Question block created by wizard

This exam contains 52 questions.

$cg = \frac{h}{3}$

$cg = \frac{4r}{3\pi}$

$M = F \cdot d$

$M_+ = M_-$

$F = \sigma \cdot A$

$F = m \cdot A$

$F_B \cdot b = F_A \cdot a$

$MA = \frac{r_B}{r_A}$

$F = k \cdot \Delta l$

$F \cdot \Delta t = m \cdot \Delta v$

$imp = F \cdot \Delta t$

$p = m \cdot \Delta v$

$F_s = \frac{m \cdot v^2}{r}$

$W = m \cdot g \cdot \Delta h$

$W = Q - \Delta U$

$E_{kin} = \frac{1}{2} \cdot m \cdot v^2$

$E_{pot} = m \cdot g \cdot h$

$Q = m \cdot c \cdot \Delta T$

$\eta = \frac{W}{Q_H} (\times 100\%)$

$f_s^{max} = \mu_s \cdot F_N$

$f_k = \mu_k \cdot F_N$

$\rho = \frac{m}{V}$

$sg = \frac{\rho_{substance}}{\rho_{water\ (277K)}}$

$mfr = \rho \cdot A \cdot v$

$F = \frac{9}{5}\,^{o}C + 32$

$v_f = v_0 + \Delta v$

$p = \rho \cdot g \cdot h$

$p = p_{atm} + p_{liquid}$

$s = v \cdot t$

$s_f = v_0 \cdot t + \frac{1}{2} \cdot a \cdot t^2$

$v = a \cdot t$

$v_f = v_0 + a \cdot t$

$v = f \cdot \lambda = \frac{\lambda}{T}$

$v = \frac{2 \cdot \pi \cdot r}{T}$

$v = \sqrt{a_c \cdot r}$

$T = 2\pi \cdot \sqrt{\frac{l}{g}}$

$\theta = \omega \cdot t = \frac{2\pi}{T} \cdot t$

$\Delta V = \beta \cdot V_0 \cdot \Delta T$

$R = \frac{p \cdot V}{T} = \frac{2 \cdot c_p}{5} = \frac{2 \cdot c_V}{3} = R_s \cdot m$

$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$

$m = \frac{h_i}{h_o}$

$T = \frac{1}{f}$

$I = \frac{P}{A}$

$4{,}186\ kJ = 1 kcal$

1. The particles of an atom can have an electrical charge.

Which particle has a positive charge?

- o (a) Electron.
- o (b) Neutron.
- • (c) Proton.

If choice c is selected set score to 1.

2. Which particles determine the volume of an atom?

- (a) Electrons in their shells.

o (b) Protons in the nucleus.
o (c) Neutrons in the nucleus.

If choice a is selected set score to 1.

3. Which of the following expressions is a property of a compound?

o (a) A compound consist only of two elements.

- (b) A compound always contains the same mass ratio of its component atoms.

o (c) The properties of a compound are equal to the properties of its elements.

If choice b is selected set score to 1.

4. Which of the following expressions is a property of a liquid?

o (a) Liquids have no surface, and no fixed shape or volume.

- (b) Liquids have much greater density than gases.

o (c) There are very strong forces of attraction between the particles of a liquid.

If choice b is selected set score to 1.

5. Which of the following expressions is a property of a solid.

- (a) Solids are extremely difficult to compress.

o (b) Solids have less density than gases.
o (c) There are almost no forces of attraction between the particles of a solid.

If choice a is selected set score to 1.

