

Question block created by wizard

This exam contains 52 questions.

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

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

$$M = F \cdot d$$

$$M_+ = M_-$$

$$F = \sigma \cdot A$$

$$F = m \cdot A$$

$$F_B \cdot b = F_A \cdot a$$

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

$$F = k \cdot \Delta l$$

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

$$imp = F \cdot \Delta t$$

$$p = m \cdot \Delta v$$

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

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

$$W = Q - \Delta U$$

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

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

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

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

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

$$f_k = \mu_k \cdot F_N$$

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

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

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

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

$$v_f = v_0 + \Delta v$$

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

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

$$s = v \cdot t$$

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

$$v = a \cdot t$$

$$v_f = v_0 + a \cdot t$$

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

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

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

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

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

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

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

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

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

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

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

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

1. The period number equals the ...

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

If choice a is selected set score to 1.

2. Is water, H₂O, a molecule, an atom or a halogen?

- (a) Atom.
- (b) Molecule.
- (c) Halogen

If choice b is selected set score to 1.

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

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

If choice b 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.
- (b) Liquids have no surface, and no fixed shape or volume.
- (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 gas?

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

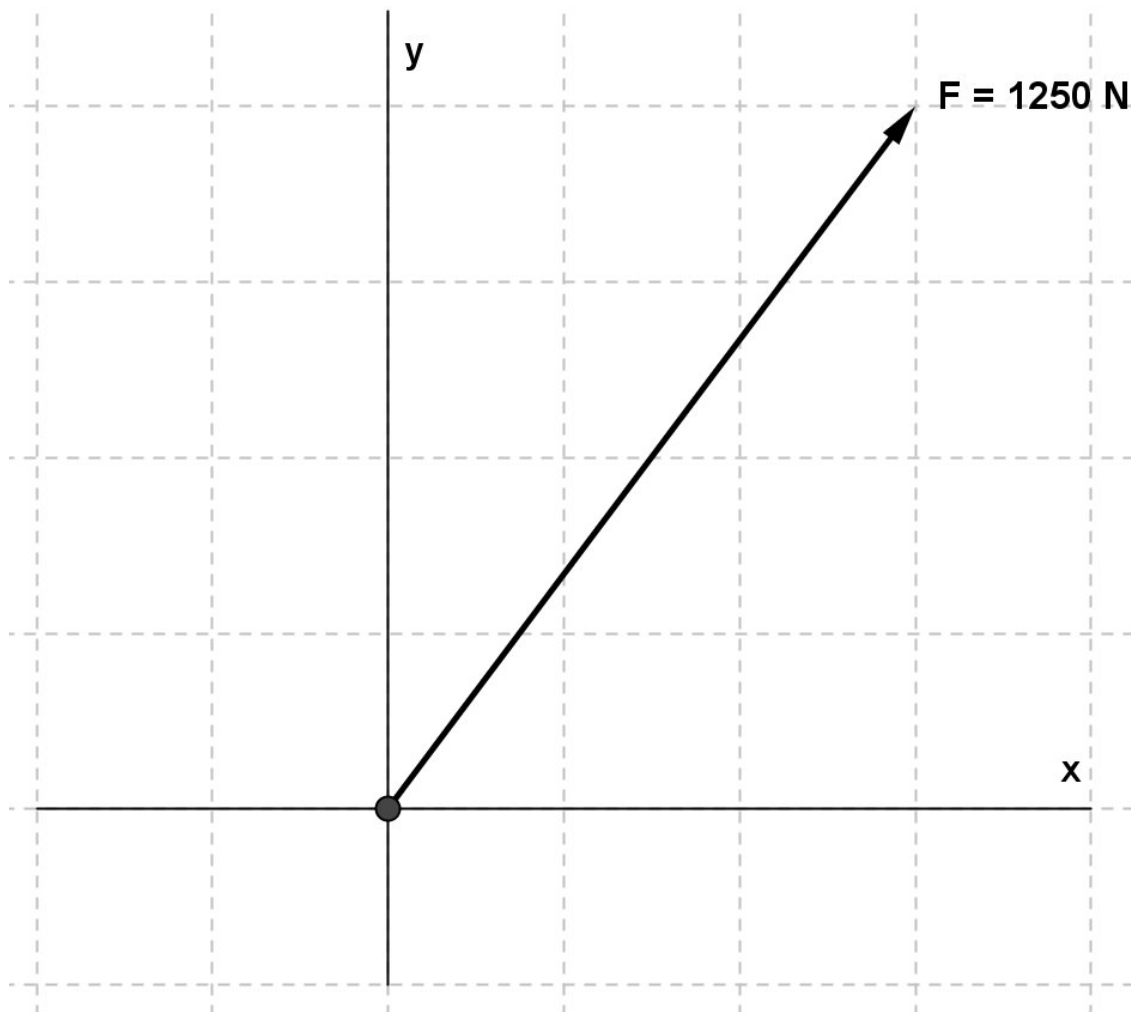
If choice a is selected set score to 1.

