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. Name three elements of group one of the Periodic Table of Elements.

- (a) F, Cl, Br.
- (b) He, Ne, Ar.
- (c) Li, N, K.

If choice c is selected set score to 1.

2. Which particles determine the volume of an atom?

- o (a) Protons in the nucleus.
- o (b) Neutrons in the nucleus.
- • (c) Electrons in their shells.

If choice c is selected set score to 1.

3. Is it possible to break down a compound in chemical way?

- o (a) Yes, but chemical and physical is possible.
- o (b) No, it is not possible.
- • (c) Yes, it is possible.

If choice c is selected set score to 1.

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

- o (a) A liquid is easy to diffuse.
- o (b) The liquid particles are too strongly held together to allow movement, they vibrate about their position.
- • (c) Liquids will expand on heating.

If choice c is selected set score to 1.

5. Which of the following expressions is a property of a gas?

- o (a) Gases have a higher viscosity than liquids and solids.
- o (b) Gases consist of moving atoms or molecules, with a definite shape or volume.
- • (c) Gases consist of freely moving atoms or molecules, without a definite shape or volume.

If choice c is selected set score to 1.

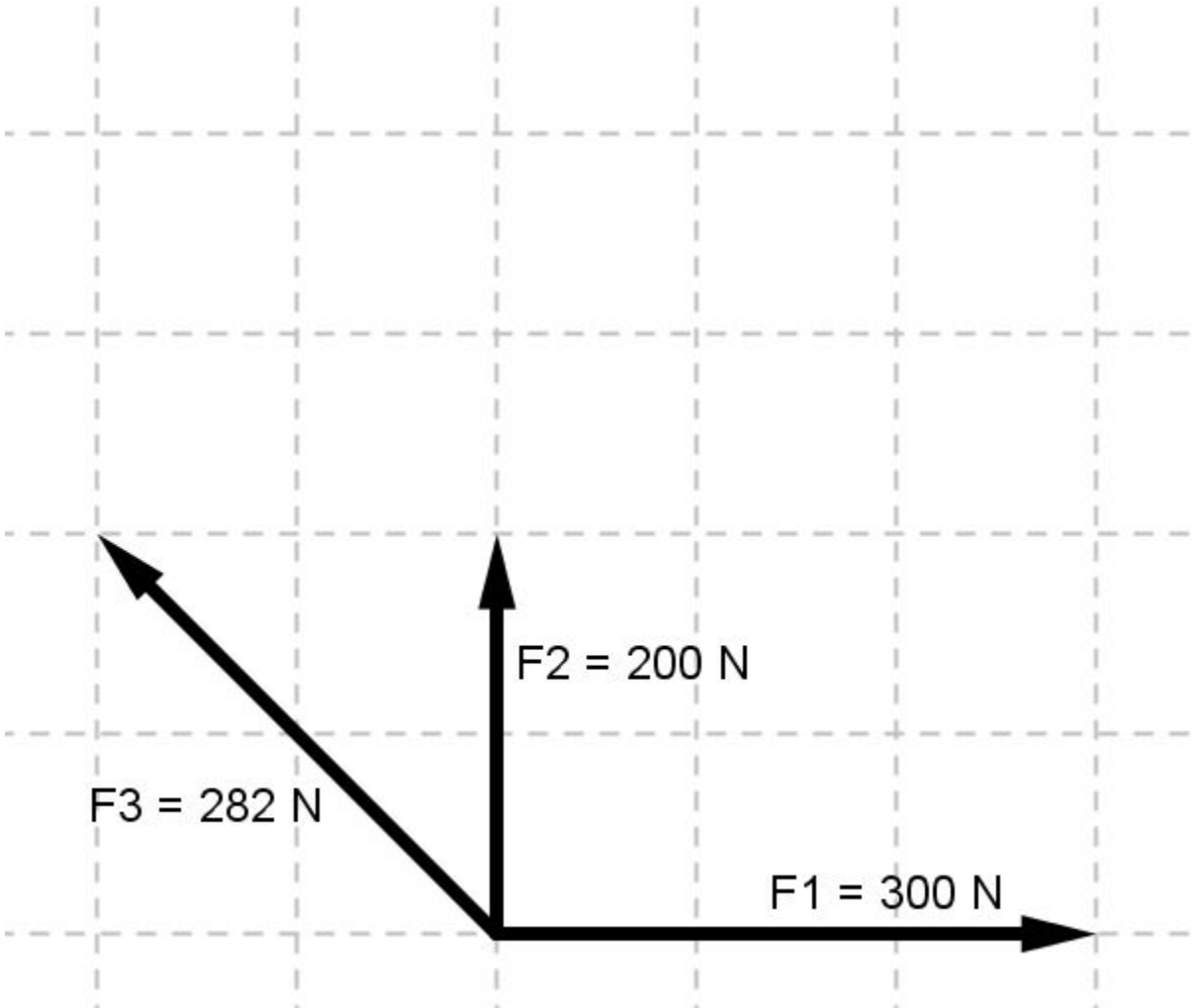
6. If gas is condensing, the new state is liquid or solid, the temperature...