6. How do you call the change of matter from solid to liquid?

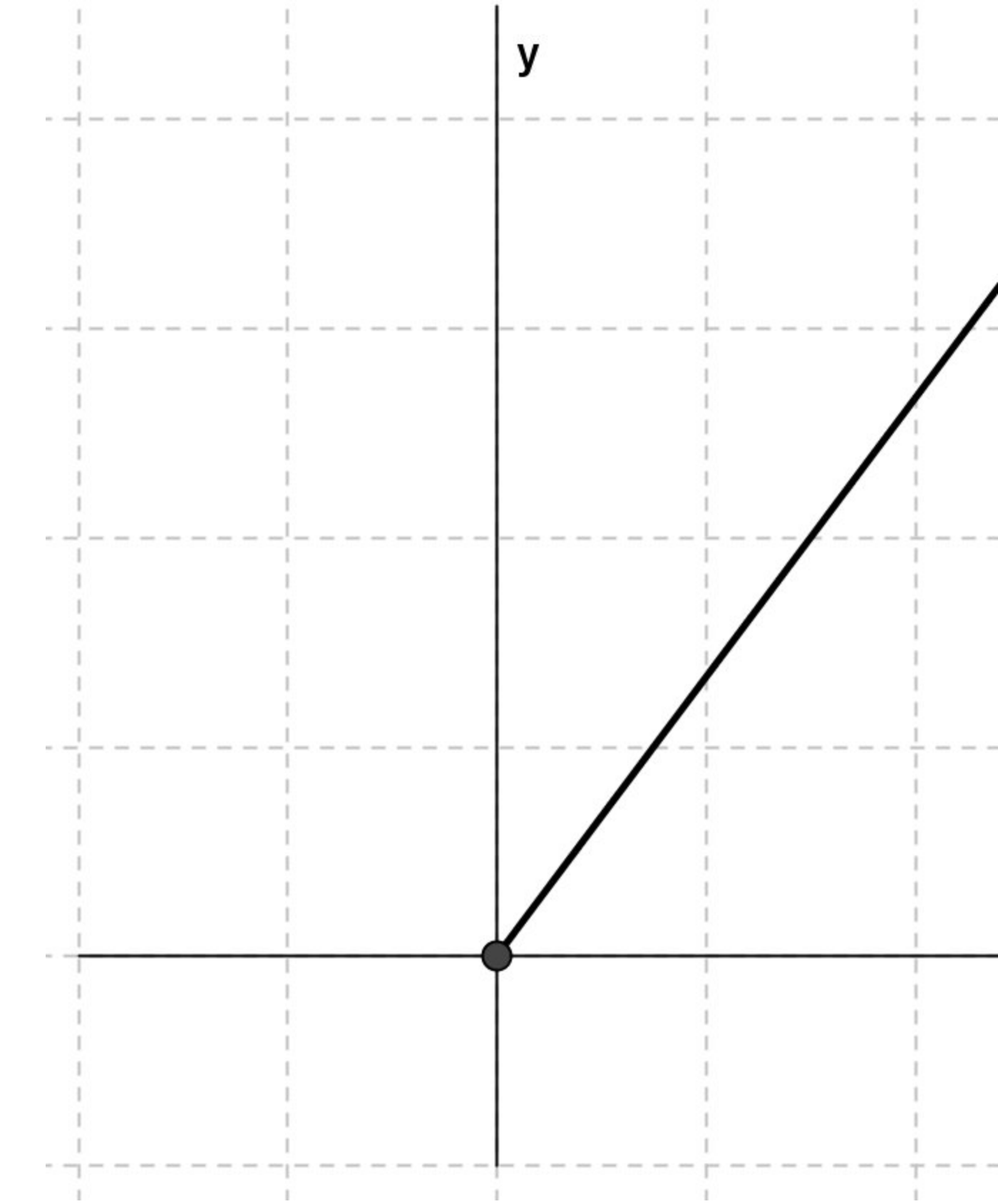
o (a) Subliming.

- (b) Melting.

o (c) Cooking.

If choice b is selected set score to 1.

