

Free Mechanical Reasoning Test

10 questions with a worked solution for every one

This is a full-length practice test. Work through it under exam conditions if you can: give yourself 10 minutes and avoid checking the answers as you go. Every question is multiple choice with exactly one correct answer.

The worked solutions start after the last question. They show the method step by step and explain every wrong option, so a question you get wrong tells you something.

Questions	10
Suggested time limit	10 minutes
Format	Multiple choice, four options
Answers	Included, with full worked solutions

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Written by Guy Thornton. Updated 20 July 2026.

Questions

QUESTION 1 OF 10

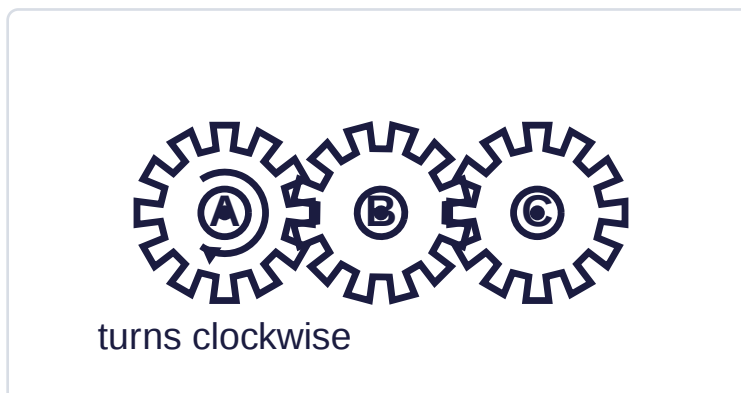
Gear A turns clockwise. Which way does gear B turn?



- A) Clockwise
- B) Anticlockwise
- C) It stays still
- D) It turns clockwise, then reverses

QUESTION 2 OF 10

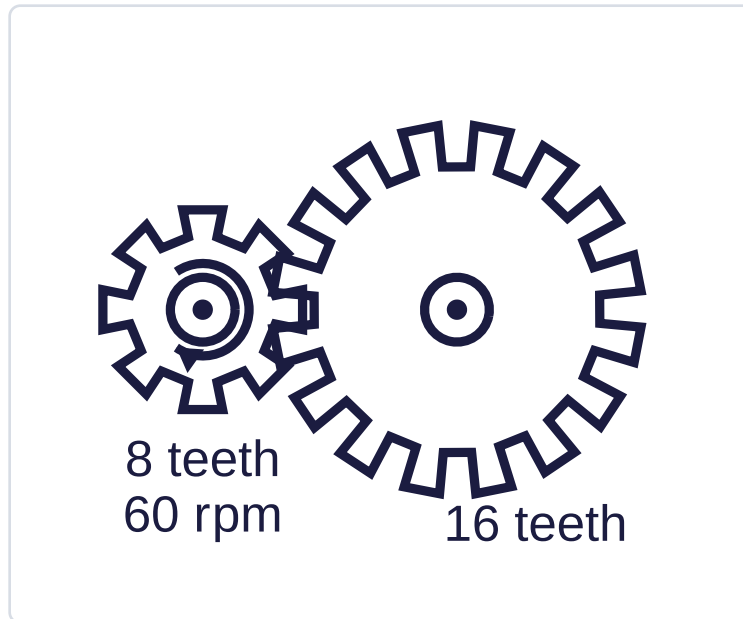
Gear A turns clockwise. Which way does gear C turn?



- A) Anticlockwise
- B) Clockwise
- C) It cannot turn, it is locked
- D) It turns clockwise, then anticlockwise

QUESTION 3 OF 10

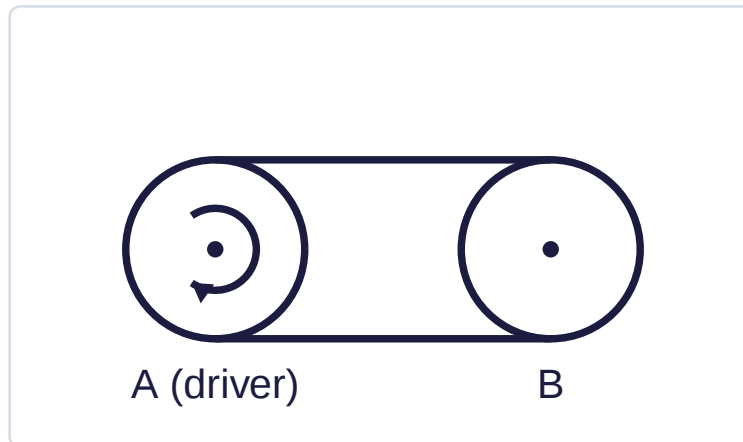
The small driver gear has 8 teeth and turns at 60 rpm. The large gear has 16 teeth. How fast does the large gear turn?



