

# Physics

## Delprov A1

engelsk version

Årskurs

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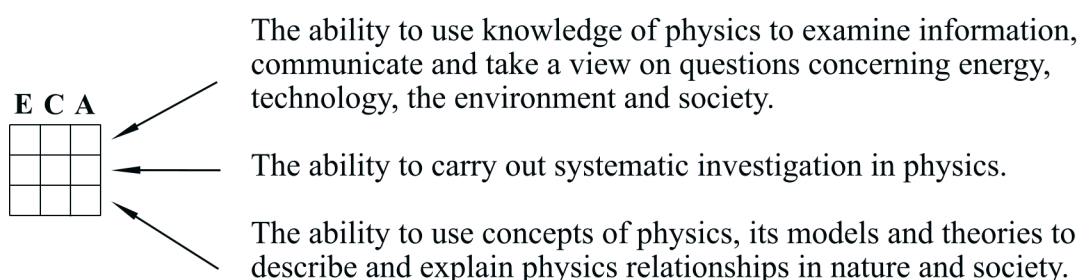
Elevens namn och klass/grupp



## NATIONAL TEST IN PHYSICS 2017

The national test gives you a chance to show what you know about physics. On the right of each question you will find a symbol that tells you which of three abilities you can demonstrate in your answer.

The rows in the symbol describe these different abilities.



For each row you will be able to show your knowledge at three different levels: E, C and A.

For example, the table on the right indicates that the question allows you to show that you can use concepts of physics, its models and theories to describe and explain physics relationships in nature and society at level E and C.


Your answers to the questions should be clearly written so that other persons can read your text and understand your meaning. Therefore it is important that you show all your work.

Time allowed: 75 minutes

Name: \_\_\_\_\_

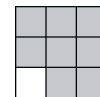
School: \_\_\_\_\_ Class: \_\_\_\_\_

Date of Birth: Year \_\_\_\_\_ Month \_\_\_\_\_ Day \_\_\_\_\_

*Your answers must be written on separate sheets of paper, NOT on the question paper. The question paper must be returned to your teacher together with your answers.*

1. The Sun, the Andromeda galaxy and the centre of the Milky Way are located at different distances from Earth.

Combine each of the alternatives **1-3** with the distance **A-C** from Earth.

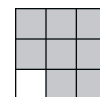


- |    |                             |    |   |
|----|-----------------------------|----|---|
| 1. | The Sun                     | A. | Approximately 30 000 light years from Earth.    |
| 2. | The Andromeda galaxy        | B. | Approximately 8 light minutes from Earth.       |
| 3. | The centre of the Milky Way | C. | Approximately 2 000 000 light years from Earth. |

2. Rail tracks for trains consist of two metal rails. When the rail track is built and the metal rails are put on the ground, consideration is taken to how the metal is affected by the varying of temperature during the year.



Which of the alternatives **A-D** describes how the metal rails are affected when they are heated by the sun on a warm summer day?



- A. The volume of the metal rails is increasing.
- B. The volume of the metal rails is decreasing.
- C. The mass of the metal rails is increasing.
- D. The mass of the metal rails is decreasing

3. Scientific discoveries have led to developments of several areas of use in society.

Combine each of the methods 1-3 with one of the area of use A-C.



### Scientific discoveries

### Areas of use

1. Ultrasound is sound with a high frequency impossible for humans to hear.

A. Possibility to study other planets.

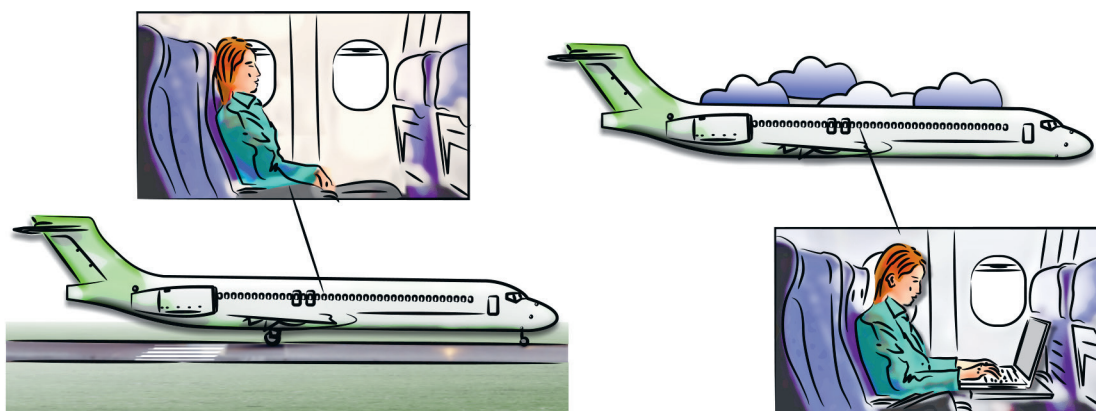
2. Electromagnetic induction transforms kinetic energy into electricity.