7. Calculate the force that causes a vertical displacement.



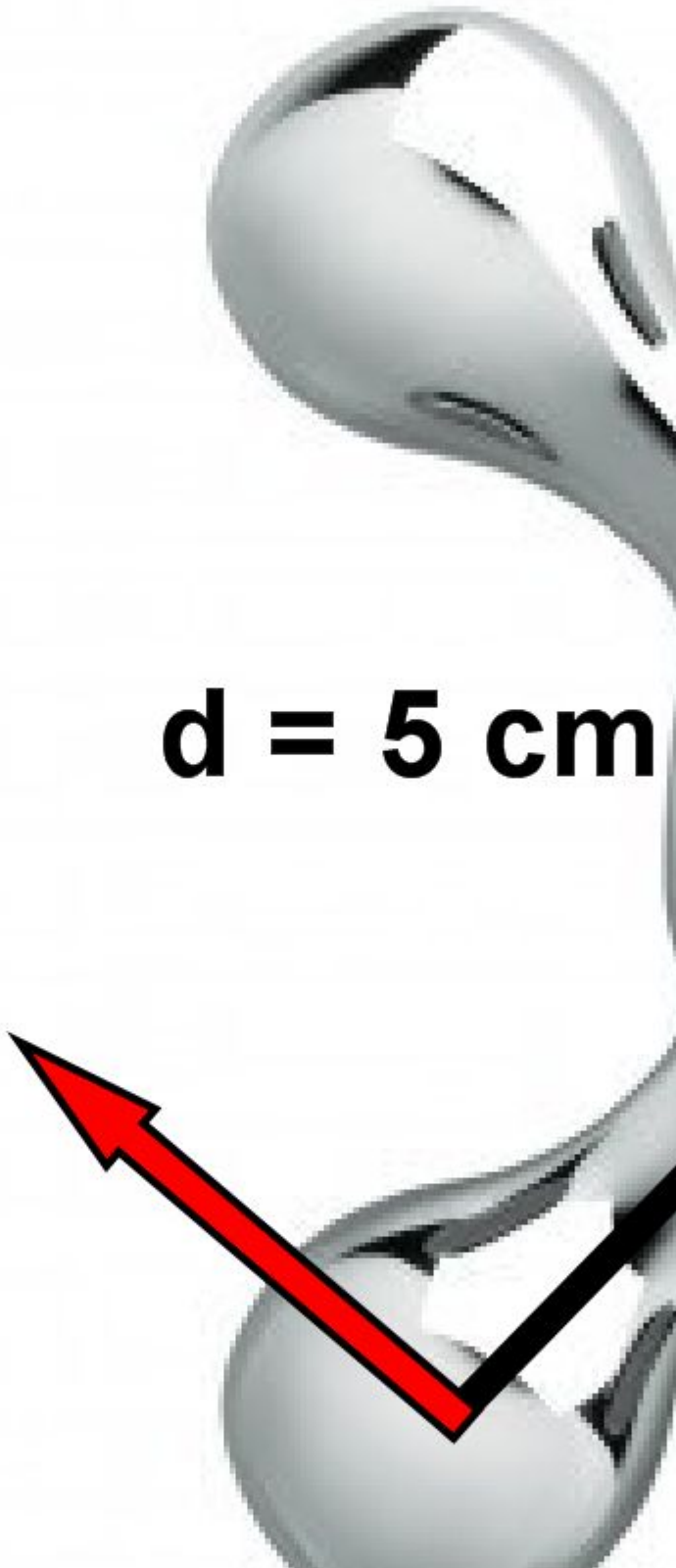
- (a) 1000 N

- o (b) 625 N
- o (c) 750 N

If choice a is selected set score to 1.

8. On a wheelop cross key two forces are acting. Each force equals 50 N and the diameter of the tap is 5 cm.

Determine the moment of this couple of forces.


d = 5 cm

- (a) 5 Nm
- (b) 1,25 Nm

- (c) 2,5 Nm

If choice c is selected set score to 1.

9. In any rigid extended body is a unique point at which the total gravitational force acts.

Give another name for this total gravitational force.

