Question block created by wizard

This exam contains 52 questions.

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

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

$M = F \cdot d$

$M_+ = M_-$

$F = \sigma \cdot A$

$F = m \cdot A$

$F_B \cdot b = F_A \cdot a$

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

$F = k \cdot \Delta l$

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

$imp = F \cdot \Delta t$

$p = m \cdot \Delta v$

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

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

$W = Q - \Delta U$

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

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

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

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

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

$f_k = \mu_k \cdot F_N$

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

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

$\mathrm{mfr} = \rho \cdot A \cdot v$

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

$v_f = v_0 + \Delta v$

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

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

$s = v \cdot t$

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

$v = a \cdot t$

$v_f = v_0 + a \cdot t$

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

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

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

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

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

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

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

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

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

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

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

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

1. What is the name of group 18 of the Periodic Table of Elements?

- o (a) Alkali metals.
- • (b) Noble gases.
- o (c) Halogens.

If choice b is selected set score to 1.

2. An atom consists of 58 neutrons and its mass number is 103.

Determine the atoms atomic number.

- o (a) 161
- o (b) 22
- • (c) 45

If choice c is selected set score to 1.

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

- o (a) Yes, it is possible.
- • (b) Yes, both chemically and physically is it possible.
- o (c) No, it is not possible.

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.
- o (b) Liquids have much greater density than gases.
- • (c) There are very strong forces of attraction between the particles of a liquid.

If choice c is selected set score to 1.

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

- o (a) With decrease in temperature, the particles move faster.
- o (b) The particles are moving very close to each other.
- • (c) There are almost no forces of attraction between the particles of a gas.

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) remains the same.

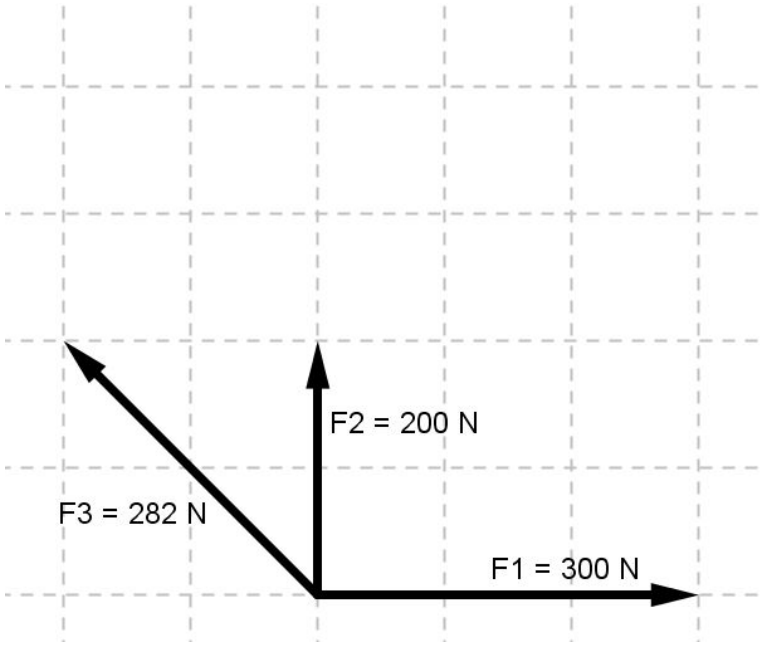
• (b) decreases.

o (c) increases.

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.



• (a) 100 √(17) N

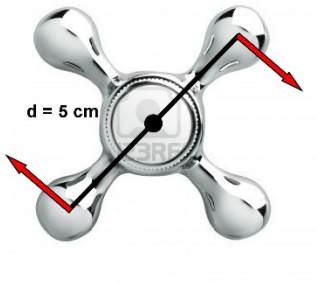
o (b) 100 √(16) N

o (c) 100 √(17,6) 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.

