IBMYP Integrated Sciences Sample Paper 1

Group 5: Integrated Science
On-Screen Examination
Total marks: 93

Instructions

- The on-screen examination has not yet started.
- Your time will begin once you have clicked the Start button below. Do not click Start until instructed to do so.
- Before the examination begins you are given 5 minutes to become familiar with its structure. Please navigate around the examination, taking note of the length of each task and question. You have 2 hours to complete the examination.
- There are 10 separate questions in this examination. Each question may have sub-parts. Answer all the questions in the response boxes provided. The maximum mark for this examination is 100 marks.
- As you progress through the questions, your answers are automatically saved.
- When 2 hours has ended. you will no longer be able to answer any questions.

Q 1) The image portrays an intense tug-of-war contest between two individuals. Each participant firmly grips one end of the taut rope, exerting their strength as they pull in opposite directions. (1 mark)
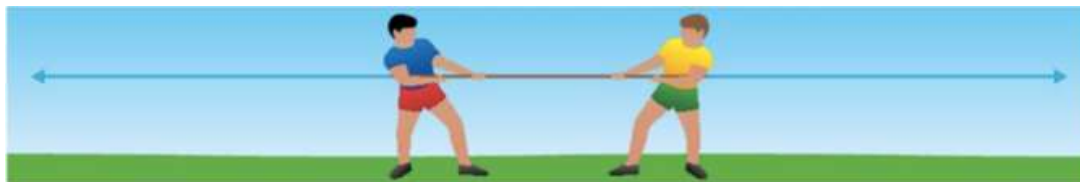
A. What is the type of force acting upon the rope?

a.Tension
b.Weight
c.Normal
d. Strain

Answer: D. Strain

B. In a tug-of-war contest, Team A and Team B are engaged in a battle on an uphill slope. The slope has an incline angle of 30 degrees. Team A exerts a force of 500 N uphill, while Team B exerts a force of 800 N downhill. Calculate the net force acting on the rope and determine whether the rope will move up or down the incline. Assume no friction or other external forces affecting the system. (3 marks)

Answer:
Given:

Force exerted by Team A uphill = 500 N
Force exerted by Team B downhill = 800 N
Incline angle = 30 degrees

To calculate the horizontal and vertical components of the forces:

- *Horizontal component of Team A's force = 500 N * cos(30°)*
  *= 500 N * 0.866*
  = 433 N

- *Horizontal component of Team B's force = 800 N * cos(30°)*
  *= 800 N * 0.866*
  = 693 N

- *Vertical component of Team A's force = 500 N * sin(30°)*
  *= 500 N * 0.5*
  = 250 N

- *Vertical component of Team B's force = -800 N * sin(30°) [negative due to downhill direction]*
  *= -800 N * 0.5*
  = -400 N

To calculate the net force:
- *Horizontal net force = Horizontal component of Team A's force + Horizontal component of Team B's force*
  = 433 N + 693 N
  = 1126 N

- *Vertical net force = Vertical component of Team A's force + Vertical component of Team B's force*
  = 250 N + (-400 N)
  = -150 N

Since the vertical net force is negative (-150 N), the rope will move down the incline.

Therefore, the net force acting on the rope is 1126 N horizontally and -150 N vertically, and the rope will move down the incline in this tug-of-war scenario.

C. Player A and Player B are now participating in a running race. Player A has an average speed of 6 m/s, while Player B has an average speed of 8 m/s. If the race is 200 metres long, how much time does it take for each player to complete the race? (2 marks)

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