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. The group number equals the ...

- o (a) the total number of electrons of an atom.
- o (b) number of shells.
- • (c) number of electrons in the outer shell.

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

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

If choice c is selected set score to 1.

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

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

o (b) Liquids have no surface, and no fixed shape or volume.
o (c) There are very strong forces of attraction between the particles of a liquid.

If choice a is selected set score to 1.

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

o (a) Solids have less density than gases.

- (b) Solids are extremely difficult to compress.

o (c) There are almost no forces of attraction between the particles of a solid.

If choice b is selected set score to 1.

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

o (a) increases.

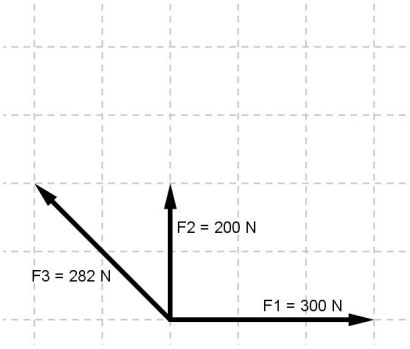
- (b) decreases.

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.

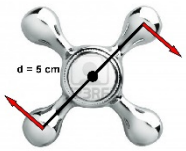


- o (a) 100 √(16) N
- o (b) 100 √(17,6) N
- • (c) 100 √(17) N

If choice c 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.

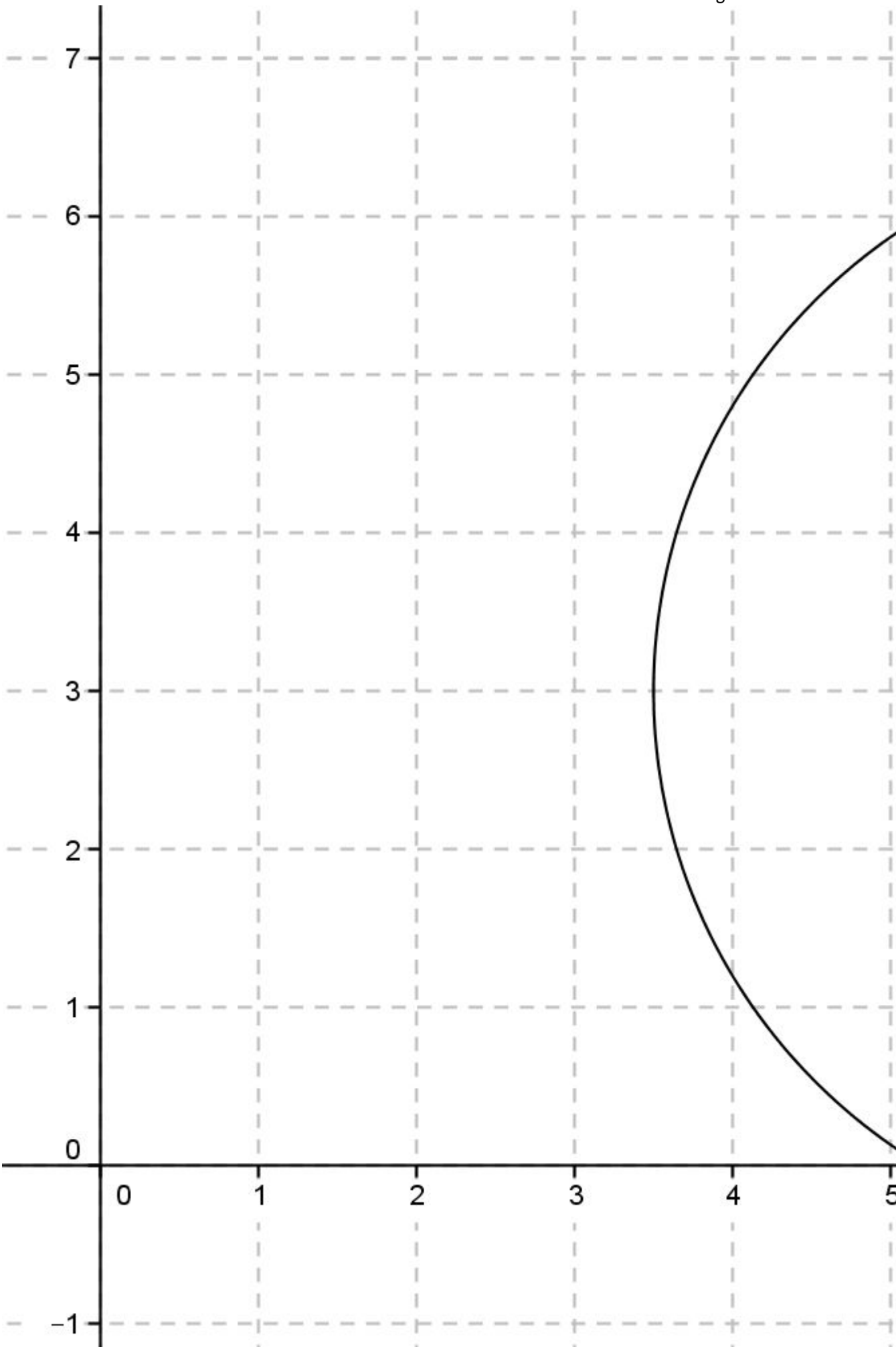
Determine the moment of this couple of forces.



