Section A: Answer all questions from this section - you should allow about 5 minutes per question. Each question carries 5 marks

Question 1

(a) What is the difference between a *scalar* and a *vector* quantity?
(b) A hiker walks due north for 4.0 km to reach point A and then northeast for 6.0 km to reach point B. Find by calculation or by scale drawing (you can use a sheet of graph paper)

- The straight line distance from the starting point to B
- The direction from the starting point to | Deleted: B |
- The average velocity of the hiker if the whole walk takes 2 hours
- The average speed of the hiker if the whole walk takes 2 hours

Question 2

A car moves forward at 54 km/hr for 60 seconds; stops for 30 seconds; and then reverses at 18 km/hr for 30 seconds

a) Sketch a velocity-time graph for this motion
b) Calculate the displacement of the car from its starting position
c) Sketch a distance-time curve for the motion

Question 3

A cyclist rides for 100 seconds at a steady speed of 4.0 m s^{-1} up a hill sloping up at 10°

a) If the cyclist and bicycle weigh 85 kg calculate their gain in potential energy over this period
b) If the cyclist's energy output is 2.0 kW over this period calculate the total work done
c) what fraction of this work is
- converted into potential energy
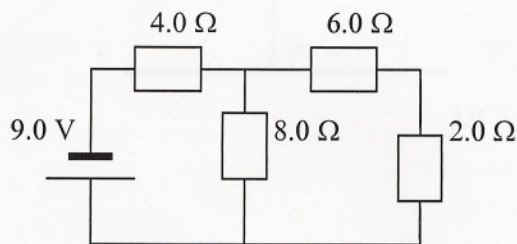- converted into kinetic energy
- done against friction

Question 4

Two 60 Ω light bulbs are connected to a 240 V supply.

a) Calculate the current if they are connected in series
b) Calculate the current if they are connected in parallel
c) In each case calculate the power consumed by ONE bulb

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Question 5

4.0 Ω   6.0 Ω

9.0 V   8.0 Ω   2.0 Ω

a) Calculate the total resistance of the circuit, above and | Deleted: |
b) the total current drawn from the supply
c) the voltage across the 8.0 Ω resistor

IntroPhysics Bridging Course   Final Examination (Series E)