheatstone bridge circuit with balanced loads in each of its arms. Because there is no voltage across lamp No. 5, it will not be lit.

10. **The correct answer is C.** The farad is a unit of capacitance. Most capacitors used in electronics are small and their capacitance is only a tiny fraction of a farad. One microfarad is one millionth of a farad.

11. **The correct answer is A.** In a common transistor the common leads are collector, base, emitter.



12. **The correct answer is C.** This is proper safety procedure and should be followed.

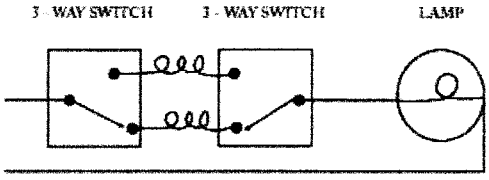
13. **The correct answer is C.** The number on the wires is in reverse order to the amount of current that they can carry. No. 12 is the smallest of the wires.

14. **The correct answer is A.** The plug can go into the outlet in only one way in a polarized outlet. In the other outlets, the plug can be reversed.

15. **The correct answer is B.** Connecting the bell to a 6- or 12-volt source on the secondary of a transformer is done as a safety precaution. The other way would be dangerous.

16. **The correct answer is D.** This is a mechanical or solderless connector. It does away with the need to solder wires and is found in house wiring.

17. **The correct answer is C.** Two three-way switches will control a lamp from two different positions.



18. **The correct answer is B.** A battery is an assembly of chemical cells. The common 9-volt battery found in transistor radios consists of six 1.5-volt cells connected in series to produce a total of six times 1.5 volts—or 9 volts.

19. **The correct answer is D.** The third prong in the plug is the grounding wire.

20. **The correct answer is B.** Connecting a lead from the anode to the cathode of a battery produces a short circuit.

Items Answered Incorrectly: _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____

Items Unsure Of: _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____

Total Number Answered Correctly: _____

PART 7: AUTO & SHOP INFORMATION

1. C	6. D	11. D	16. C	21. B
2. D	7. B	12. D	17. C	22. A
3. B	8. C	13. D	18. B	23. A
4. B	9. C	14. B	19. D	24. C
5. A	10. B	15. A	20. D	25. C

1. **The correct answer is C.** The most popular engine has a four-stroke cycle. The four cycles are intake, compression, power, and exhaust.

2. **The correct answer is D.** Automotive internal combustion engines are usually configured in either in-line or in a V configuration. A V6 engine is one in which there are three cylinders on each side in a V pattern.

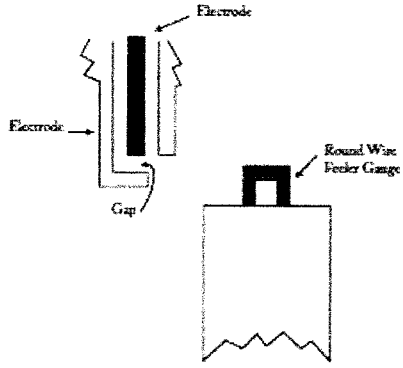
3. **The correct answer is B.** Torque is a twisting force, measured in foot-pounds. Automobile engines (and other components) require specified torque so that components are tight enough, but not too tight (which may cause something to break). Torque wrenches are used to ensure the appropriate torque is applied.

4. **The correct answer is B.** The governor is a device that is used to limit the maximum speed of an auto. It is used as a safety device.

5. **The correct answer is A.** Headlights are connected in parallel. In a parallel circuit, if one headlight goes out, the other will still light.

6. **The correct answer is D.** Automobiles use internal combustion engines. Fuel is ignited inside a cylinder to produce power.

7. **The correct answer is B.** The spark jumps across the arc at only one point on the electrode. A round wire feeler gauge gives the best spark plug gap at one point.



8. **The correct answer is C.** The clearance volume is the space, at compression, between the top of the piston and the cylinder roof. The total volume is the total space in the cylinder when the piston is at the bottom of the intake stroke. To calculate the compression ratio, divide the total volume by the clearance volume. Many modern engines run at a compression ratio of 8:1.

9. **The correct answer is C.** Choice C is the best answer. When the engine block and the radiator are clogged, a mechanic wants to remove any foreign material that prevents the antifreeze-water mixture from cooling the engine. Flushing with water and using compressed air remove the blockages. The other methods might not do the job adequately.