- o (a) increases.
- • (b) decreases.
- o (c) remains the same.

If choice b is selected set score to 1.

7. Three forces are acting upon an object; F1+ F2+F3. They create a resulting force FR.

Determine the magnitude of the resultant force FR.



o (a) 100 √(16) N

• (b) 100 √(17) N

o (c) 100 √(17,6) N

If choice b is selected set score to 1.

8. On a wheelop cross key two forces are acting. The moment of this couple of forces equals 30 Nm.

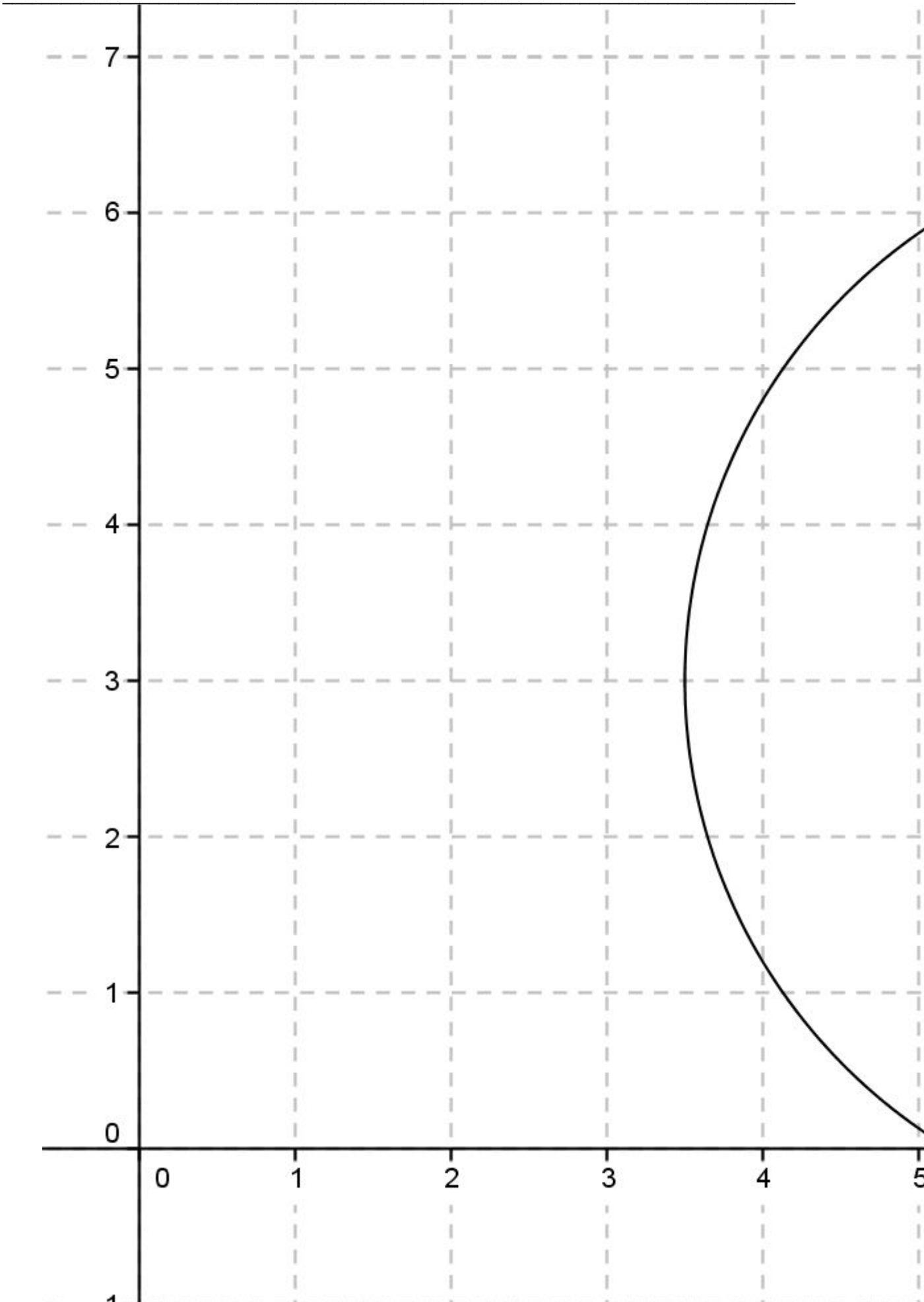
Calculate **one** of these equal forces.

