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ASVAB Section 3 : Mechanical Comprehension

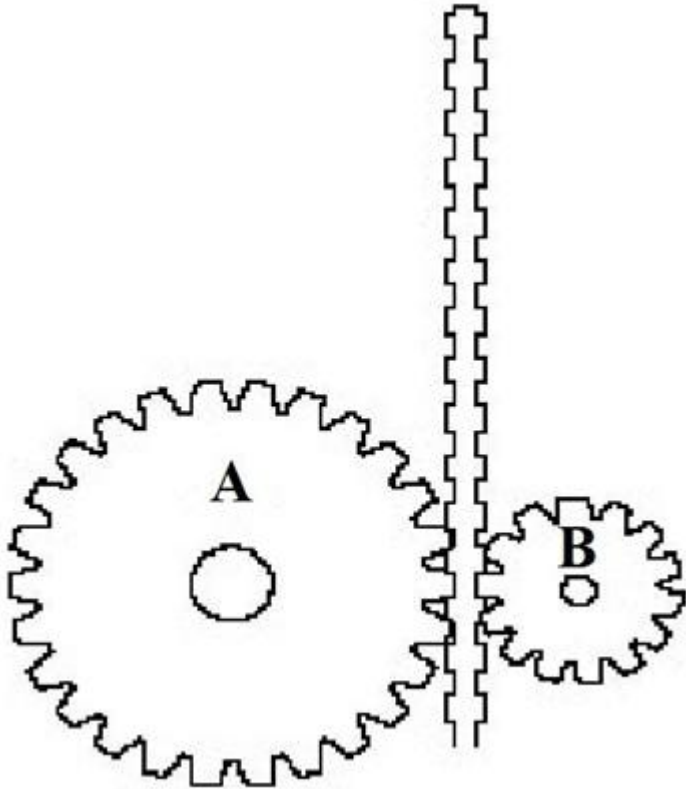
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Question: 173

In the figure above, if the cogs move up the track at the same rate of speed, Cog A will _____.



- A. reach the top at the same time as Cog B
- B. reach the top after Cog B
- C. reach the top before Cog B
- D. have greater difficulty staying on track

Answer: C

The larger cog (Cog A) covers a greater linear distance in a given period of time.

Question: 174

If a house key, a wooden spoon, a plastic hanger, and a wool jacket are all the same temperature, which one feels the coldest?

- A. key
- B. spoon
- C. hanger
- D. jacket

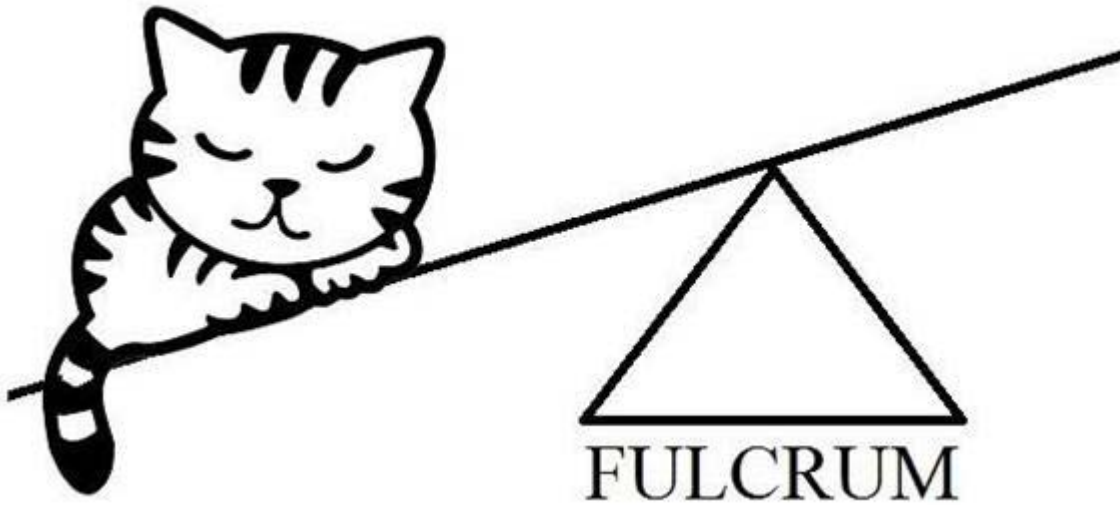
Answer: B

The key will feel coldest because metal is a better conductor than the other materials.