10. **The correct answer is B.** Water freezes at 32°F, or 0°C. Adding alcohol will cause the water to freeze at a lower temperature and will help prevent the engine block from cracking. *Note:* When water freezes, it expands, and the pressure created can crack an engine block.

11. **The correct answer is D.** Usually when a warning light of any kind comes on while driving, the best thing to do is to pull over and stop the car immediately. However, in the case of a charging system warning light, if you shut off the car, you may not be able to restart it. If the car is running, you have enough electrical power, and you should drive it to the nearest repair shop.

12. **The correct answer is D.** A wooden mallet is used in woodworking. The other hammers are made of steel. They are too hard and might crack a wood chisel. Choice A is a ball peen hammer, choice B is a straight peen hammer, and choice C is a brick hammer.

13. **The correct answer is D.** An expansion bolt is put into a hole that has been drilled into solid masonry. The bolt is then tightened, forcing apart the sides of the expansion bolt. This anchors into the concrete.

14. **The correct answer is B.** A 10-penny nail is 3 inches long. For each 2-penny increase, the length increases by $\frac{1}{2}$ inch. So, a 4-penny nail is $1\frac{1}{2}$ inches long and a 12-penny nail is $3\frac{1}{2}$ inches long.

15. **The correct answer is A.** Glazier's points are triangular-shaped pieces of metal that are inserted into a window frame to prevent the glass from being pushed out.

16. **The correct answer is C.** The key to this question is the complete loss of oil pressure. This would occur due to a lack of oil in the crankcase.

17. **The correct answer is C.** When two pieces of metal rub together, the friction causes a great deal of heat. Oil reduces the friction between the two pieces of metal.

18. **The correct answer is B.** The tool shown is a "star drill." It is hit with a hammer to make a hole in concrete.

19. **The correct answer is D.** One would not be able to see a defect in a painted ladder, such as a knot or a split in the wood. A ladder should *never* be painted.

20. **The correct answer is D.** When a blade in the gauge matches the threads in the screw, the measure is the screw pitch.

21. **The correct answer is B.** A finishing nail is similar in shape to a brad in that they both do not have flat heads and are designed to be countersunk into the wood.

22. **The correct answer is A.** A rope is made from many separate strands of hemp or synthetic fiber, such as nylon. When a rope is cut, the strands can unravel if the ends are not whipped or wrapped with cord.

23. **The correct answer is A.** The set is the angle at which the teeth are bent. It makes the teeth stand out from the rest of the saw and prevents the saw from getting stuck or binding to the stock.

24. **The correct answer is C.** Lacquer thinner is a strong solvent and will dissolve hardened paint.

25. **The correct answer is C.** The flattened part of the tool in choice C rests at the top of the hole and the ruler is then pushed down into the hole until it reaches the bottom. The depth of the hole is then read from the ruler.

Items Answered Incorrectly: _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____

Items Unsure Of: _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____

Total Number Answered Correctly: _____

PART 8: MECHANICAL COMPREHENSION

1. B	6. B	11. B	16. C	21. D
2. B	7. D	12. B	17. D	22. C
3. A	8. C	13. A	18. A	23. B
4. D	9. C	14. B	19. A	24. A
5. D	10. C	15. A	20. B	25. A

1. **The correct answer is B.** The truck will have to move 30 feet. Three ropes are supporting tank T. The mechanical advantage (the number of supporting wires holding the load) is three. The distance must be three times the height raised.

2. **The correct answer is B.** The volume is dependent on the area of the outlet.

   Since $A = \text{I}\, r^2$ and $r = \frac{d}{2}$, then $A = \pi\left(\frac{d^2}{4}\right)$ where A is the area and d is the diameter.

   The volume is proportional to the diameter squared (d^2). When the volumes of the 1-inch and 2-inch outlets are compared, we see that the latter will produce 4 times as great a volume. If the 1-inch outlet has an 8-gallon flow, then the 2-inch outlet will have a 32-gallon flow.

3. **The correct answer is A.** The slowest points for lever AB are 3 and 7 where the direction reverses and the velocity momentarily becomes zero. The midpoint, 5, represents the maximum speed, as it is halfway between these minimum points.

4. **The correct answer is D.** A yellow flame means too much fuel or too little oxygen is present during combustion. The best answer is to allow more air to enter and mix with the gas.

5. **The correct answer is D.** Gear A turns in the opposite direction from gear B. A clockwise turn of A results in a counterclockwise revolution of gear B. Since the distance traversed by A (perimeter = I × diameter = I × 4) is twice that of C (perimeter = I × 2), the speed of C is doubled.

