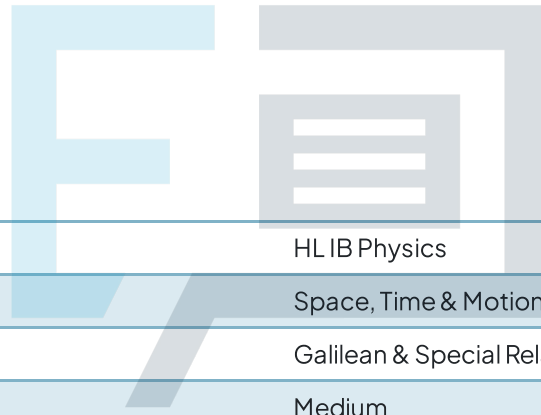




Galilean & Special Relativity

Question Paper



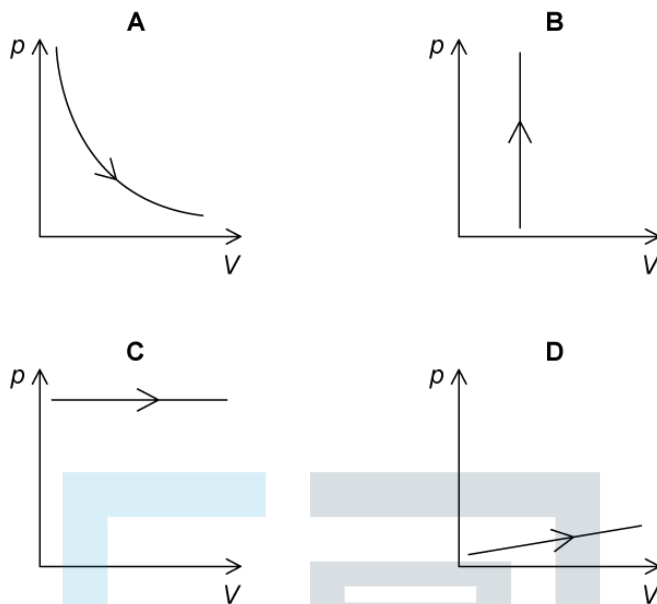
Course	HL IB Physics
Section	Space, Time & Motion
Topic	Galilean & Special Relativity
Difficulty	Medium

Exam Papers Practice

To be used by all students preparing for HL IB Physics
Students of other boards may also find this useful

Question 1

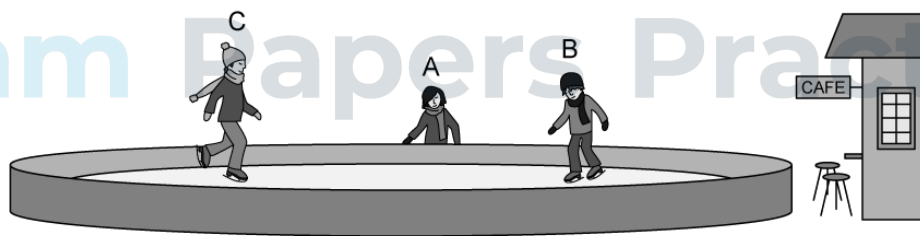
Which of the following graphs correctly shows the Lorentz factor for objects travelling at different velocities?



[1 mark]

Question 2

Persons A, B & C go to an ice skating rink. Person A sits at the side as an observer. Person B and person C are skating.



Person B skates away from the cafe at a constant speed of 10 m s^{-1} . Person C skates toward the cafe at a constant speed of 8 m s^{-1} . Persons B and C pass one another in front of Person A.

What speed is Person C travelling at from Person B's reference frame?

- A. -18 m s^{-1}
- B. -2 m s^{-1}
- C. 2 m s^{-1}
- D. 18 m s^{-1}

[1 mark]

Question 3

Twin A goes on a space exploration trip to the furthest reaches of the Solar System, leaving Twin B behind on Earth. The date of Twin A's departure is their 31st birthday. Twin A travels at a constant speed of $0.85c$, as measured by Twin B, for the entire duration of the trip.

When Twin A returns to Earth, Twin B is 47 years old.

What is the age of Twin A when they return to Earth?

- A. 33 years old
- B. 39 years old
- C. 47 years old
- D. 61 years old

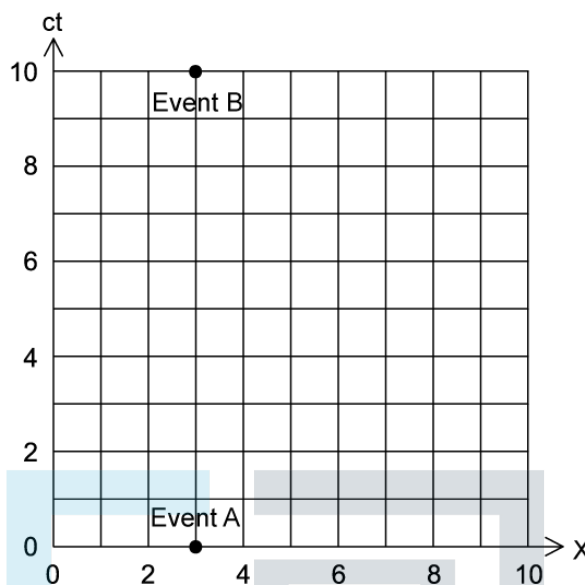
[1 mark]



Exam Papers Practice

Question 4

On a space-time diagram, the units of time are metres.



Event A occurred 10 seconds after event B.

Which value is equal to 1 second on the spacetime diagram?

- A. 1 m
- B. 10 m
- C. 3×10^8 m
- D. 3×10^9 m

Exam Papers Practice [1 mark]

Question 5

Which postulate(s) of special relativity, if any, can be predicted by Maxwell's theory of electromagnetism?

- A. The laws of physics are the same in all inertial frames of reference
- B. The speed of light in a vacuum is the same in all inertial reference frames
- C. Both postulates
- D. Neither postulate

[1 mark]