o (a) 60 N
o (b) 120 N

- (c) 30 N

If choice c is selected set score to 1.

9. Determine the coordinates of the centre of gravity of the circle in the figure.

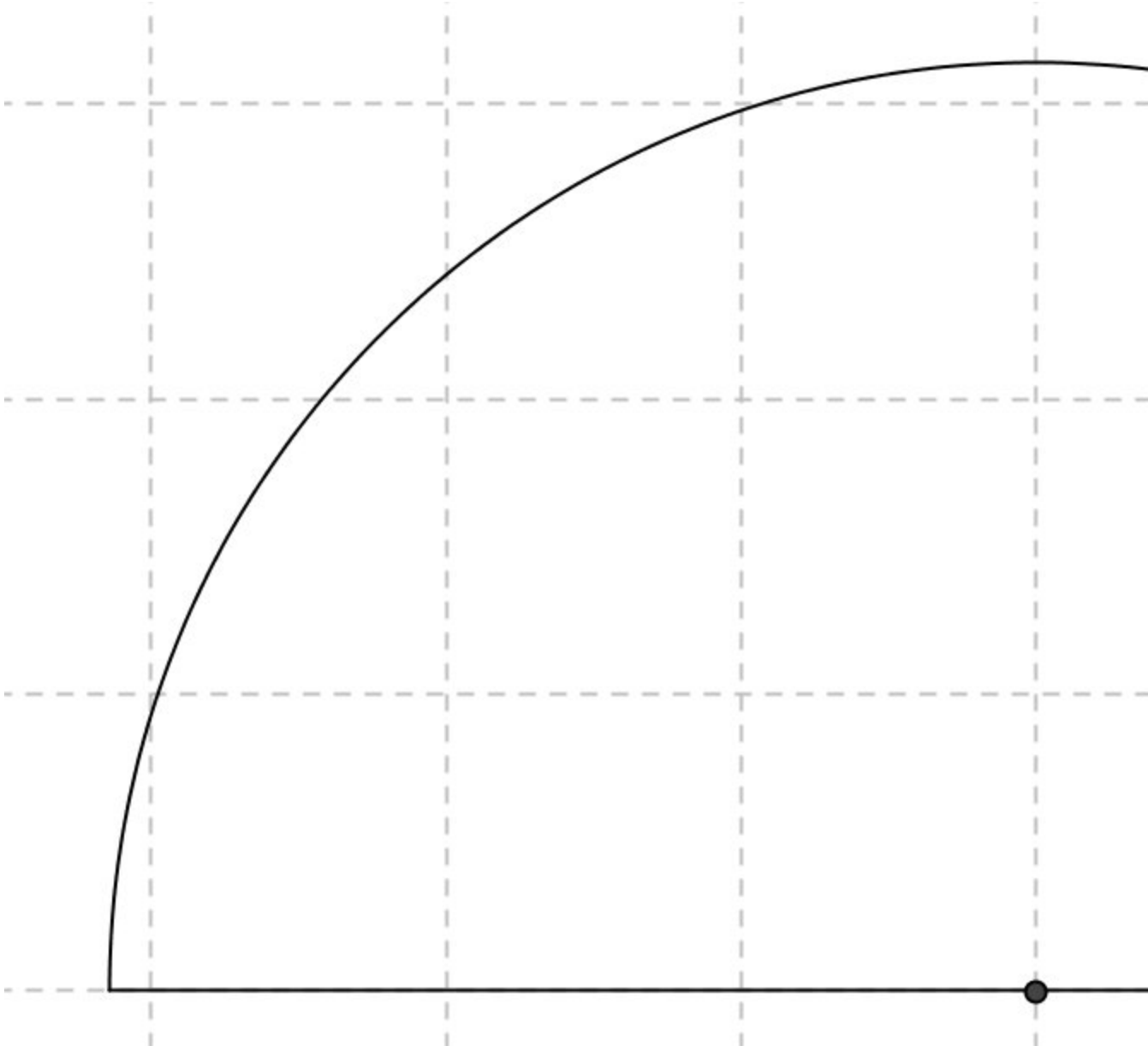

7
6
5
4
3
2
1
0
0
1
2
3
4
5

o (a) 3,5
o (b) (3,7)

- (c) (7,3)

If choice c is selected set score to 1.

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



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

- (c) 1,33 m

If choice c is selected set score to 1.

11. Calculate the stress in an object if a force of 200 N is exerted and the cross section area is 8 cm^2.

- o (a) 0,25 N/m^2
- o (b) 25 N/m^2
- • (c) 250 kN/m^2

If choice c is selected set score to 1.

12. An atom consists of 76 electrons and 115 neutrons.

Determine the atoms mass number.

- • (a) 191
- o (b) 39
- o (c) 1,51

If choice a is selected set score to 1.

13. Within a stationary homogeneous liquid in a horizontal plane, the pressure is the same everywhere.

This is the law of....

- o (a) Pascal.
- • (b) hydrostatics.
- o (c) buoyance.

If choice b is selected set score to 1.

14. If we say: "A car is travelling with 20 m/s due to east.", do we talk about speed, velocity or acceleration?

- o (a) Speed.
- • (b) Velocity.
- o (c) Acceleration.

If choice b is selected set score to 1.

15. What kind of quantity is acceleration?

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

If choice a is selected set score to 1.

16. A stone is falling of a tower. The initial speed of the stone is 0 m/s. The final speed of the stone, just before it hits the earth is 20m/s. The time the stone is falling is 2 s.

Calculate the height of the tower.

o (a) 80 m

• (b) 20 m

o (c) 400 m

If choice b is selected set score to 1.

17. The centrifugal force is caused by....

• (a) the inertia of the object.

o (b) the mass of the object.
o (c) the weight of the object.

If choice a is selected set score to 1.

18. Describe a simple pendulum.

• (a) A particle mass m, frictionless pivot P and a cable of negligible mass and length L.

o (b) A particle mass m, frictionless pivot P and a cable of mass q and length L.
o (c) A particle mass m, pivot P and a cable of negligible mass q and length L.

If choice a is selected set score to 1.

19. The graph that belongs to a harmonic motion is a....

• (a) a sinusoid.

o (b) exponential graph.
o (c) straight line.

If choice a is selected set score to 1.

20. If a lever is in balance....

• (a) the power into and out of the lever is the same.

o (b) the input power is less than the output power.
o (c) the input power is higher than the output power.

If choice a is selected set score to 1.

21. 592 mg = ... dg

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

If choice c is selected set score to 1.