6. **The correct answer is B.** The figure shown is a bimetallic strip that works like the wire in a thermostat. High temperatures will cause the metals to heat unevenly. The rivets will keep the strips together, so the only thing that they can do is bend.

7. **The correct answer is D.** Wheel P has 16 teeth; wheel M has 12 teeth. When wheel M makes a full turn, wheel P will still have 4 more teeth to turn. So, wheel P is slower and will take more time to turn.

8. **The correct answer is C.** An inclined plane is a sloping, triangular shape, used here as a wedge to force open an axe cut made in the log.

9. **The correct answer is C.** The trick with this question is that both of the rods will be pulled in at the same time when the turnbuckle is turned. If it is turned 12 times (12 threads per inch), both rods will be pulled in 1 inch.

10. **The correct answer is C.** The downward pull equals the 100-lb. weight being hoisted plus the 50-lb. effort required with the single movable block in the pulley, which has a mechanical advantage of 2. 100 lbs. + 50 lbs. = 150 lbs.

11. **The correct answer is B.** Imagine the driven wheel as a vinyl record. For one rotation of the record, point y travels much farther than point x. It takes more turns of the driver wheel to turn point y one complete revolution.

12. **The correct answer is B.** The diameter of the handle is $3\frac{1}{2}$ times $\left(\frac{28}{3}\right)$ the diameter of the axle. When 50 lbs. of force is applied to the handle, it is multiplied by $3\frac{1}{2}$ times, or, $\frac{28}{8} \times 50 = 175$ lbs.

13. **The correct answer is A.** When steam flows through pipes, it expands. The pipes would burst if extra space were not provided for expansion and contraction.

14. **The correct answer is B.** Let x = effort that must be exerted.

$60 \times 3 = x \times 5;\ 180 = 5x;\ x = \frac{80}{5} = 36$

15. **The correct answer is A.** The water is filling up in the tank at a rate of 120 gallons per hour, or 2 gallons per minute $\left(\frac{120}{60} = 2\right)$. The tank is also emptying at a rate of 1 gallon per minute. The net flow is increasing by 1 gallon per minute, because 2 gal./min. input − 1 gal./min. output = 1 gal./min. increase. Note: The easiest way to find the answer is to change all measurements to gallons per minute.

16. **The correct answer is C.** Figure No. 3 has the largest surface area and thus would need the shortest sides. Area = length × width. For No. 3, area = 7 ft. × 4 ft. = 28 sq. ft.

17. **The correct answer is D.** The water shut-off valve on a flush tank is closed by the force of a lightweight ball rising inside the tank. If this float becomes waterlogged, it will not rise and shut off the water.

18. **The correct answer is A.** The mechanical advantage is calculated by the number of strands supporting the weight. A has 3 strands, B has 2, and C has only 1.

19. **The correct answer is A.** Study the diagram and note that the follower is at its highest position between points Q and R.

20. **The correct answer is B.** Clockwise is right to left, so if the nut moves, it follows the threads of the bolt downward.

21. **The correct answer is D.** When the tuning fork vibrates, it causes a disturbance in the air that causes the ping-pong ball to swing away from the tuning fork.

22. **The correct answer is C.** The film of water inside the loop would form a lens that would enlarge the printing on the page. If you look through a water-filled globe, objects will also appear larger.

23. **The correct answer is B.** If the man moves to the back of the seesaw, his momentum (weight × distance from center) will increase. The woman, who is lighter, will rise in the air.

24. **The correct answer is A.** Insulating the pipes keeps warm moisture-laden air from coming into contact with the cold pipes. This stops condensation.

25. **The correct answer is A.** The measurements that can be made on the micrometer are: a) 2 major divisions and 1 minor division on the ruler-type scale, or 0.2 + 0.025 = 0.225; b) 2 minor divisions above 0 on the rotating scale, or 0.002. Summing, we find the final measurement is 0.225 + 0.002 = .227.