Question: 175

In the figure above, if the fulcrum supporting the lever is moved closer to the cat, the cat will be _____.

CAT



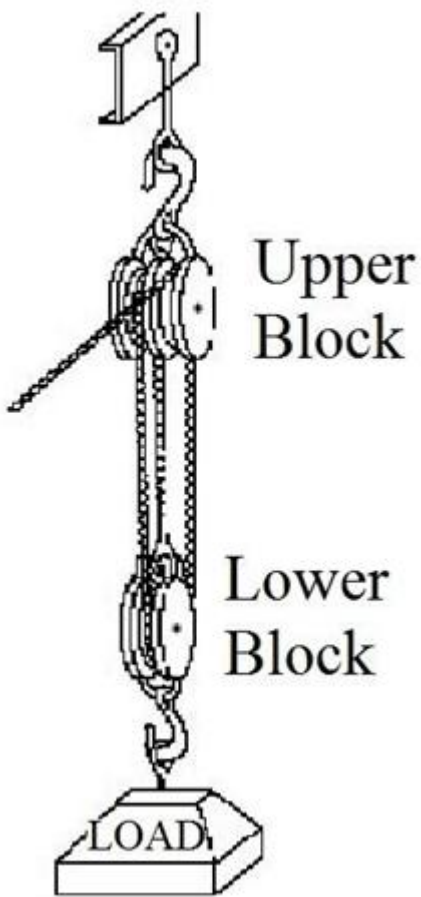
- A. easier to lift and will move higher
- B. harder to lift but will move higher
- C. easier to lift but will not move as high
- D. harder to lift and will not move as high

Answer: C

If the fulcrum is moved closer to the cat, the length of the effort arm of the lever will be increased, making the cat easier to raise, but the height to which the cat can be raised will be reduced.

Question: 176

The mechanical advantage of the block-and-tackle arrangement shown above is _____.



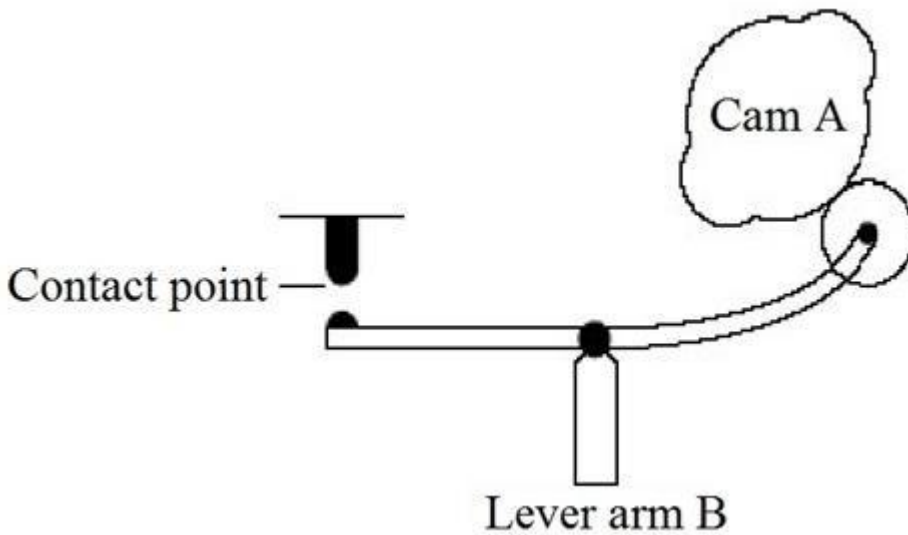
- A. 2
- B. 4
- C. 6
- D. 1

Answer: A

Because this block-and-tackle arrangement merely changes the direction of the pull, it has a mechanical advantage of only 2.