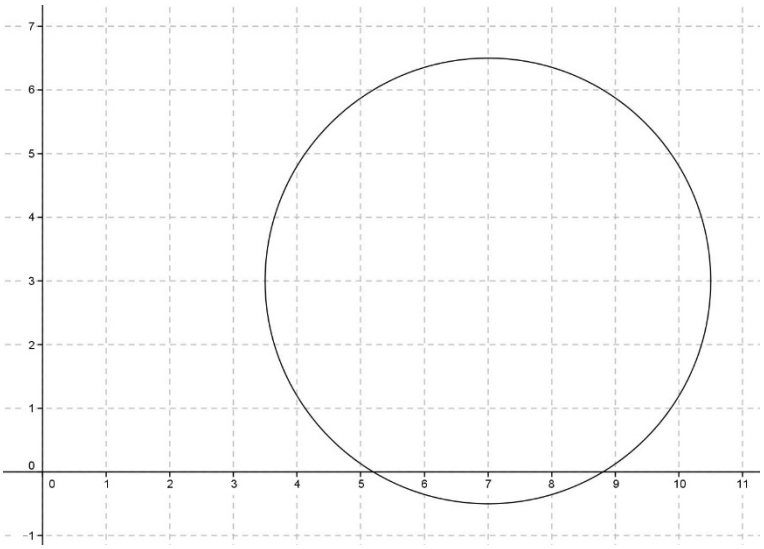
Determine the moment of this couple of forces.



- o (a) 5 Nm
- • (b) 1,25 Nm
- o (c) 2,5 Nm

If choice b is selected set score to 1.

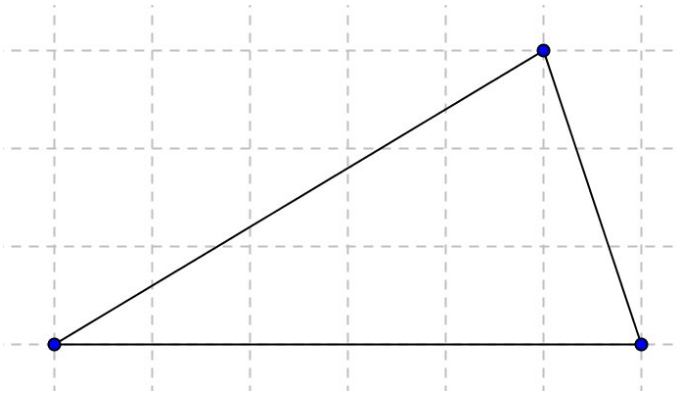
9. Determine the coordinates of the centre of gravity of the circle in the figure.



- • (a) 3,5
- o (b) (3,7)
- o (c) (7,3)

If choice a is selected set score to 1.

10. Calculate the height of the centre of gravity of a triangle with a base of 6 m, and a height of 3 m, measured from the base.



- (a) 2,0 m

o (b) 0,5 m
o (c) 1,0 m

If choice a is selected set score to 1.

11. Stress and strain are.....

o (a) unit less.

- (b) proportional.

o (c) inversely proportional.

If choice b is selected set score to 1.

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

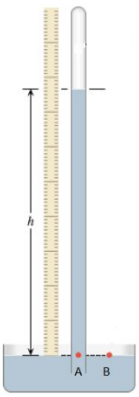
Determine the number of neutrons in this atom.

o (a) 43
o (b) 15

- (c) 2,07

If choice c is selected set score to 1.

13. The pressure in a Mercury barometer in point A....



- (a) equals the pressure in point B.

o (b) is less than the pressure in point B.
o (c) is more than the pressure in point B.

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 time from start till end is about 3,75 min.

Calculate the length of the runway.

o (a) 19200 m
o (b) 270 m

- (c) 4500 m

If choice c is selected set score to 1.

15. The measure of how much the velocity changes per unit of elapsed time is called....

- (a) acceleration.

o (b) velocity.
o (c) speed.

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.