Items Answered Incorrectly: _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____

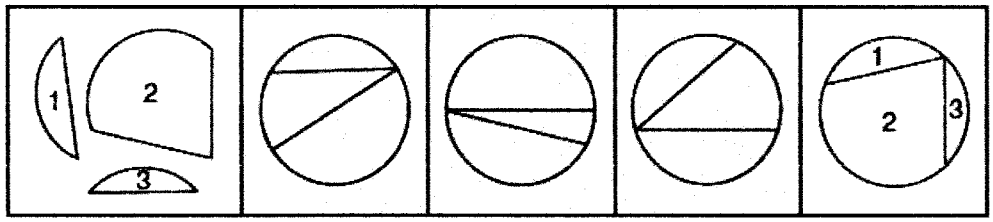
Items Unsure Of: _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____

Total Number Answered Correctly: _____

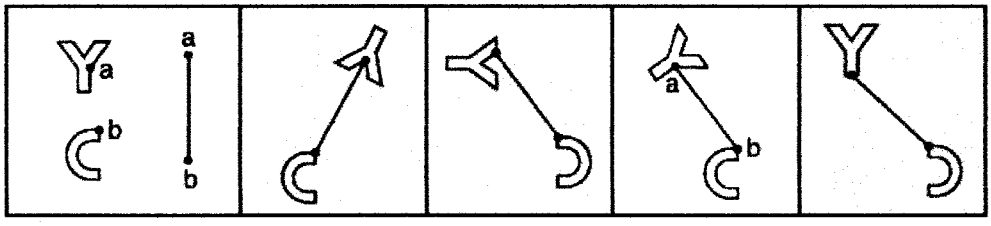
PART 9: ASSEMBLING OBJECTS

1. D	5. B	8. D	11. B	14. C
2. C	6. C	9. B	12. C	15. B
3. C	7. D	10. C	13. B	16. C
4. B				

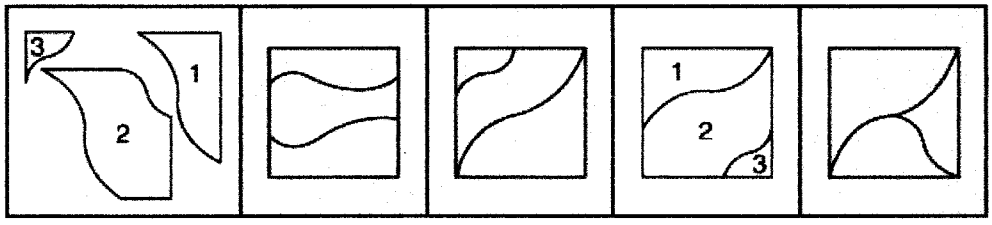
1. The correct answer is D.



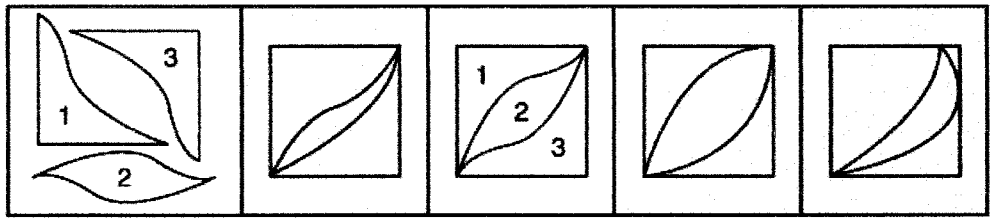
2. The correct answer is C.



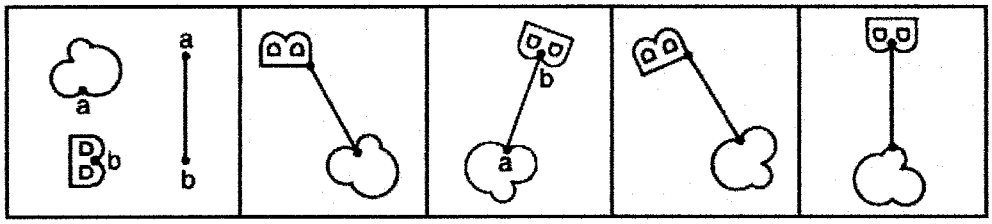
3. The correct answer is C.



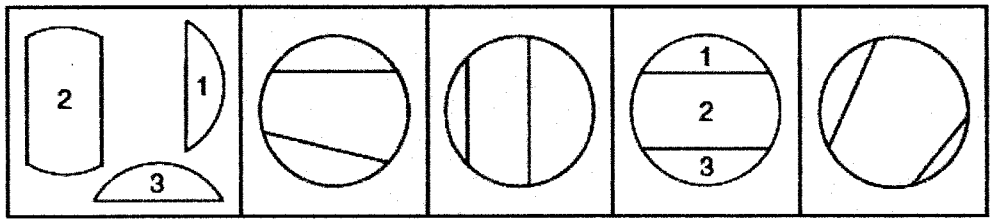
4. The correct answer is B.