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

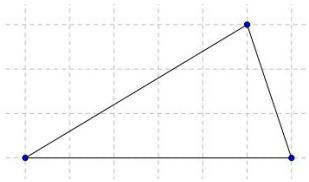

7
6
5
4
3
2
1
0
−1
0
1
2
3
4
5

- (a) (7,3)

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

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) 1,0 m

o (b) 2,0 m
o (c) 0,5 m

If choice a is selected set score to 1.

11. What kind of external forces cause stress?

o (a) Body forces.

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

o (c) Surface forces.

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.

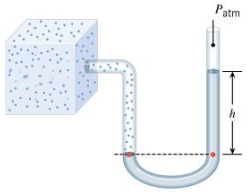
o (a) 2,07
o (b) 43

- (c) 15

If choice c is selected set score to 1.

13. A pressure gauge is filled with mercury with a density of 12,5 kg/dm^3. The height of the mercury in the right tube is 50 cm related to the height in the left tube. The atmospheric pressure is 1·10^5 Pa.

Calculate the pressure in the container left.



- (a) 1,675 bar

o (b) 32,5 kPa
o (c) 1675 kPa

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?

o (a) 30 s

- (b) 2 min

o (c) 0,33 h

If choice b is selected set score to 1.

15. An airplane is accelerating to take-off. Its initial speed was 0 m/s and the final speed is 45 m/s. The time for this take-off was 10 s.

Calculate the acceleration of the plane.

o (a) 0,22 m/s^2

- (b) 4,5 m/s^2

o (c) 450 m/s^2

If choice b 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) 400 m

- (b) 20 m

o (c) 80 m

If choice b is selected set score to 1.

17. In what direction does the centrifugal acceleration work?

- (a) Perpendicular on the centripetal acceleration.

o (b) Opposite direction of the centripetal acceleration.
o (c) Opposite direction of the speed of the circular motion.

If choice a is selected set score to 1.

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

Calculate the length of the pendulum.

o (a) 2,5 m

- (b) 40 m

o (c) 0,4 m

If choice b is selected set score to 1.

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

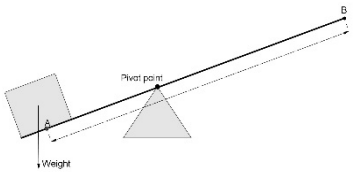
- (a) The frequency will increase.

o (b) The frequency will decrease.
o (c) Angular speed and frequency are not related.

If choice a is selected set score to 1.

20. We are using a lever with a length of 2 m (A,B) and a pivot point at 0,5 m relative to A. We use the lever to lift a crate with a weight of 2,4 kN.

Calculate the force we have to exert to lift the crate.



- (a) 0,8 kN

o (b) 1600 N
o (c) 600 N

If choice a is selected set score to 1.

21. 592 mg = ... dg

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

If choice c 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. Where is the mass of an object depending on?

- • (a) The number of protons and neutrons in the core of the atoms.
- o (b) A variety of quantities.
- o (c) Definition of the used units.