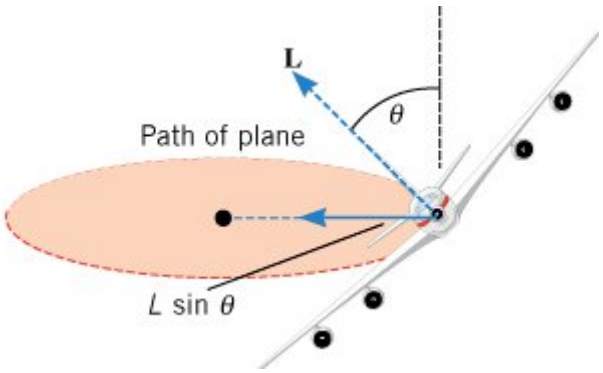
o (a) 80 m

- (b) 20 m

- (c) 400 m

If choice b 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 centrifugal force.
- (b) To create the centripetal force.
- (c) To create the centripetal acceleration.

If choice b is selected set score to 1.

18. A pendulum has a period time of 0,4π s.

Calculate the length of the pendulum.

- (a) 40 m
- (b) 2,5 m
- (c) 0,4 m

If choice c is selected set score to 1.

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

- (a) Angular speed and frequency are not related.
- (b) The frequency will increase.
- (c) The frequency will decrease.

If choice c is selected set score to 1.

20. The equation to calculate the MA of a block and tackle is: $MA = v_A/v_B = n$.

What is the meaning of the letter "n"?

- (a) The number of rope sections that support the moving block.

- (b) The number of rope sections that support the fixed block.
- (c) The number of pulleys.

If choice a is selected set score to 1.

21. 1,5 kg = ... hg

- (a) 15

- (b) 0,15
- (c) 150

If choice a 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.

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

- (c) The mass of a substance is proportional to the amount of matter.

If choice b is selected set score to 1.

23. Where is the mass of an object depending on?

- (a) The number of protons and neutrons in the core of the atoms.

- (b) Definition of the used units.
- (c) A variety of quantities.

If choice a 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
- (b) < - 300N

- (c) = - 300 N

If choice c is selected set score to 1.

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

An object under influence of a force....

- (a) will stay at rest or in motion along a straight line.
- (b) will accelerate.

- (c) gives a negative reaction force.

If choice c is selected set score to 1.

26. If a force of 100 N is acting on an object but the object doesn't move.

How much work is done?

- o (a) $W=F\times\cos\theta\times s$
- o (b) If there is no movement of the object, the work done by the force acting on the object is zero.

- (c) 100 Nm.

If choice c is selected set score to 1.

27. The potential energy of a stone is 88 J and it has a mass of 2 kg.

Calculate the height of the stone. ($g = 10\ m/s^2$)

- o (a) 44 m
- o (b) 4,4 m

- (c) 17,6 m

If choice c is selected set score to 1.

28. The linear momentum is a....

- o (a) vector quantity that points in the same direction as the velocity.

- (b) scalar quantity that points in the same direction as the velocity.

- o (c) scalar quantity that points in opposite direction of the velocity.

If choice b is selected set score to 1.

29. A stone gets an impulse of 4,0 Ns, the duration of the impulse is 20 ms.

Calculate the force on the stone to get this impulse.

- o (a) 5 mN

- (b) 200 N

- o (c) 80 mN

If choice b is selected set score to 1.

30. Give 2 applications of a gyroscope.

- (a) Compasses and artificial horizon.

o (b) Stabilizers and gimbals.
o (c) Compasses and gimbals.

If choice a is selected set score to 1.

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

- (a) the normal force on an object and the coefficient of static friction.

o (b) the weight of an object and the coefficient of static friction.
o (c) the speed of an object and the coefficient of static friction.

If choice a is selected set score to 1.

32. How do you calculate the specific gravity of a substance?

- (a) (Density substance × density reference substance) ×100%.

o (b) Calculate the ratio of the substance density relative to the density of a reference substance.
o (c) Density substance × density reference substance.