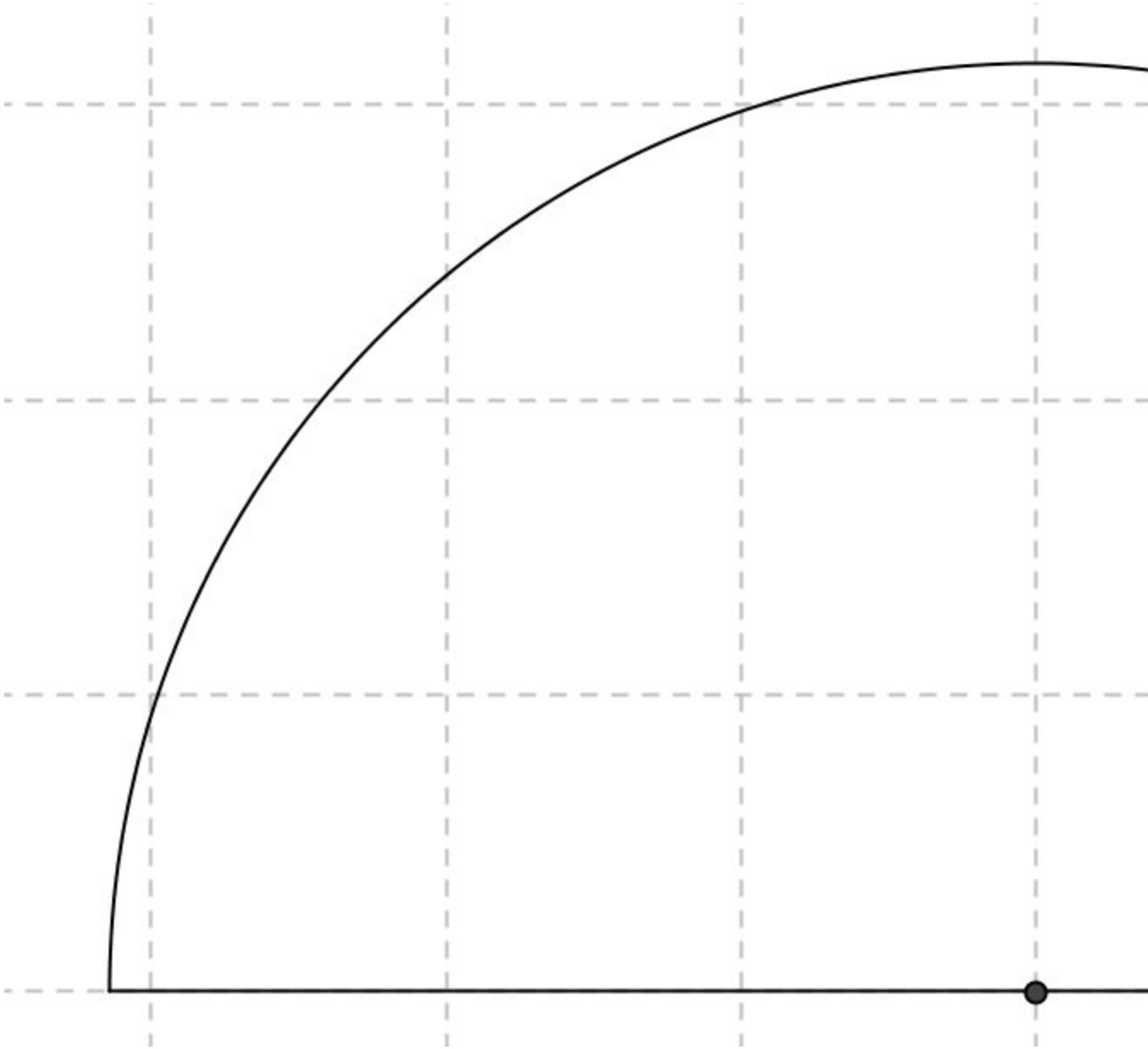
- (a) Gravity (m/s^2).

- (b) Weight (N).

- (c) Mass (kg).

If choice b is selected set score to 1.

10. Calculate the centre of gravity of a semicircle with a radius of π m.



- (a) 1,33 m

o (b) 0,75 m
o (c) 1,04 m

If choice a is selected set score to 1.

11. What kind of external forces cause stress?

o (a) Body forces.
o (b) Surface forces.

- (c) Both, surface- and body forces.

If choice c is selected set score to 1.

12. An atom consists of 14 protons and its mass number is 29.

Determine the number of neutrons in this atom.

o (a) 43

• (b) 15

o (c) 2,07

If choice b is selected set score to 1.