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?

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

If choice c 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.
- • (b) will accelerate.
- o (c) gives a positive reaction force.

If choice b is selected set score to 1.

26. I push a car over 400 m with a force of 600 N.

Calculate the work I have done.

- (a) 240.000 J

o (b) 0,67 J
o (c) 1,5 J

If choice a is selected set score to 1.

27. A ball with a mass of 2 kg is falling down from a height of 40m.

Calculate the work that is done on the ball when he is at a height of 20 m. (g= 10m/s^2).

- (a) 400 J

o (b) 0,5 J
o (c) 40 J

If choice a is selected set score to 1.

28. A ball has a momentum of 1,2 kg·m/s and a mass of 200 g.

Calculate the velocity of the ball.

- (a) 6 m/s

o (b) 0,16 m/s
o (c) 0,24 m/s

If choice a is selected set score to 1.

29. You hit a ball with a force of 300 N during 3 ms.

Calculate the impulse the ball will get.

o (a) $1 \cdot 10^{-5}$ Ns
o (b) 100.000 Ns

- (c) 0,9 Ns

If choice c is selected set score to 1.

30. Which law applies to a gyroscope?

o (a) The first law of Newton
o (b) The law of conservation of momentum.

- (c) The law of conservation of angular momentum.

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

If choice a is selected set score to 1.

32. What concept do we use to compare densities?

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

- (c) Specific gravity.

If choice c is selected set score to 1.

33. The density of hydraulic oil is 8 kg/dm^3. The volume of a tank filled with oil is 3,2 m^3.

Calculate the mass of this oil.

o (a) 25,6 kg
o (b) 2500 kg

- (c) 25600 kg

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) 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...

- (a) stays the same.

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

If choice a is selected set score to 1.

36. Calculate: 60°C = ...°F

- o (a) 76 °F
- • (b) 140 °F
- o (c) $65^1/_3$ °F

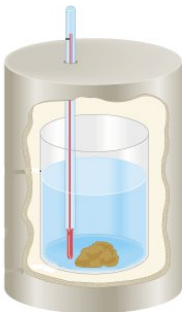
If choice b is selected set score to 1.

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)?

- • (a) 36000 J
- o (b) 4,44 J
- o (c) 16000 J

If choice a is selected set score to 1.

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



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

If choice a 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)
  $\beta = \alpha/3$
- o (b)
  $3\beta = \alpha$

- (c)
  $\beta = 3\alpha$

If choice c is selected set score to 1.

40. The internal energy of a gas decreases with 1500J, the supplied heat is 2500J.

Calculate the work done on the gas.

o (a) W= -1000 J

- (b) W= 4000 J

o (c) W= 1000 J

If choice b is selected set score to 1.

41. Give Boyle's law.

o (a) 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.

- (b) 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 (c) 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.

If choice b 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?

o (a) 62500 J

- (b) 10000 J

o (c) 5000 J

If choice b 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) $3 \cdot 10^{7}$ m/s
o (b) $1{,}2 \cdot 10^{21}$ m/s

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

If choice c 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.

o (a) 20 °

- (b) 70 °

o (c) 90 °

If choice b 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) - $^{5}/_{6}$ m
o (b) 1,2 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.....

- (a) 90 °

o (b) < 90 °
o (c) 180 °

If choice a 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.
o (b) at the same time.

- (c) at slightly different times.

If choice c is selected set score to 1.

48. The frequency of a wave is 40 Hz.

Calculate the period of this wave.

o (a) 40 s

- (b) 0,025 s

o (c) 0,25 s

If choice b is selected set score to 1.

49. The wave length is 500m, the frequency is 20Hz.

Calculate the speed of the wave.

o (a) 0,04 m/s

• (b) 10.000 m/s

o (c) 25 m/s

If choice b is selected set score to 1.

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

o (a) neutral interference.

• (b) destructive interference.

o (c) constructive interference.

If choice b 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) Temperature and volume of the air.

• (b) Density and temperature of the air.

o (c) Air density and volume of the air.

If choice b 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

• (b) lower

o (c) constant

If choice b is selected set score to 1.

If assessment score is 0% to 100% Feedback