- A) 120 rpm
- B) 30 rpm
- C) 60 rpm
- D) 15 rpm

QUESTION 4 OF 10

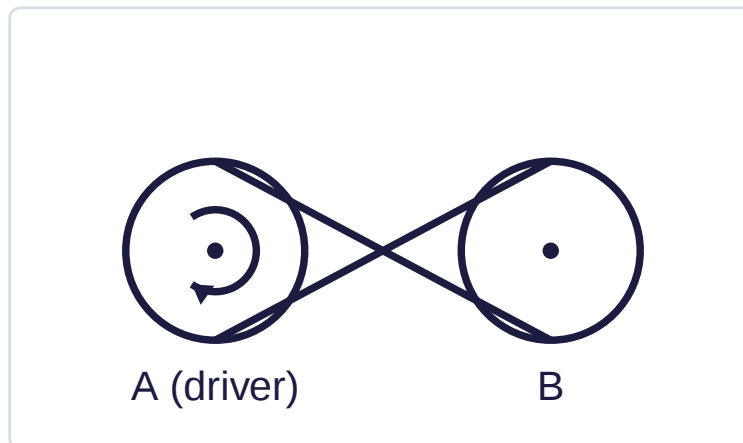
Pulley A drives an open belt and turns clockwise. Which way does pulley B turn?



- A) Clockwise
- B) Anticlockwise
- C) It stays still
- D) It turns anticlockwise, then clockwise

QUESTION 5 OF 10

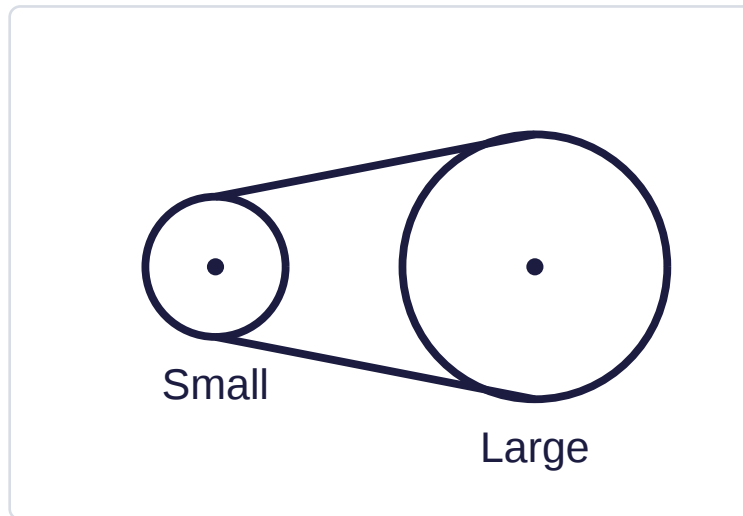
Pulley A drives a crossed belt and turns clockwise. Which way does pulley B turn?



- A) Clockwise
- B) It stays still
- C) Anticlockwise
- D) It changes direction each turn

QUESTION 6 OF 10

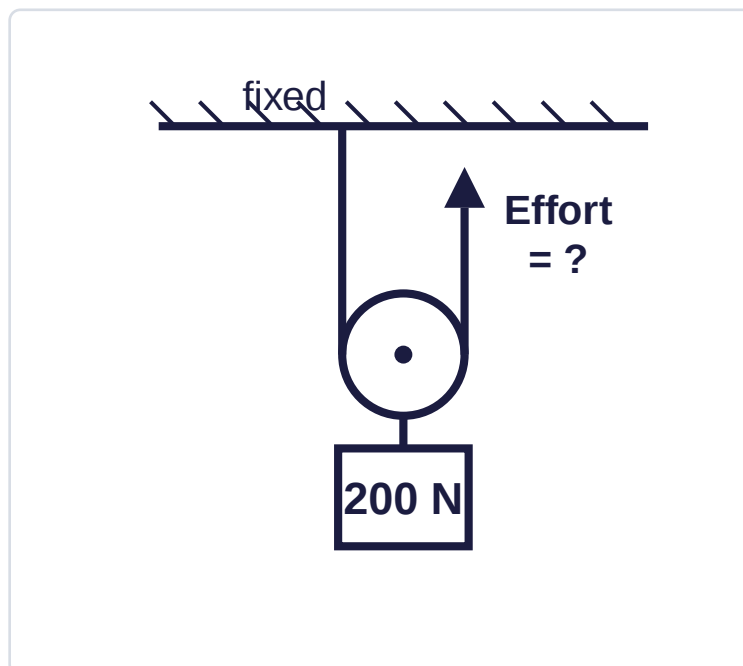
The two pulleys are joined by a belt. Which pulley completes more turns each minute?