Question: 177

When Cam A completes one revolution, the lever will touch the contact point _____.



- A. once
- B. never
- C. four times

D. twice

Answer: D

When the high point of the cam connects with the lever arm, the lever arm will touch the contact point. Two high points on the cam mean the lever arm will touch the contact point twice with each revolution of the cam.

Question: 178

A single block-and-fall is called a _____.

- A. fixed pulley**
- B. gun tackle**
- C. runner**
- D. sheave**

Answer: C

A single block-and-fall is called a runner.

Question: 179

A clutch is a type of _____.

- A. universal joint**
- B. coupling**
- C. gear differential**
- D. cam follower**

Answer: B

Clutches connect and disconnect parts, so they're a type of coupling.

Question: 180

A cubic foot of water weighs about 62.5 pounds.

If an aquarium is 18 feet long, 10 feet deep, and 12 feet wide, what's the approximate pounds-per-square-inch pressure (psi) on the bottom of the tank?

- A. 2 psi**
- B. 4 psi**
- C. 5 psi**
- D. 7 psi**

Answer: B

You can determine the pressure of all that water by multiplying the volume of the aquarium by the weight of the water. Volume = lwh. The bottom of the tank is 18 feet long by 12 feet wide by 10 feet high for a total volume of 2,160 cubic feet (18 x 12 x 10).

A cubic foot of water weighs approximately 62.5 pounds. 2,160 x 62.5 gives an approximate pressure on the bottom of the tank of about 135,000 pounds over the entire surface area. The surface area of the bottom of the tank is length x width.

216 inches (18 feet x 12) x 144 inches (12 feet x 12) = 31,104.

Dividing the pressure of 135,000 by the number of square inches of surface area gives an approximate PSI of 4.

Question: 181

Springs used in machines are usually made of _____.

- A. plastic
- B. bronze
- C. nylon fiber
- D. steel

Answer: D

Machine springs are usually made of steel although sometimes they're made of brass or other metal alloys.

Question: 182

The force produced when a boxer's hand hits a heavy bag and "bounces" off it is called _____.

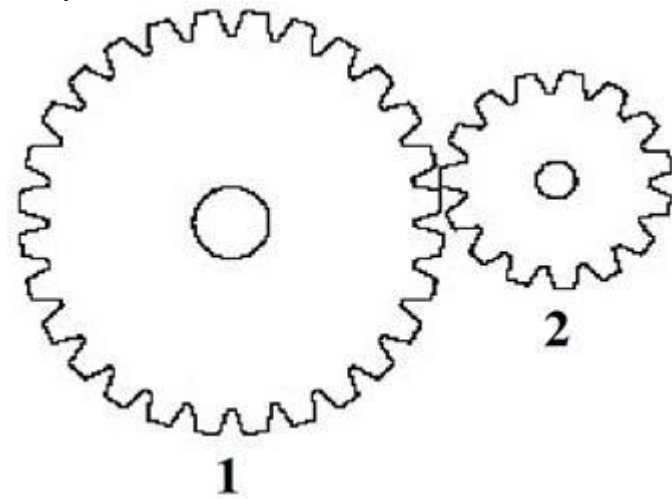
- A. static electricity
- B. magnetism
- C. recoil
- D. gravity

Answer: C

Recoil occurs when an object producing a force is kicked back.

Question: 183

In the figure above, if Gear 1 has 25 teeth and Gear 2 has 15 teeth, how many revolutions does Gear 2 make for every 10 revolutions Gear 1 makes?



