Family name, given name	*Student number*	*Tutorial group*

PHY293, Part B (Modern Physics)

Quizz 3.1, November 2017
(You have 20 minutes to complete this Quiz)
(You may use a non-programmable calculator)

Answer the question on the remainder of the page. All parts of the question receive equal weight in the overall grade of the quiz. If you supply the correct numerical answer for each question you will get full marks, but you are encouraged to include a clear explanation of your intermediate work as partial credit will be given if you are headed in the right direction but make a mistake in extracting the final result. Use back if necessary.

Anna and Bob are born simultaneously, just as Anna's spaceship passes Earth, traveling at a constant speed 0.6c. From Bob's perspective, in a stationary frame on the Earth, Planet X is 25 light-years away. As Anna passes Planet X and continues on her journey at a constant speed:

1. What will Anna's age be, according to her (moving) clock?
2. What will Bob's age be, according to Anna's (moving) clock?
3. What will Bob's age be, according to Bob's (stationary) clock?
4. What will Anna's age be, according to Bob's (stationary) clock?

Family name, given name	*Student number*	*Tutorial group*

PHY293, Part B (Modern Physics)

Quizz 3.2, November 2017
(You have 20 minutes to complete this Quiz)
(You may use a non-programmable calculator)

Answer the question on the remainder of the page. All parts of the question receive equal weight in the overall grade of the quiz. If you supply the correct numerical answer for each question you will get full marks, but you are encouraged to include a clear explanation of your intermediate work as partial credit will be given if you are headed in the right direction but make a mistake in extracting the final result. Use back if necessary.

Anna and Bob are born simultaneously, just as Anna's spaceship passes Earth, traveling at a constant speed 0.8*c*. From Bob's perspective, in a stationary frame on the Earth, Planet X is 10 light-years away. As Anna passes Planet X and continues on her journey at a constant speed:

1. What will Bob's age be, according to Bob's (stationay) clock?
2. What will Bob's age be, according to Anna's (moving) clock?
3. What will Anna's age be, according to Anna's (moving) clock?
4. What will Anna's age be, according to Bob's (stationary) clock?

Family name, given name	*Student number*	*Tutorial group*

PHY293, Part B (Modern Physics)

Quizz 3.3, November 2017
(You have 20 minutes to complete this Quiz)
(You may use a non-programmable calculator)

Answer the question on the remainder of the page. All parts of the question receive equal weight in the overall grade of the quiz. If you supply the correct numerical answer for each question you will get full marks, but you are encouraged to include a clear explanation of your intermediate work as partial credit will be given if you are headed in the right direction but make a mistake in extracting the final result. Use back if necessary.

An experimental particle physicist determines that a particle created at one end of his experimental hall, travelling at a constant speed of $v = 0.85c$, survives for 320 ns and decays just as it reaches the other end of the experimental hall:

1. According to the experimenter, how far did the particle travel from its point of creation to its point of decay? In other words how long is the experimental hall in the stationary frame?
2. In the particle's reference frame, how long did it live?
3. From the perspective of the particle (or an observer moving in a reference frame where the particle is at rest, if you prefer) how long is the experimental hall?

Family name, given name	*Student number*	*Tutorial group*

PHY293, Part B (Modern Physics)

Quizz 3.4, November 2017
(You have 20 minutes to complete this Quiz)
(You may use a non-programmable calculator)

Answer the question on the remainder of the page. All parts of the question receive equal weight in the overall grade of the quiz. If you supply the correct numerical answer for each question you will get full marks, but you are encouraged to include a clear explanation of your intermediate work as partial credit will be given if you are headed in the right direction but make a mistake in extracting the final result. Use back if necessary.

An experimental particle physicist determines that a particle created at one end of his experimental hall, travelling at a constant speed of $v = 0.99c$, survives, on average, for 6 μs and decays just at the other end of the experimental hall:

1. In the particle's reference frame, how long did it live?
2. According to the experimenter, how far did the particle travel from its point of creation to its point of decay?
3. From the perspective of the particle (or an observer moving in a reference frame where the particle is at rest, if you prefer) how long is the experimental hall?