B. Possibility for light around the clock.

3. Refraction refers to the change of direction of light when it moves from one transparent material into another.

C. Possibility to medical examinations and treatments.

4. Melissa is sitting in an airplane that will take off. When the airplane is accelerating on the runway, Melissa experiences that she is pushed back towards the seat. When the airplane has flown for a while, she does not experience that she is pushed back towards the seat.

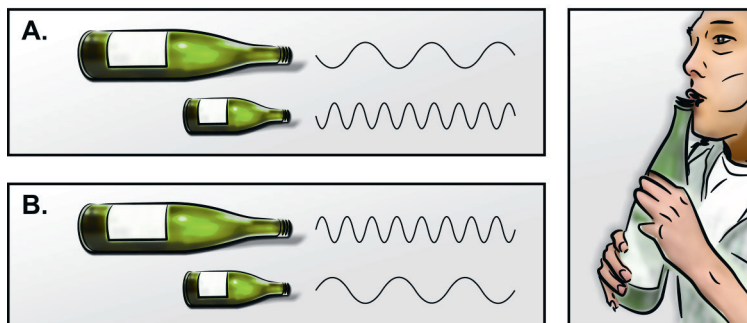


Explain why Melissa experiences that she is pushed back towards the seat when the airplane is accelerating during take-off, but not after the airplane has flown for a while.



5. Luis is blowing into two empty glass bottles with the same shape but difference sizes. When Luis is blowing equally hard into the bottles, different sound waves arise.

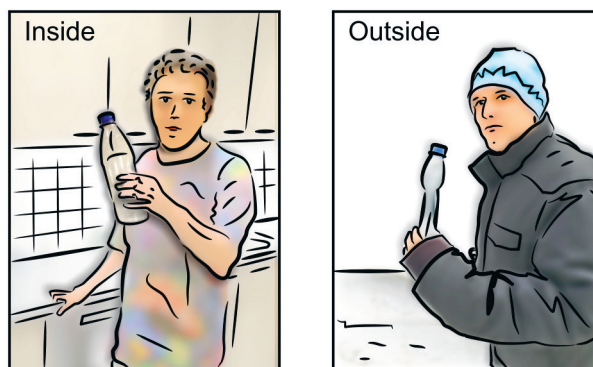
### Sound waves



- Which of the alternatives **A-B** shows that there will be a high pitched sound in the smaller bottle and a low pitched sound in the bigger bottle?
- Motivate your choice by using your knowledge about wavelength or frequency.



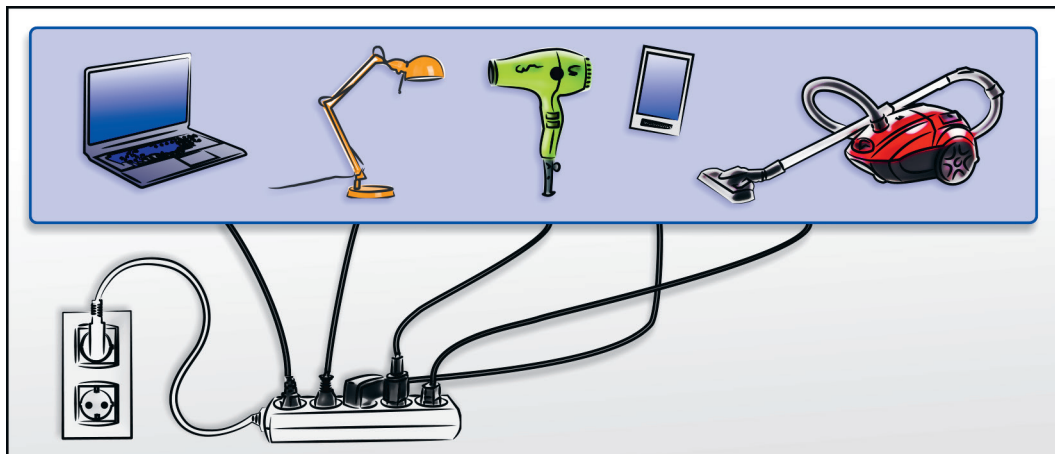
6. A cold winter day, Dragomir is going to recycle PET bottles. When he leaves home, the bottles have a certain shape. When he comes to the shop, the bottles have changed shape even though no air has leaked from them.



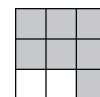
Use your knowledge about the movement of particles to explain why the PET bottle has changed shape.