- A. about $16\frac{2}{3}$
- B. 12
- C. about $\frac{1}{3}$ more
- D. about 20

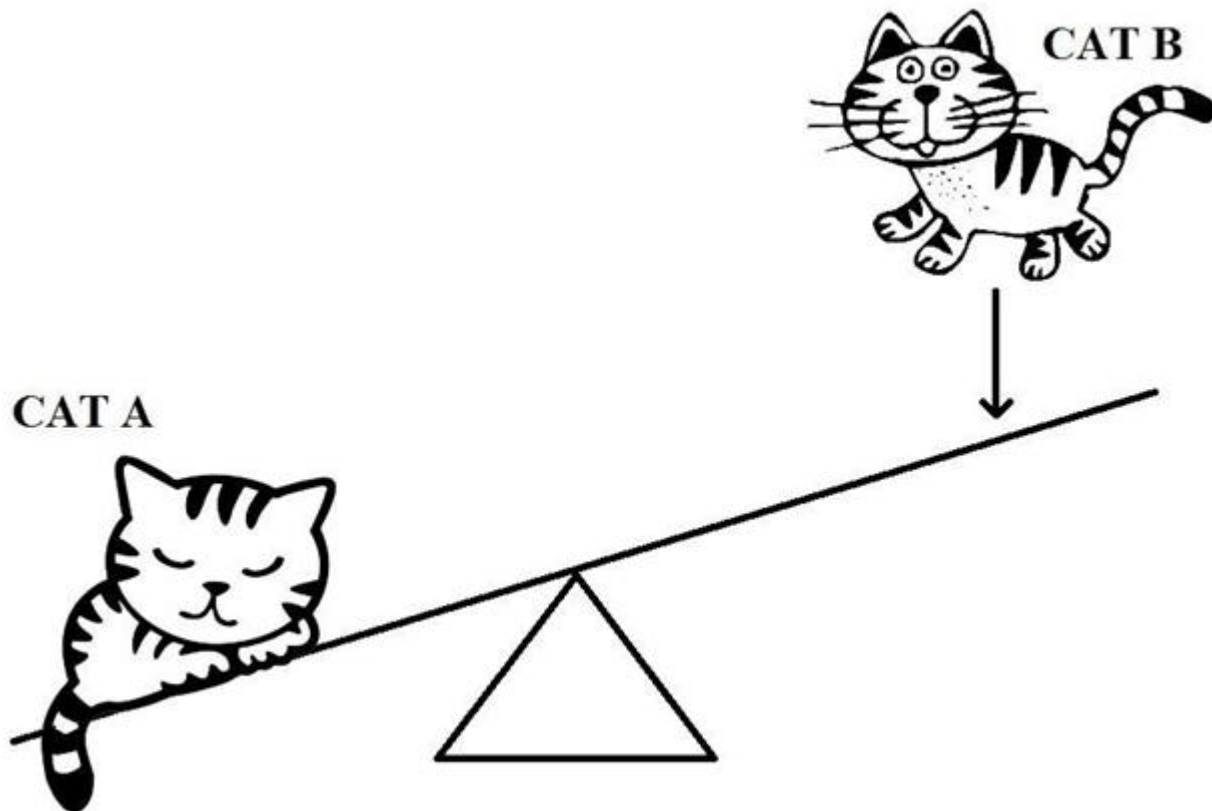
Answer: A

To determine the answer, multiply the number of teeth Gear 1 has D and the number of revolutions it makes (R). Divide that number by the number of teeth

Gear 2 has D to determine the number of revolutions Gear 2 makes (r). Because the gears are proportional, this formula will show you the ratio of teeth to revolutions. $r = DR/d$ $r = (25 \times 10)/15$ $r = 250/15$, or $16\frac{10}{15}$, or $16\frac{2}{3}$

Question: 184

Looking at the figure above, when Cat B lands on the seesaw, Cat A will _____.



- A. remain stationary
- B. hit the ground hard
- C. rise in the air quickly
- D. enter the stratosphere

Answer: C

Cat B landing on the seesaw will propel Cat A into the air.