- A) The small pulley
- B) The large pulley
- C) They complete the same number
- D) Neither pulley turns

QUESTION 7 OF 10

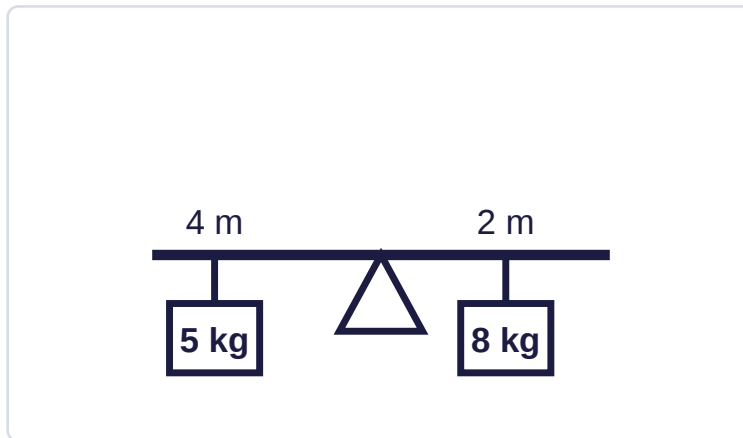
The load weighs 200 N. Ignoring friction, what effort is needed to hold it using this single movable pulley?



- A) 200 N
- B) 100 N
- C) 400 N
- D) 50 N

QUESTION 8 OF 10

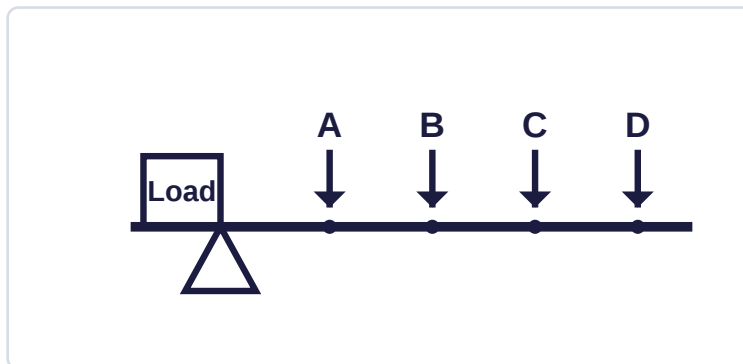
The beam is released from level. Which way does it tip?



- A) The left-hand side goes down
- B) The right-hand side goes down
- C) It stays balanced
- D) It tips right, then left

QUESTION 9 OF 10

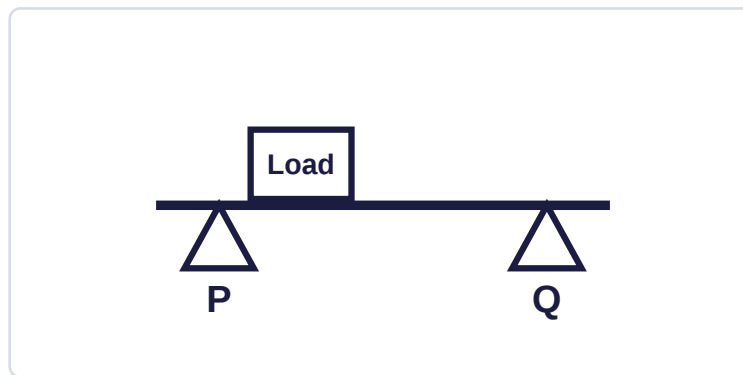
Pressing down at which point raises the load with the least effort?



- A) Point A
- B) Point B
- C) Point C
- D) Point D

QUESTION 10 OF 10

Which support carries more of the load's weight?