22. How is the kilogram defined?

- o (a) The mass of a standard cylinder of platinum.
- o (b) The mass of a standard cylinder of silver iridium alloy.
- • (c) The mass of a standard cylinder of platinum iridium alloy.

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

If choice c is selected set score to 1.

24. A water heater has an efficiency of about 95%. To heat 100 litres of water from 35 ^{o}C up to 60 ^{o}C, you need about 9,5 MJ of energy.

How much energy does the heater need?

- • (a) 10 MJ
- o (b) 997,5 MJ
- o (c) 9,975 MJ

If choice a is selected set score to 1.

25. Give another name of the first Law of Newton.

- o (a) The law of gravity.
- • (b) The law of inertia.
- o (c) The law of acceleration.

If choice b is selected set score to 1.

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

- (a) Joule.

o (b) Ohm.
o (c) Watt.

If choice a is selected set score to 1.

27. When a net-force performs work on an object.

What kind of energy will change?

- (a) Kinetic energy.

o (b) Chemical energy.
o (c) Potential energy.

If choice a is selected set score to 1.

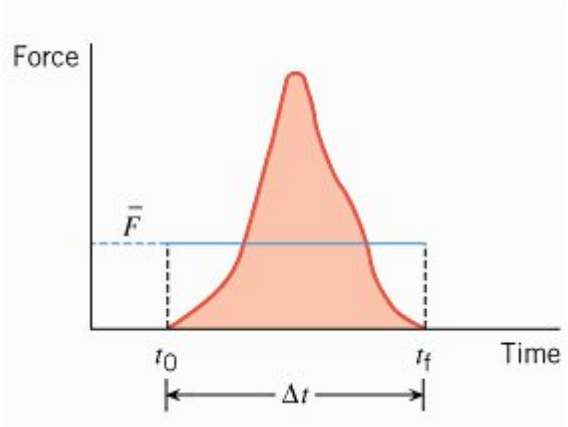
28. The definition of "conservation of linear momentum" states that....

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 picture describes the graph of....



o (a) linear momentum.
o (b) impulse-momentum.

- (c) impulse.

If choice c is selected set score to 1.

30. What two kind of gyroscopes do we know?

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

If choice b is selected set score to 1.

31. The static friction force is depending on....

- o (a) the weight of an object and the coefficient of static friction.
- o (b) the speed of an object and the coefficient of static friction.
- • (c) the normal force on an object and the coefficient of static friction.

If choice c is selected set score to 1.

32. The specific gravity of a substance is 1,126.

In this case we are talking about...

- • (a) 1126 kg/m^3 glycerol
- o (b) 113 kg/m^3 methane
- o (c) 888 kg/m^3 fuel

If choice a is selected set score to 1.

33. The mass of a sheet of titanium with a density of 4500 kg/m^3 is 15,75 kg.

Calculate the volume titanium.

- o (a) 3,5 m^3
- o (b) 0,035 m^3
- • (c) 0,0035 m^3

If choice c is selected set score to 1.

34. What influence does a higher temperature have on gases?

- o (a) Viscosity decreases with higher temperature.
- o (b) Temperature doesn't influence the viscosity.
- • (c) Viscosity increases with higher temperature.

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 speed of the fluid when the pressure increases and the density stays the same?

The speed of the fluid...

o (a) stays the same.

• (b) decreases.

o (c) increases.

If choice b 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. A specific quantity of copper is cooled down ΔT=25 K, hereby releases energy Q = 7000 J. (c_{copper} = 400 J/(kgK)).

Calculate the mass of copper.

o (a) 1,43 kg
o (b) 112 kg

• (c) 0,7 kg

If choice c is selected set score to 1.

38. Give the equation to calculate the thermal conductivity?

o (a) $k = (Q \cdot l \cdot \Delta T) / (t \cdot A)$

• (b) $Q = (k \cdot t \cdot A \cdot \Delta T) / l$

o (c) $k = (Q \cdot \Delta T) / (l \cdot t \cdot A)$

If choice b is selected set score to 1.