13. It's important to know some units of pressure.

1 bar = ... N/m^2

• (a) $1 \cdot 10^5$

o (b) 1
o (c) $1 \cdot 10^3$

If choice a is selected set score to 1.

14. An airplane is taxiing on the runway with a speed of 72 km/h. The length of the runway is 2400 m.

Calculate how much time is needed to taxi the full length of the runway?

• (a) 2 min

o (b) 0,33 h
o (c) 30 s

If choice a is selected set score to 1.

15. What kind of quantity is acceleration?

o (a) Scalar quantity.
o (b) Depending on the speed it can be a scalar or a vector quantity.

• (c) Vector quantity.

If choice c is selected set score to 1.

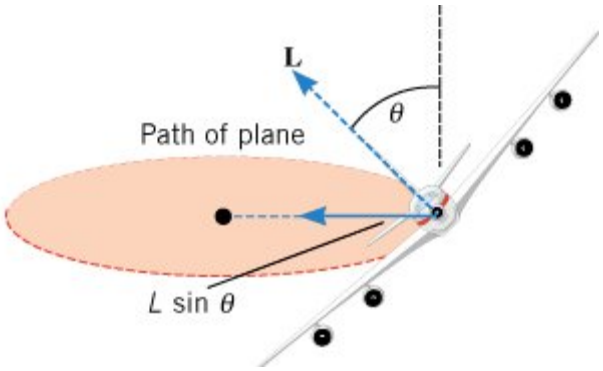
16. During a free fall, the air resistance is....

• (a) negligible and the acceleration is constant.

o (b) negligible and the acceleration is not constant.
o (c) not negligible and the acceleration is not constant.

If choice a is selected set score to 1.

17. Why does a pilot bank or tilt a plane at an angle to make a turn?



- (a) To create the centripetal force.

o (b) To create the centripetal acceleration.
o (c) To create the centrifugal force.

If choice a is selected set score to 1.

18. In which part of the perpendicular movement equals the speed of the pendulum 0 (zero) m/s?

- (a) In the extreme positions.

o (b) In the equilibrium position.
o (c) Halfway the extreme and the equilibrium position.

If choice a is selected set score to 1.

19. If the angular speed of a harmonic motion decreases, what will happen to with the period of this harmonic motion?

o (a) Angular speed and period are not related.

- (b) The period will increase.

o (c) The period will decrease.

If choice b is selected set score to 1.

20. "It is a measure of the force amplification achieved by using a tool, mechanical device or machine system".

This is the description of....

o (a) law of gear trains.
o (b) law of the lever.

- (c) mechanical advantage.

If choice c is selected set score to 1.

21. 592 mg = ... dg

- o (a) 0,592
- • (b) 5,92
- o (c) 0,0592

If choice b is selected set score to 1.

22. Which definition is the definition of mass?

- • (a) The mass of a substance is directly proportional to the amount of matter.
- o (b) The mass of a substance is proportional to the amount of matter.
- o (c) The mass of a substance is inversely proportional to the amount of matter.

If choice a is selected set score to 1.

23. What is the first step toward ensuring accuracy and reproducible units in which measurements are made?

- o (a) An international agreement.
- o (b) Making the measurements reproducible as possible.
- • (c) Defining the units.

If choice c is selected set score to 1.

24. I beat a hammer with a force of 300 N on a nail. The nail shoots partly in the wood.

What is the magnitude of the reaction force of the nail?

- • (a) = - 300 N
- o (b) < - 300N
- o (c) > - 300 N

If choice a is selected set score to 1.

25. Which statement in the answers is the second law of Newton?

An object under influence of a force....

- o (a) will stay at rest or in motion along a straight line.
- o (b) gives a positive reaction force.
- • (c) will accelerate.

If choice c is selected set score to 1.

26. The SI-unit of work (Nm) is referred to as one....

- o (a) Ohm.
- o (b) Watt.
- • (c) Joule.

If choice c is selected set score to 1.

27. If work is done on an object, the object will move.

Is it possible for a moving object to do work?

