

## Unit 9 Space Travel

### **A** Multiple-choice questions

1. A
2. D
3. C
4. B
5. D
6. C
7. A
8. A
9. B
10. C
11. C
12. A
13. B
14. D
15. D
16. B
17. C
18. A
19. B
20. B

## **B** True or false questions

1. F
2. T
3. F
4. F
5. F
6. T
7. F
8. T
9. T
10. F

## **C** Fill-in-the-blanks

1. newton balance / spring balance, newton (N)
2. speed / direction
3. non-contact
4. air friction / air resistance
5. space shuttles
6. spacesuits
7. streamlined, air friction
8. vacuum
9. radiation
10. reaction, opposite

**D****Short questions**

1. The layer of water between the blade and the ice surface greatly reduces the friction acting on the blade. Hence, we can skate at a high speed on ice surface.
2. Seahorse is not designed to be a good swimmer. It is because it does not have streamlined body.
3. The surface of a space shuttle is covered with insulating tiles that protect the space shuttle from burning.

Parachutes are used to slow down the space shuttle so that the space shuttle can land more safely.

(Or other reasonable answers.)

4. Michael has to push the window hard before he can open it because the friction between the moving parts of the hinges of the window is large.  
He should apply some lubricating oil at the hinges to reduce the friction.

5.

a



- b There is friction acting on the block if it rests on an inclined plane. Friction prevents the block from sliding down.

6. Since the rocket has to fly in air, its body should be streamlined to reduce air resistance when it moves in air. However, since the lunar landing vehicle travels only in space (a vacuum), it does not need a streamlined shape.
7. The force acting on the wall by Paul points towards the left. Hence, the reaction acting on Paul by the wall points towards the right and Paul will move towards the right after the push.
8. When an astronaut faces the Sun in space, the tinted visor reflects radiation and prevents excessive radiation from reaching the astronaut. Also the shiny surface of the spacesuit reflects radiation and reduces the absorption of radiation from the Sun.
9. Since the weight of an object on the Moon is only one-sixth of that on the Earth. Therefore, the weight of the block of 100 kg is much lighter on the Moon than that on the Earth and John can lift it on the Moon.
10. Since there is no air on the Moon, even if the fan of the cart is turned on, no force (reaction) will act on the cart and the cart will not move.

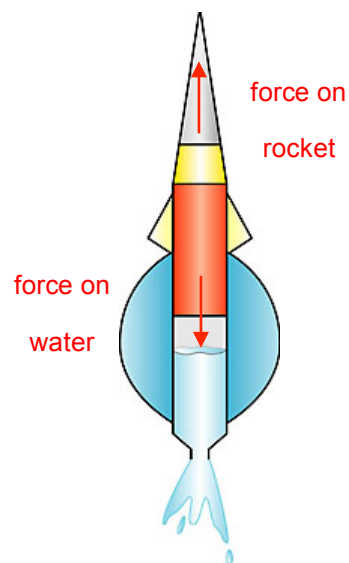
## E Long questions

1.

- a When Tommy throws a sandbag, a reaction acts on Tommy by the sandbag and hence he, together with the cart, moves.
- b Tommy moves at a higher speed when he throws the sandbag with 5 kg. It is because he applies a larger force in throwing a heavier sandbag and a larger reaction force acts on him. Hence he can move faster.
- c It is because friction acts on the cart when it moves. Therefore, the cart slows down and stops.

2.

a



- b They are called action and reaction. They have the same size.
- c Pump more air into the rocket.  
(or other reasonable answers)
- d The kinetic energy and potential energy of the rocket increases.

3.

- a Force of gravity attracts them towards the Earth.  
Air resistance oppose their motion.
- b The spacecraft moves faster because its bottom has a smaller surface area than that of the space shuttle, the air resistance is also less than that of the space shuttle.
- c The surface of the space shuttle is covered with insulating tiles.

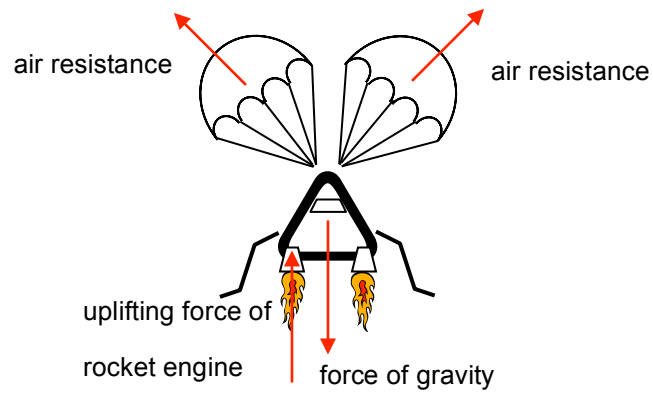
4.

- a Weightlessness is the situation in which we cannot feel our weight.
- b It is because the gravity of the Moon is only one-sixth of that of the Earth.  
Hence, Armstrong felt much lighter on the Moon than on the Earth.
- c In space,  
astronauts have to use specially designed toilet,  
astronauts have to themselves in beds, or  
astronauts have to add water through a long needle inserted into the sealed containers with foods in dried form.  
(any ONE or other reasonable answers)
- d Small lasers in CD driver  
Scratch-resistant lenses  
Dried food and high energy food  
(any ONE or other reasonable answers)

5.

a The speed of the spacecraft is very high. And the temperature of the spacecraft is very high.

b



c Astronauts should put on spacesuits with oxygen tank.

d The weight of the astronaut on Planet Y =  $800 \text{ N} \times \frac{3}{4} = 600 \text{ N}$