If choice a is selected set score to 1.

33. Is it possible to use the weight in the density equation instead of the mass?

o (a) Yes, you can use the weight without problems.
o (b) Yes, but you have to calculate the mass of the substance first.

- (c) No, it is not possible.

If choice c 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) 4 kg/dm^3
o (b) 40 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...

- (a) stays the same.

o (b) increases.
o (c) decreases.

If choice a is selected set score to 1.

36. Calculate: 450 °C = ...K.

o (a) 810

- (b) 176,85

o (c) 723,15

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)?

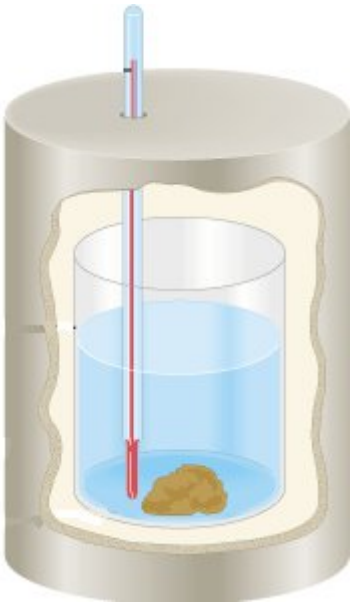
o (a) 4,44 J

- (b) 36000 J

o (c) 16000 J

If choice b is selected set score to 1.

38. What quantity do we measure with the apparatus in the picture?



- (a) Specific heat capacity of an unknown substance.

o (b) Heat capacity of an unknown material.
o (c) Volume of an unknown material.

If choice a is selected set score to 1.

39. If water is heated from 0 ^{o}C to 4 ^{o}C, what will happen with the volume?

o (a) The volume doesn't change.

- (b) The volume decreases.

o (c) The volume increases.

If choice b is selected set score to 1.

40. Give the first law of thermodynamic.

- (a) 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 (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) 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 b is selected set score to 1.

41. What equation is used to express the ideal gas law?

- (a) $\frac{V_i}{T_i} = \frac{V_f}{T_f}$
- (b) $R = \frac{P \times V}{T}$

- (c) $V_i \times P_i = P_f \times V_f$

If choice c 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) 62500 J

- (b) 10000 J
- (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.

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

- (b) $3 \cdot 10^{7}$ m/s
- (c) $1{,}2 \cdot 10^{21}$ m/s

If choice a 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 °
- (b) 90 °

- (c) 20 °

If choice c 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.

- (a) -1,2 m

- (b) 1,2 m
- (c) $-\,^{5}/_{6}$ m

If choice a 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.....

- (a) 180 °

o (b) < 90 °
o (c) 90 °

If choice a is selected set score to 1.

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

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

o (b) at slightly different times.
o (c) at the same time.

If choice a is selected set score to 1.

48. The frequency of a wave is 40 Hz.

Calculate the period of this wave.

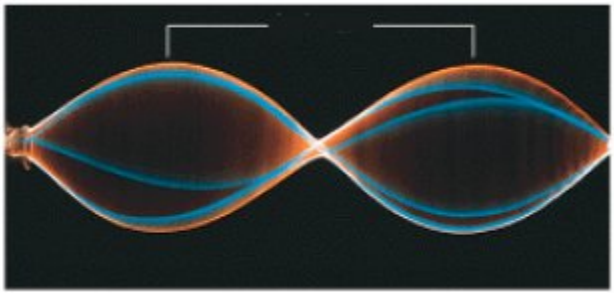
o (a) 0,025 s

- (b) 0,25 s

o (c) 40 s

If choice b 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) Interference points
o (b) Antinodes

- (c) Nodes

If choice c 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. In what kind of material is a specific sound wave the fastest?

- (a) In a liquid.

o (b) In a gas.
o (c) In a solid.

If choice a 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) lower

- (b) higher

o (c) constant

If choice b is selected set score to 1.

If assessment score is 0% to 100% Feedback