- • (a) If it is allowed to push or pull another object.
- o (b) Only if it is allowed to push another object.
- o (c) Only if it is allowed to pull another object.

If choice a is selected set score to 1.

28. The definition of "conservation of linear momentum" states that....

- o (a) it is not necessary that the vector sum of the external forces acting on a system has to be zero.
- o (b) the vector sum of the internal forces of a system is zero.
- • (c) the vector sum of the external forces acting on a system is zero.

If choice c is selected set score to 1.

29. The impulse-momentum theorem states that....

- o (a) the work done by a net-force is not equal to the change in the object's kinetic energy.
- o (b) the work done by a net-force is equal to the change in the object's kinetic energy.
- • (c) the impulse produced by a net-force is equal to the change in the object's momentum.

If choice c is selected set score to 1.

30. What two kind of gyroscopes do we know?

- • (a) Mechanical and not mechanical.
- o (b) Mechanical and air driven.
- o (c) Mechanical and motor driven.

If choice a is selected set score to 1.

31. In which situation: 1, 2 or 3 is the normal force the biggest? (The mass of the blocks is equal in each situation.)

o (a) In situation 3.

• (b) They are equal in each situation.

o (c) In situation 1 and 2.

If choice b is selected set score to 1.

32. What concept do we use to compare densities?

o (a) Mass density.
o (b) Density.

• (c) Specific gravity.

If choice c is selected set score to 1.

33. When I have 2,5 dm^3 steel with a density of 7,8 kg/dm^3.

Calculate its mass.

o (a) 0,32 kg

• (b) 19,5 kg

o (c) 3,12 kg

If choice b is selected set score to 1.

34. Calculate the density of turpentine with a mass flow rate of 60 kg/s and a velocity of 30 dm/s through a pipe with a cross sectional area of 2 dm^2.

o (a) 40 kg/dm^3
o (b) 4 kg/dm^3

• (c) 1 kg/dm^3

If choice c is selected set score to 1.

35. When using Bernoulli's equation:

$$p_1 + \tfrac{1}{2} \cdot \rho \cdot v_1^2 + \rho \cdot g \cdot y_1 = p_2 + \tfrac{1}{2} \cdot \rho \cdot v_2^2 + \rho \cdot g \cdot y_2$$

What happens to the pressure if the density and the speed of the fluid stays the same?

The pressure...

o (a) decreases.
o (b) increases.

• (c) stays the same.

If choice c is selected set score to 1.

36. The thermocouple makes use of two junctions.

What are the names of these junctions?

o (a) Cold- and Hot-junction.

• (b) Hot- and Reference-junction.

o (c) Cold- and Reference-junction.

If choice b is selected set score to 1.

37. How much heat is used to warm up m = 1,5 kg copper (c_{copper} = 400 J/(kgK)) from 20 °C to 80 °C (ΔT = 60 °C)?

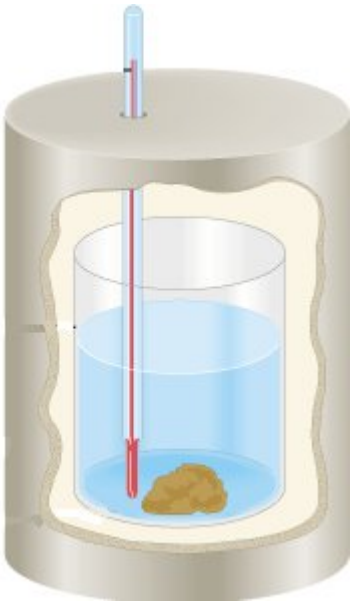
o (a) 16000 J

• (b) 36000 J

o (c) 4,44 J

If choice b is selected set score to 1.

38. What is the name of the apparatus shown in the picture?



- o (a) Joulemeter.
- o (b) Calorimetry.
- • (c) Calorimeter.

If choice c is selected set score to 1.

39. If the coefficient of linear expansion is given.

What is than the coefficient of volumetric expansion?

- o (a)
  $3\beta = \alpha$
- o (b)
  $\beta = \alpha/3$
- • (c)
  $\beta = 3\alpha$

If choice c is selected set score to 1.