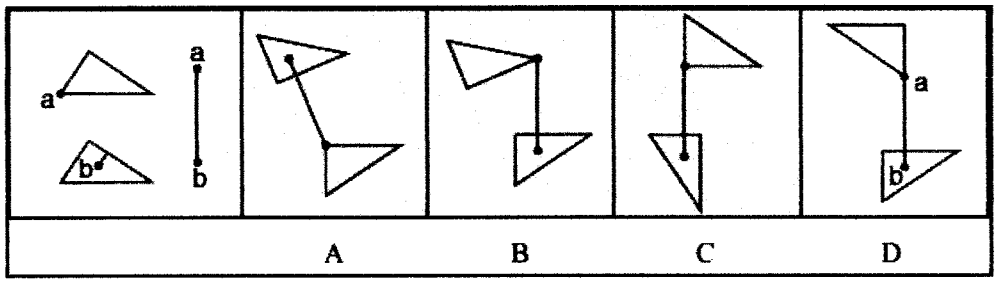
5. The correct answer is B.



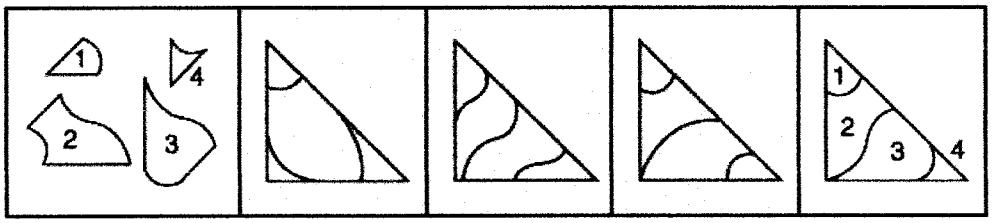
6. The correct answer is C.



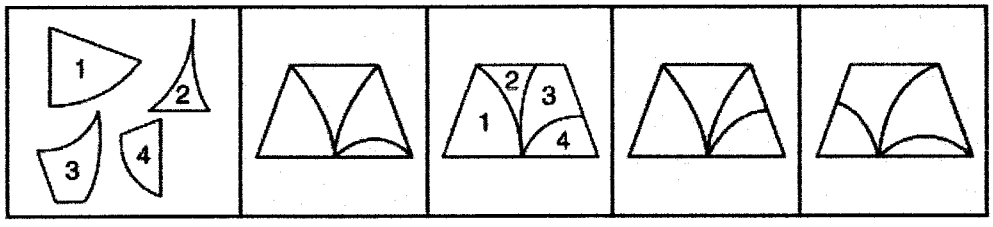
7. The correct answer is D.



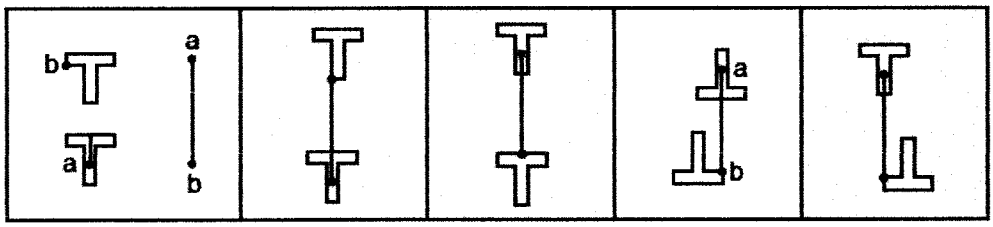
8. The correct answer is D.



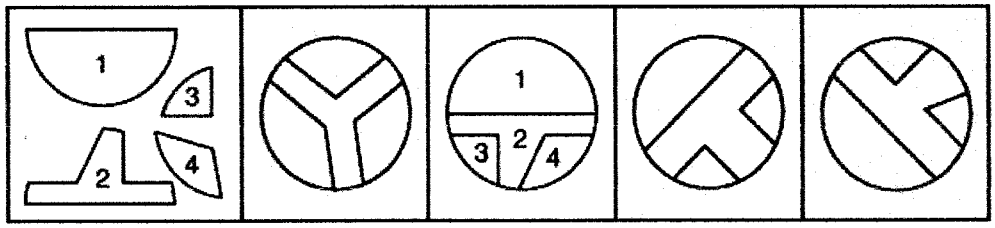
9. The correct answer is B.