39. When 2000 m^3 water (volume of a swimming pool) is heated, the volume of water increases from 2000 m^3 to 2008 m^3. The initial temperature of the water is 5°C.(β_{water}=2,0·10^{-4}/°C).

Calculate the final temperature of the water.

o (a) 30 °C
o (b) 20 °C

• (c) 25 °C

If choice c is selected set score to 1.

40. Give the second law of thermodynamic.

• (a) 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 (b) 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.
o (c) 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.

If choice a is selected set score to 1.

41. The gas constant of a gas is 4 J/K.

Determine the specific heat capacity with a constant pressure.

o (a) 2,5 J/K
o (b) 6 J/K

• (c) 10 J/K

If choice c is selected set score to 1.

42. What equation gives the coefficient of performance for a heat pump?

o (a) coefficient of performance = Q_C / W
o (b) coefficient of performance = Q_C / Q_H

• (c) coefficient of performance = Q_H / W

If choice c is selected set score to 1.

43. The wavelength of a blue light wave is 450 nm.

Calculate the periodic time of the wave.

o (a) 6,66·10^{14} s
o (b) 135 s

• (c) 1,5·10^{-15} s

If choice c is selected set score to 1.

44. The image of an object in a plane mirror is...

- (a) upright, the same size as the object and located as far behind the mirror as the object in front of it.

o (b) upside down, the same size as the object and located as far behind the mirror as the object in front of it.
o (c) upright, smaller than the object and located as far behind the mirror as the object in front of it.

If choice a is selected set score to 1.

45. The image of an object in a mirror is 12,5 cm height. The magnification of the mirror is 2,5.

Calculate the height of the object.

- (a) 5 cm

o (b) 31,25 cm
o (c) 0,2 cm

If choice a is selected set score to 1.

46. Which equation can be used to calculate the critical angle?

- (a) $\sin\theta_c = \frac{n_2 \sin 90^\circ}{n_1} \quad (n_1 > n_2)$

o (b) $\sin\theta_c = \frac{n_2 \sin 90^\circ}{n_1} \quad (n_1 < n_2)$

o (c) $\sin\theta_c = \frac{n_1 \sin 90^\circ}{n_2} \quad (n_1 > n_2)$

If choice a is selected set score to 1.

47. Give the definition for the "acceptance angle".

The acceptance angle is the maximum angle to the axis of the fibre that light entering the fibre is propagated and depends on fibre ...

o (a) properties and transmission conditions.
o (b) properties.

- (c) properties and transmission.

If choice c is selected set score to 1.

48. The frequency of a wave is 80 Hz.

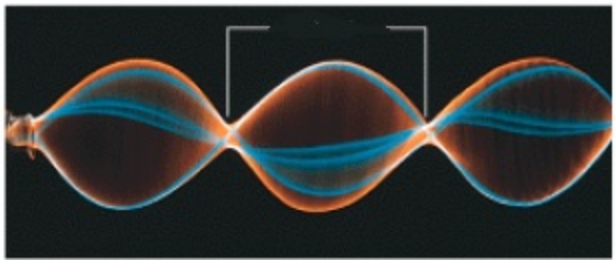
Calculate the period of this wave.

o (a) 0,123 s
o (b) 80 s

• (c) 0,0125 s

If choice c is selected set score to 1.

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



o (a) Antinodes.
o (b) Interference points.

• (c) Nodes.

If choice c is selected set score to 1.

50. What kind of interference do we use to reduce the loudness of undesirable sounds?

o (a) constructive interference.

• (b) destructive interference.

o (c) neutral interference.

If choice b is selected set score to 1.

51. The sound power of a source is 0,05 W. The sound intensity is ..... on a distance of 5 meter from the source, relative to 1 meter?

• (a) lower

o (b) the same
o (c) higher

If choice a is selected set score to 1.

52. When an ambulance with siren leaves you, the frequency of the siren ...

• (a) is constant

- o (b) is lower
- o (c) is higher

If choice a is selected set score to 1.

If assessment score is 0% to 100% Feedback