40. Give the second law of thermodynamic.

- o (a) Heat flows spontaneously from a substance at a lower temperature to a substance at a higher temperature and does not flow spontaneously in the reverse direction.
- • (b) Heat flows spontaneously from a substance at a higher temperature to a substance at a lower temperature and does not flow spontaneously in the reverse direction.
- o (c) The internal energy of a system changes from an initial value U_i tot a final value of U_f due to heat Q and work W.

If choice b is selected set score to 1.

41. Give Boyle's law.

- (a) At a constant temperature, the absolute pressure of a fixed mass (fixed number of molecules) of a low-density gas is inversely proportional to its volume.

o (b) At a constant temperature, the pressure of a fixed mass (fixed number of molecules) of a low-density gas is directly proportional to its volume.
o (c) At a constant temperature, the absolute pressure of a fixed mass (fixed number of molecules) of a low-density gas is direct proportional to its volume.

If choice a is selected set score to 1.

42. The coefficient of performance of a heat pump is 2,5. The heat delivered into a house is 25000J.

How much work has to be done?

- (a) 10000 J

o (b) 62500 J
o (c) 5000 J

If choice a is selected set score to 1.

43. The frequency of a light wave is $6 \cdot 10^{14}$ Hz. The wavelength of this wave is 500 nm.

Calculate the speed of the light.

o (a) $1{,}2 \cdot 10^{21}$ m/s

- (b) $3 \cdot 10^{8}$ m/s

o (c) $3 \cdot 10^{7}$ m/s

If choice b is selected set score to 1.

44. The angle of reflection with respect to the normal on a plane mirror is 20 degrees.

Determine the angle of incidence with respect to the mirror.

- (a) 70 ^{o}

o (b) 90 ^{o}
o (c) 20 ^{o}

If choice a is selected set score to 1.

45. The focal length of a convex mirror is -2 m, an object is at 3 m in front of the mirror.

Determine the distance of the image.

o (a) 1,2 m

o (b) - $^{5}/_{6}$ m

• (c) -1,2 m

If choice c is selected set score to 1.

46. When the angle of incidence reaches a certain value, called the critical angle θc, the angle of refraction is.....

o (a) < 90 ^{o}

• (b) 90 ^{o}

o (c) 180 ^{o}

If choice b is selected set score to 1.

47. Modal dispersion means modes arrive at the fibre end...

o (a) at the same time depending on the numerical aperture.

• (b) at slightly different times.

o (c) at the same time.

If choice b is selected set score to 1.

48. The frequency of a wave is 40 Hz.

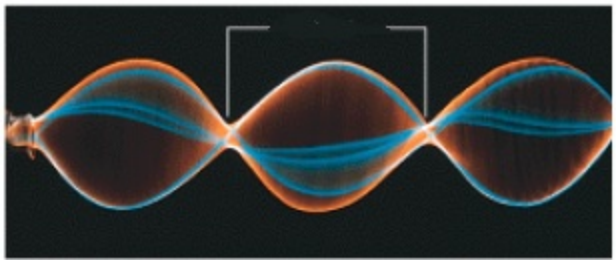
Calculate the period of this wave.

• (a) 0,025 s

o (b) 0,25 s
o (c) 40 s

If choice a is selected set score to 1.

49. In a transverse standing wave, how do you call the points depicted by the white lines?



• (a) Nodes.

o (b) Interference points.

o (c) Antinodes.

If choice a is selected set score to 1.

50. When two waves meet out of phase, we call this....

- (a) destructive interference.

o (b) neutral interference.
o (c) constructive interference.

If choice a is selected set score to 1.

51. The speed of sound in the air is depending on a number of variables. Which variable?

o (a) Air density and volume of the air.
o (b) Temperature and volume of the air.

- (c) Density and temperature of the air.

If choice c is selected set score to 1.

52. When an ambulance with siren leaves you, the frequency of the siren seems to be higher / lower or constant ?

o (a) higher
o (b) constant

- (c) lower

If choice c is selected set score to 1.

If assessment score is 0% to 100% Feedback