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

- (a) Subliming.
- (b) Evaporating.
- (c) Freezing.

If choice c is selected set score to 1.

7. Calculate the force that causes a horizontal displacement.

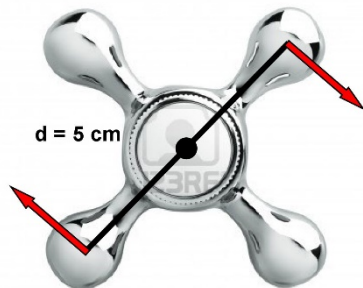


- (a) 1000 N
- (b) 625 N
- (c) 750 N

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.



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

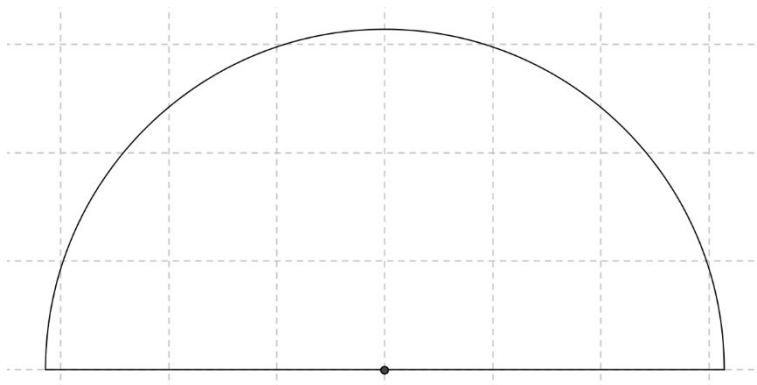
If choice b is selected set score to 1.

9. To determine the centre of gravity of a three dimensional body you can use the method of...

- (a) measuring and equating moments.
- (b) measuring the CG of several parts of the body.
- (c) equating the CG of several parts of the body.

If choice a is selected set score to 1.

10. Calculate the centre of gravity of a semicircle with a radius of $\pi \text{ m}$.



- (a) 1,33 m
- (b) 1,04 m

- (c) 0,75 m

If choice a is selected set score to 1.

11. The Young's modulus is used to calculate?

- (a) The tension in an object.
- (b) The stretching of an object.
- (c) The tear or torsion of an object.

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.

- (a) 43
- (b) 15
- (c) 2,07

If choice b is selected set score to 1.

13. A cylindrical tank is partially filled with oil with a density of 800 kg/m^3 . The pressure on the bottom of the tank is 20.000 Pa .

Calculate the height of the oil in the tank.

- (a) 0,25 m
- (b) 2,5 m
- (c) 25 m

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?

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

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.

- (a) 0,22 m/s²
- (b) 4,5 m/s²
- (c) 450 m/s²

If choice b is selected set score to 1.

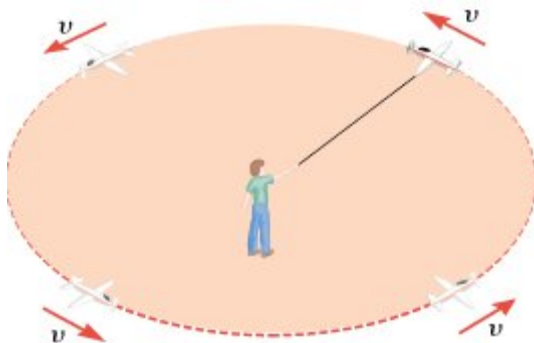
- 16.** The acceleration of a free falling body is called the acceleration due to....

- (a) the velocity of the object.
- (b) gravity.
- (c) the mass of the object.

If choice b is selected set score to 1.

- 17.** A model airplane on a guideline. The radius of the circular motion is 3m. The periodic time is $1,5\pi$ second.

Calculate the velocity of the model airplane.



- (a) 1,11 km/h
- (b) 9,86 m/s
- (c) 4 m/s

If choice c is selected set score to 1.

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

Calculate the length of the pendulum.

- (a) 40 m

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

If choice a is selected set score to 1.

19. What is a "driven motion"?

- (a) Exerting a "force" on an oscillating object to decrease the oscillation.
- (b) Exerting a "reactive force" on an oscillating object to maintain the oscillation.
- (c) Exerting a "force" on an oscillating object, to maintain the oscillation.

If choice c is selected set score to 1.

20. A gear train consists of two gears, input gear with 200 teeth and the output gear with 20 teeth.

Calculate the velocity ratio of this gear train.

- (a) 0,5
- (b) 0,1
- (c) 10

If choice b is selected set score to 1.