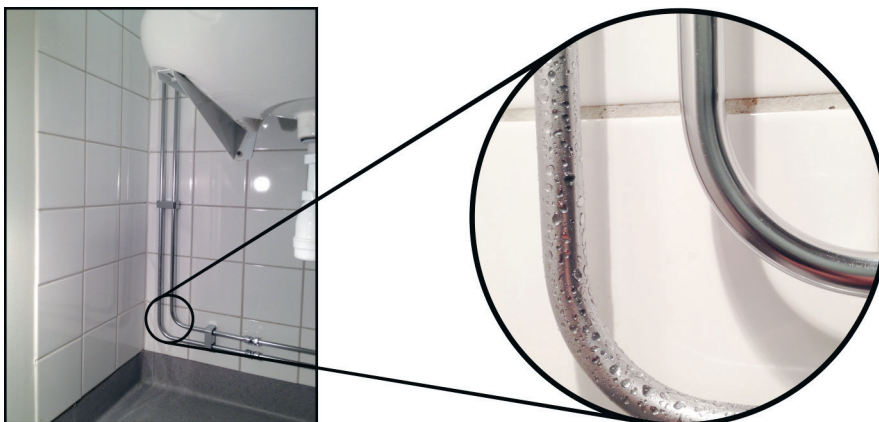
7. In a room, there are a number of electrical devices. All devices are connected to the same wall socket. When all devices are used at the same time, the electricity cuts out.



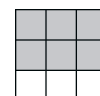
Explain why the electricity suddenly cuts out when all devices are used at the same time.



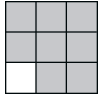
8. In a bathroom, water runs in two pipes, one with cold water and one with hot water. When Olle has showered, he realises that there are small water drops on one of the pipes. He examines if the pipes is leaking, but it does not.



Use your knowledge about phase transitions and the movement of particles to explain why small water drops are produced on one of the water pipes.

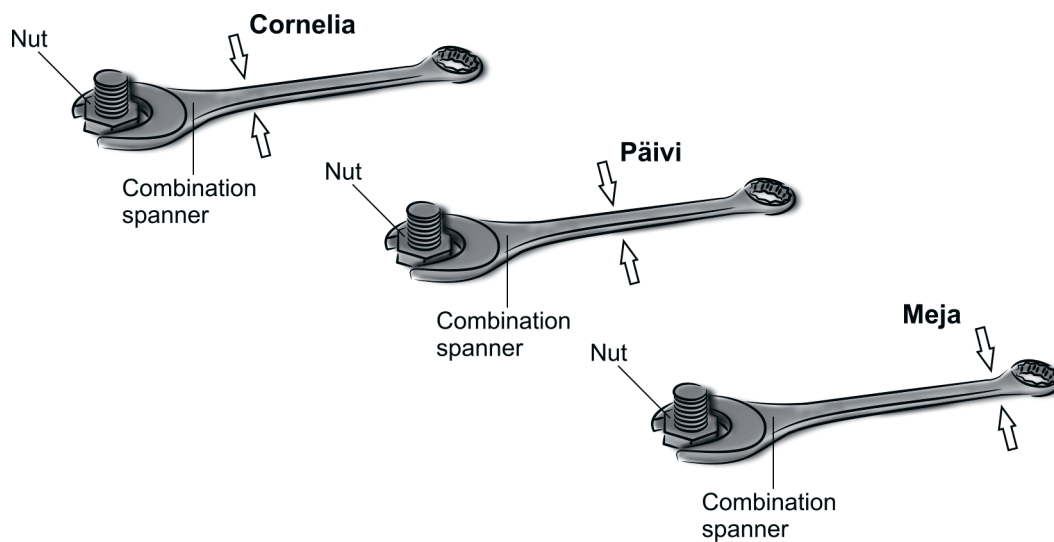


9. State an effect of ionizing radiation when used to treat cancer.

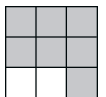


10. Cornelia, Päivi and Meja are using a combination spanner to tighten a nut. They discuss where on the spanner they should hold their hands thereby having to use as little force as possible.

The figures show where on the combination spanner they are planning to hold their hands having to use as little force as possible.



Explain who will have to use the least force to tighten the nut.



11. A family are going to replace their old refrigerator with a new refrigerator.



- Use your knowledge about the use of energy to reason in two steps how the replacement of a refrigerator can affect the environment.
- Use your knowledge about the use of natural resources to reason in two steps how the replacement of a refrigerator can affect the environment.



12. Laser light is a monochrome light with a high energy density. Laser light is used within health care, for example during eye operations and when treating tissue damage.

Explain the implication laser light has had for humans' living condition. State one possibility and one risk with the use in your explanation.









Institutionen för tillämpad utbildningsvetenskap