- A) Support P
 - B) Support Q
 - C) They carry equal weight
 - D) The plank carries it, not the supports
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Answers and worked solutions

Every wrong option is explained too, not just the correct answer.

Question 1

Correct answer: B) Anticlockwise

The answer is B. When two gears mesh, their teeth push directly against each other, so meshed gears always turn in opposite directions. Gear A turns clockwise, so gear B must turn anticlockwise. Option A is the direction you would get if the gears were joined by an open belt or chain rather than meshing teeth. A driven gear does not stay still while A turns it, and a steady drive never makes a meshed gear reverse, so C and D are wrong.

Question 2

Correct answer: B) Clockwise

The answer is B. Meshed gears alternate direction along a train: A clockwise makes B anticlockwise, and B anticlockwise makes C clockwise. With an odd number of gears the last one always matches the first, so C turns the same way as A. Option A is the direction of the middle gear B, a common slip. A three-gear train turns freely rather than locking, and a constant drive gives a constant direction, so C and D are wrong.

Question 3

Correct answer: B) 30 rpm

The answer is B. For meshed gears the number of teeth times the turning speed is the same for both, because every tooth of one gear moves exactly one tooth of the other. So 8 times 60 equals 16 times the unknown speed, giving 30 rpm. The larger gear has twice the teeth, so it turns at half the speed. Option A doubles the speed instead of halving it, C leaves it unchanged, and D halves it twice over. Only 30 rpm fits $8 \times 60 = 16 \times 30$.

Question 4

Correct answer: A) Clockwise

The answer is A. An open, uncrossed belt keeps the same edge of the belt on top across both pulleys, so the two pulleys turn the same way. Driver A turns clockwise, therefore B also turns clockwise. Opposite directions would need the belt crossed into a figure of eight, which is not shown, so B is wrong. A taut belt drives B steadily, so it neither stays still nor flips direction, which rules out C and D.

Question 5

Correct answer: C) Anticlockwise

The answer is C. A crossed belt swaps which edge of the belt sits on top between the two pulleys, so the driven pulley turns the opposite way to the driver. A turns clockwise, so B turns anticlockwise. The same direction would need an open, uncrossed belt, which rules out A. The crossing does not stop the belt or make it flip on every turn, so B and D are wrong; it simply reverses the sense once.

Question 6

Correct answer: A) The small pulley

The answer is A. A belt moves at the same speed all along its length, so both pulleys pass the same length of rim in a given time. The small pulley has a shorter circumference, so it needs more turns to move that length and therefore spins faster. The large pulley covers more rim per turn and so turns fewer times, making B wrong. Equal turns would need equal-sized pulleys, ruling out C, and the belt clearly drives both, ruling out D.

Question 7

Correct answer: B) 100 N

The answer is B. A single movable pulley hangs from two sections of rope, and together they share the load so each section carries half. The effort on the free end equals the tension in one section, which is half of 200 N, or 100 N, once friction is ignored. Option A forgets that the pulley helps at all. Option C doubles the force the wrong way, and D would need four supporting ropes rather than two. Two supporting ropes give a mechanical advantage of two, so 100 N is correct.

Question 8

Correct answer: A) The left-hand side goes down

The answer is A. A beam turns towards the side with the larger turning effect, found by multiplying each weight by its distance from the pivot. The left side gives $5 \text{ kg} \times 4 \text{ m} = 20$, the right gives $8 \text{ kg} \times 2 \text{ m} = 16$. Because 20 is greater than 16, the left-hand side drops. Option B is tempting because the right-hand weight is heavier, but distance from the pivot counts just as much as weight. The turning effects are unequal, so it neither balances nor rocks to and fro, ruling out C and D.

Question 9

Correct answer: D) Point D

The answer is D. The further the effort acts from the fulcrum, the longer its lever arm, and the less force is needed to raise the same load, because turning effect is force multiplied by distance. Point D is furthest from the fulcrum, so pressing there needs the least effort. Point A is nearest the pivot and would need the most force, while B and C sit in between. Choosing the longest available lever arm always minimises the effort, so D is correct.

Question 10

Correct answer: A) Support P

The answer is A. When a load rests between two supports, each support carries more of the weight the closer the load sits to it. Here the load is much nearer P than Q, so P bears the greater share. Support Q still carries some of the weight, but less, which makes B wrong. The shares would only be equal if the load sat midway between the supports, ruling out C. The supports are what hold the plank up, so D is wrong.

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