21. 12.000 μg = kg

- (a) 0,000012
- (b) 0,0012
- (c) 0,12

If choice a is selected set score to 1.

22. Which definition is the definition of mass?

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

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?

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

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) $< - 300\text{N}$
- (b) $= - 300\text{ N}$
- (c) $> - 300\text{ N}$

If choice b is selected set score to 1.

25. "Inertia is the natural tendency of an object to remain at rest or in motion at a constant speed along a straight line."

This is the....

- (a) second law of Newton.
- (b) third law of Newton.
- (c) first law of Newton.

If choice c 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) 1,5 J
- (b) 0,67 J
- (c) 240.000 J

If choice c 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. ($g= 10\text{m/s}^2$).

- (a) 400 J
- (b) 0,5 J
- (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) 0,16 m/s
- (b) 0,24 m/s
- (c) 6 m/s

If choice c 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.

- (a) 0,9 Ns
- (b) $1 \cdot 10^{-5}$ Ns
- (c) 100.000 Ns

If choice a is selected set score to 1.

30. Which law applies to a gyroscope?

- (a) The first law of Newton
- (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. An object is about to slide over a surface.

What can you tell about the f_s^{\max} and the f_k ?

- (a) $f_s^{\max} > f_k$
- (b) $f_s^{\max} = f_k$
- (c) $f_s^{\max} < f_k$

If choice b is selected set score to 1.

32. Determine the specific gravity of blood with a density of 1060 kg/m³

- (a) 1,06
- (b) 0,94 kg/m³
- (c) 0,94

If choice a is selected set score to 1.

33. When I have 2,5 dm³ steel with a density of 7,8 kg/dm³.

Calculate its mass.

- (a) 3,12 kg
- (b) 0,32 kg
- (c) 19,5 kg

If choice c is selected set score to 1.

34. What is a streamline in a fluid or gas flow?

A streamline is a line drawn in the fluid such that a...

- (a) cosine to the streamline at any point is parallel to the fluid velocity at that point.
- (b) tangent to the streamline at any point is parallel to the fluid velocity at that point.
- (c) sine to the streamline at any point is perpendicular to the fluid velocity at that point.

If choice b is selected set score to 1.

35. When using Bernoulli's equation:

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

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

The pressure...

- (a) decreases.
- (b) stays the same.
- (c) increases.

If choice b is selected set score to 1.

36. Calculate: 60°C =°F

- (a) 140 °F
- (b) 65¹/₃ °F
- (c) 76 °F

If choice a 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) 4,44 J
- (b) 16000 J

- (c) 36000 J

If choice c is selected set score to 1.

38. Give the definition of heat conduction.

Conduction is the process...

- o (a) in which energy is transferred by means of electromagnetic waves.
- o (b) in which heat is carried from place to place by the bulk movement of a fluid or gas.
- (c) whereby heat is transferred directly through a material, any bulk motion of the material playing no role in the transfer.

If choice c is selected set score to 1.

39. 2000m³ Water (volume of a swimming pool) is heated from 10°C to 30°C. ($\beta_{\text{water}} = 2,1 \cdot 10^{-4}/^{\circ}\text{C}$)

Calculate the volume expansion of the water at 30°C?

- (a) 8,4 m³
- o (b) 6,1 m³
- o (c) 2008,4 m³

If choice a 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
- o (b) W= -1000 J
- (c) W= 4000 J

If choice c is selected set score to 1.

41. Calculate the specific gas constant of 2 kg gas, with a specific heat capacity with constant volume of 6 J/K.

- o (a) 18 J/(kgK)
- o (b) 0,5 J/(kgK)
- (c) 2 J/(kgK)

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 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.

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

- (a) 70°
- (b) 90°
- (c) 20°

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.

- (a) 1,2 m
- (b) $-\frac{5}{6}$ 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 θ_c , the angle of refraction is.....

- (a) 90°
- (b) $< 90^\circ$

- (c) 180°

If choice a is selected set score to 1.

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

- (a) at slightly different times.
- (b) at the same time depending on the numerical aperture.
- (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.

- (a) 40 s
- (b) 0,25 s
- (c) 0,025 s

If choice c is selected set score to 1.

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

Calculate the speed of the wave.

- (a) 10.000 m/s
- (b) 25 m/s
- (c) 0,04 m/s

If choice a is selected set score to 1.

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

- (a) constructive interference.
- (b) neutral interference.
- (c) destructive interference.

If choice c is selected set score to 1.

51. The power of a sound source is 5π W. Calculate the sound intensity on a distance of 10 m of the source.

- (a) $1,25 \cdot 10^{-2} \text{ W/m}^2$
- (b) 5 W/m^2

- o (c)
 $\pi \cdot 10^3 \text{ W/m}^2$

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

If choice c is selected set score to 1.

If assessment score is 0% to 100% Feedback