Question: 185

Air weighs about 15 psi.

What's the amount of pressure (force) exerted on the top of your head, given a surface area of 24 inches?

- A. 360 pounds
- B. 625 pounds
- C. 5/8 pound
- D. 180 pounds

Answer: A

Power equals force divided by area in square inches ($P = F/A$). This formula can also be stated as $F = A \times P$. Substitute the known quantities. $F = 15 \times 24 = 360$ pounds.

Question: 186

If a first class lever with a resistance arm measuring 2 feet and an effort arm measuring 8 feet are being used, what's the mechanical advantage?

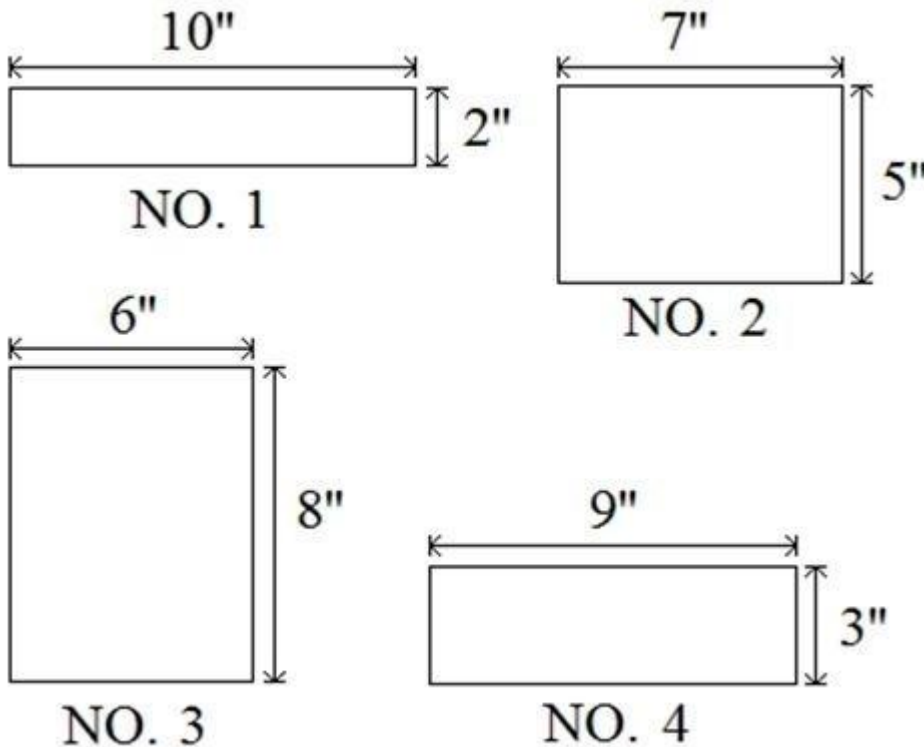
- A. 2
- B. 4
- C. 6
- D. 1

Answer: B

Mechanical advantage can be calculated as Length of Effort Arm \div Length of Resistance Arm. $MA = 8 \div 2 = 4$.

Question: 187

The bottoms of four boxes are shown above. The boxes all have the same volume.



If postal regulations state that the sides of a box must meet a minimum height, which box is most likely to be too short to go through the mail?

- A. NO. 4
- B. NO. 2
- C. NO. 1
- D. NO. 3

Answer: D

The box with the largest area on the bottom will have the shortest sides. If length \times width \times height = volume, and all the boxes have equal volume, then the sides must be shortest on the box with the largest area on the bottom. Calculate the area of each box bottom: NO. 1 = 20 square inches; NO. 2 = 35 square inches; NO. 3 = 48 square inches; and NO. 4 = 27 square inches. NO. 3, which has the largest area, will have the shortest sides.

Question: 188

An induction clutch works by _____.

- A. magnetism
- B. pneumatics
- C. hydraulics
- D. friction

Answer: A

An induction clutch is a magnetic clutch.

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