

PRELIM REVIEW PAPER 1

14 OCTOBER 2014



Lesson Description

In this lesson we:

- Review select questions from Provincial Preliminary Exams

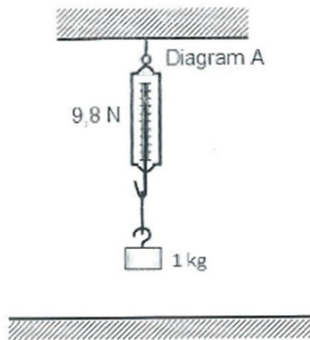


Test Yourself

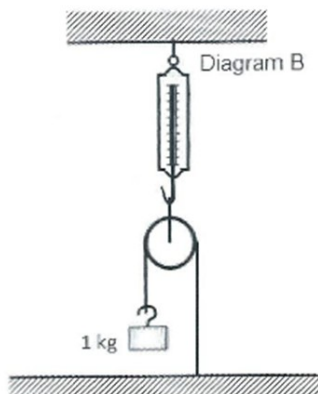
Select the most correct answer from the options given. Write down only the correct letter

Question 1

Diagram A shows a 1 kg mass suspended by a Newton scale attached to the ceiling



In diagram B, the same 1 kg mass is now suspended from a weightless, frictionless pulley by tying the rope to the floor.



If the reading on the scale in diagram A is 9,8 N, what will the scale read in diagram B?

- A. 4,9 N
- B. 9,8 N
- C. 14,7 N
- D. 19,6 N

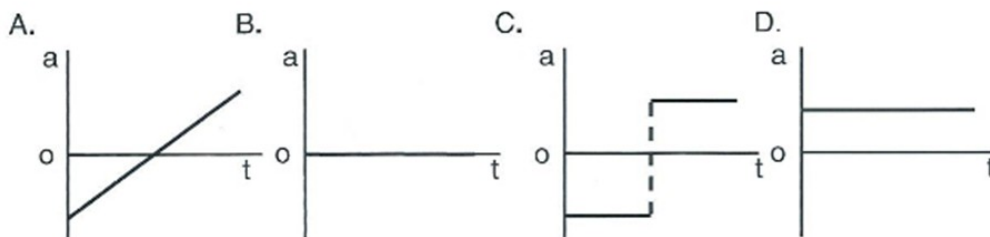
Question 2

The gravitational force between two objects is F when their centres are a distance d apart. What would the magnitude of the force be in terms of F if the mass of one object is doubled and the distance d halved?

- A. $8F$
- B. F
- C. $\frac{1}{2}F$
- D. $\frac{1}{8}F$

Question 3

An object has a momentum p for a time of t seconds. Which ONE of the following graphs correctly shows the acceleration-time relationship for this time interval?



Question 4

Which statement below is CORRECT for resistors connected in parallel in a circuit?

- A. The voltage (V) across the combination is divided by the resistors each have the same current (I)
- B. The current (I) across the combination is divided but the resistors each have the same voltage (V)
- C. The current (I) and the voltage (V) across the combination is divided.
- D. The current (I) and the voltage (V) across the combination is the same across each resistor.

Question 5

If a light is passed through a cold, diluted gas, the atoms of the gas absorb photons at a certain...

- A. velocity and form an absorption spectrum
- B. velocity and form a continuous spectrum
- C. frequency and form an absorption spectrum
- D. frequency and form a line emission spectrum

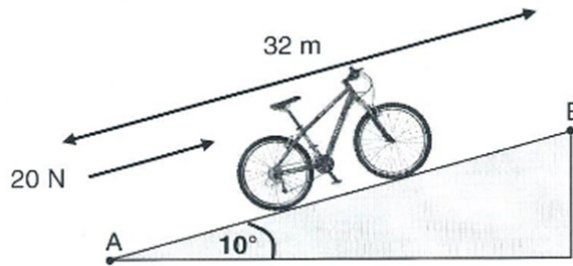


Improve your skills

Question 1

(Adapted from Gauteng Preparatory Exam 2014)

A cyclist pushes his bicycle of mass 6,1 kg up an incline with a force of 20 N. The bicycle is pushed from an initial velocity of $5 \text{ m}\cdot\text{s}^{-1}$ from point A to point B. The road is inclined at 10° to the horizontal and the distance from A to B is 32 m as shown below.



The road surface exerts a force of friction of 11 N on the bicycle tyres.

- 1.1. Calculate the work done by the cyclist on the bicycle. (3)
- 1.2. Use the work-energy theorem and calculate the magnitude of the velocity of the bicycle at 32m. (5)
- 1.3. Explain why frictional forces are regarded as non-conservative forces. (2)

Question 2

(Adapted from Gauteng Preparatory Exam 2014)

Keenan standing on the top of the Leaning Tower of Pisa accidentally drops his cell phone when it starts ringing at a frequency of $497 \times 10^3 \text{ Hz}$. The height of the tower is 56 m



- 2.1 Calculate the speed of the cell phone at a height of 18 m by using the law of conservation of mechanical energy. (4)

Nerisse standing at the bottom of the tower hears the phone ringing as it falls towards her. Ignore the effect of air friction.

- 2.2. Calculate the frequency of the sound observed by Nerisse when the phone is at a height of 18m above the ground. Take the speed of sound in air as $340 \text{ m}\cdot\text{s}^{-1}$. (4)

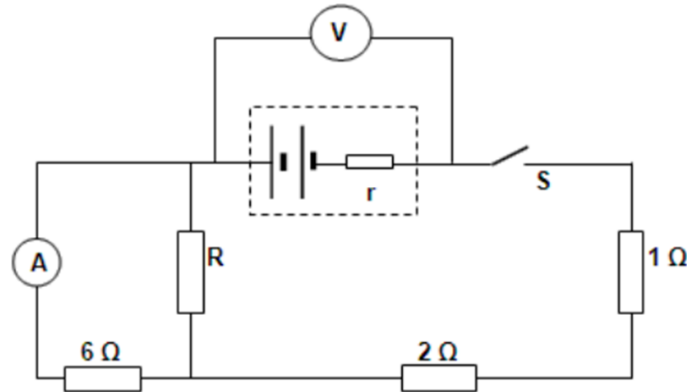
notes for...

- 2.3. Explain in terms of wavelength and frequency of sound why Keenan who is at the top of the tower, observes a lower frequency of sound than the value calculated in Question 2.2. (3)
- 2.4. How will the frequency of sound observed by Nerisse compare at a height of 18 m to that at 3 m? Write only HIGHER, LOWER or STAYS THE SAME. (1)

Question 3

(Adapted from Eastern Cape Preparatory Exam 2014)

A learner wants to use a battery with an emf of 13 V to operate a walking doll. The battery has an unknown internal resistance of r . The walking doll has a resistance of 6Ω . The learner uses the circuit below to obtain the potential difference required for the walking doll to function.



When switch **S** is closed, the reading on the voltmeter drops to 12 V and the walking doll functions at its maximum power of 6 W.

- 3.1. Explain briefly why the reading on the voltmeter drops when switch **S** is closed. (2)
- 3.2. Calculate the internal resistance, r , of the battery. Show all the steps in your calculations. (9)
- 3.3. Calculate the magnitude of the unknown resistance, R . (3)
- 3.4. The resistor R is replaced with a conducting wire of negligible resistance. What effect will this have on the 'lost volts'? Fully explain your answer. (4)