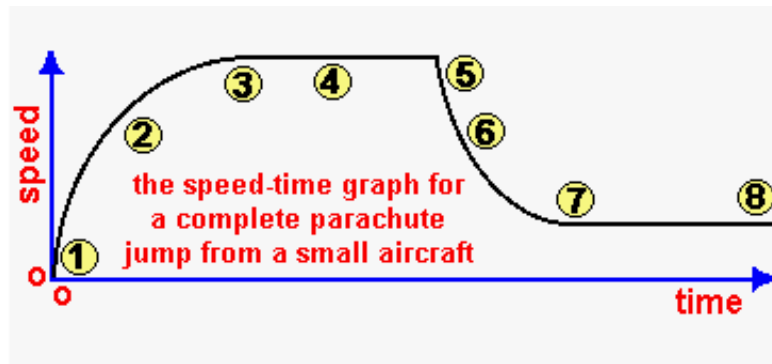


CCT Weekly Science Practice

Force and Laws of Motion

A Parachutist jumps from an aircraft. After some time, he opens his parachute. The speed-time graph for his motion is shown below:



Question 1:- At what points, is the air resistance greater than the weight of the body?

- a) 1 and 2
- b) 3 and 4
- c) 5 and 6
- d) 7 and 8

Question 2:- At what point (s), is the air resistance equal to the weight of the body?

- a) 1, 2, 5 and 6
- b) 3, 4, 7 and 8
- c) 1 only
- d) 1 and 5

Question 3:- Explain the shape of the above speed-time graph.

Question 4:- During this motion, there are many forces acting on the man (parachutist), parachute and earth. Some of them are:

- A- Weight of the man
- B- Force on man by parachute in upward direction
- C- Air resistance
- D- Force on parachute by man
- E- Upward pull on earth

Which of these are Newton's Third law pairs?

	First Pair	Second Pair
a)	A and C	D and E
b)	A and E	B and D
c)	A and E	Only one pair
d)	A and B	D and E

Question 5:- When the parachutist landed on ground, he landed on a snail on the ground by mistake. The snail died then and there but nothing happened to the parachutist. He justified,” Since the snail was very small ,a larger force was exerted by him on the snail as compared to the force exerted by the small snail on him. Comment on the correctness of his statement.

Created by:

Tanya Gera, G D Goenka Public School, Gurugram.

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Answers: - Force and Laws of Motion

1. c) 5 and 6

When the parachutist opens the parachute, air resistance increases due to large area of parachute.

2. b) 3, 4, 7 and 8

At these positions, weight becomes equal to air resistance; net force becomes zero. Hence, the body falls with a constant speed.

3. When the parachutist jumps, he falls freely and accelerates due to gravity, at this time air resistance is less than the weight (1 and 2). Weight is constant but with increase in his speed, air resistance acting on him is increasing causing him to attain a constant velocity, known as 'terminal velocity' (3 and 4) when air resistance becomes equal to weight.

Now, he opens the parachute, air resistance rapidly increases due to increase in area, deceleration takes place (5 and 6) which decreases the speed. Again at 7, air resistance becomes equal to the weight; he attains a slower terminal velocity.

- 4.

b)	A and E	B and D
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5. This is a big misconception among many people that a bigger body exerts a greater force on smaller body. The statement is incorrect as both the bodies will exert equal force on each other according to Newton's Third law. The same force will cause a greater impact on the smaller body according to second law.

Created by:

Tanya Gera, G D Goenka Public School, Gurugram.