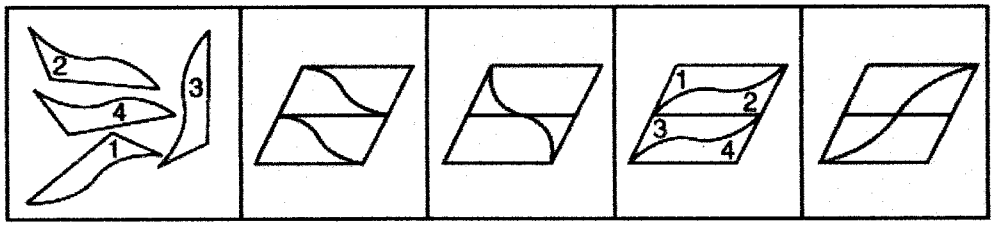
10. The correct answer is C.



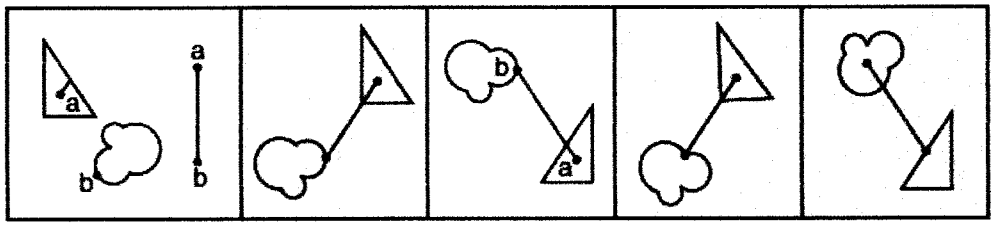
11. The correct answer is B.



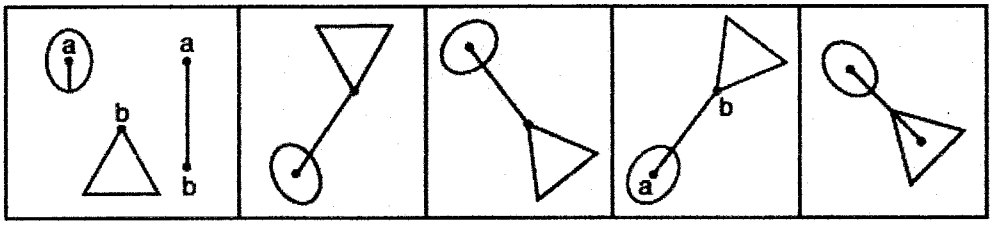
12. The correct answer is C.



13. The correct answer is B.

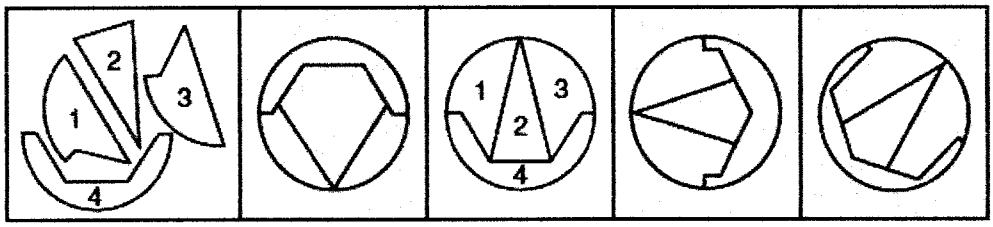


14. The correct answer is C.



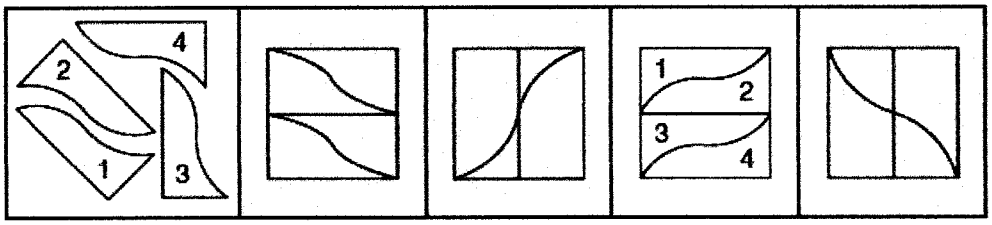
A B C D

15. The correct answer is B.



A B C D

16. The correct answer is C.



A B C D

Items Answered Incorrectly: _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____

Items Unsure Of: _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____ ; _____

Total Number Answered Correctly: _____