SAMPEL PERCUMA

Trial STPM 2021 Fizik Semester 1 Kelantan

Set penuh: Kertas Percubaan STPM

Sem 1 · Fizik

Sampel ini: 8 muka surat. Set penuh ada:

- 3 fail PDF
- Semester 1: kertas percubaan (trial) negeri, subjek yang dipilih + skema
- Blueprint 30 hari Semester 1 (setiap subjek)
- Semester 3: percubaan 2024, 10 subjek, banyak negeri, soalan + skema dalam satu fail

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Sampel bermula di muka surat sebelah

Name :…… I/C :…….

SEMESTER 1

960/1 STPM 2021

JABATAN PENDIDIKAN NEGERI KELANTAN

SIJIL TINGGI PERSEKOLAHAN MALAYSIA

PHYSICS 1 (FIZIK 1)

One and a half hours (Satu jam setengah)

Instructions to candidates:

DO NOT OPEN THIS QUESTIONS PAPER UNTIL YOU ARE TOLD TO DO SO.

There are **fifteen** *questions in Section A. For each questions, four choices of answers are given. Choose* **one** *correct answer and indicate it on the Multiple-choice Answer Sheet provided. Read the instructions on the Multiple-choice Answer Sheet very carefully. Answer* **all** *questions. Marks will not be deducted for wrong answers. Answer* **all** *questions in Section B. Write your answers in the spaces provided.*

Answer any **two** *questions in Section C. All essential working should be shown. For numerical answers, unit should be quoted wherever appropriate. Begin each answer on a fresh sheet of paper and arrange your answers in numerical order.*

Tear off the front page of this question paper in your answer sheets of Section B, and tie both of them together with your answer sheets in Section C.

Values of constant are provided.
Answers may be written in either English or Bahasa Malaysia

For examiner's use (Untuk kegunaan pemeriksa)	
Section A (Bahagian A)	
Section B (Bahagian B)	
16	
17	
Section C (Bahagian C)	
Total (Jumlah)	

This question paper consists of printed pages and 0 blank pages.
(Kertas soalan ini terdiri daripada 10 halaman bercetak dan 0 halaman kosong.)

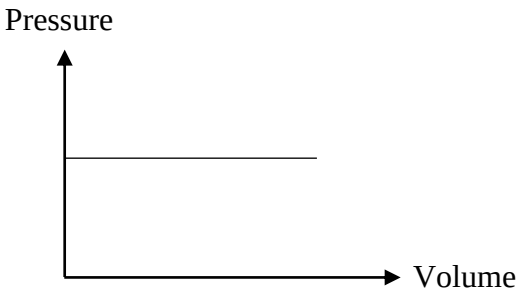
Section A

Answer **all** *questions in Section A*

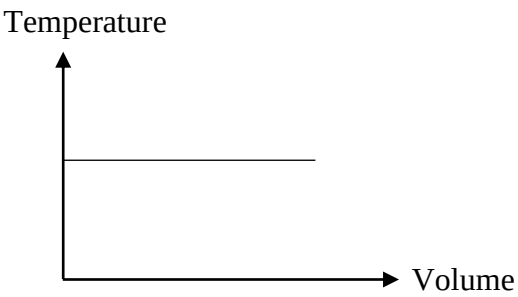
1. Under uniform acceleration, motion of an object with velocity, v, is represented by $v^2 = a + bx$ where a and b are constant, and x is a variable for displacement. If both a and b have dimensions, find the dimensions of b.

A $L^2 T^{-3}$ **B** $L^2 T^{-2}$ **C** $L T^{-2}$ **D** $L T^{-1}$

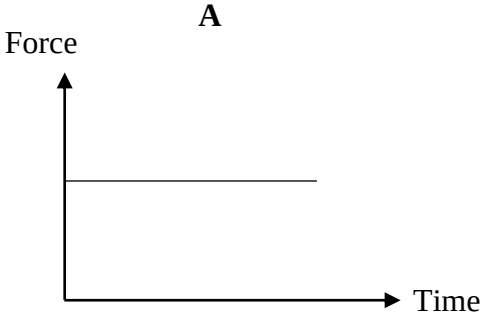
2. Which of the following graph shows that area under the graph represents change in displacement.



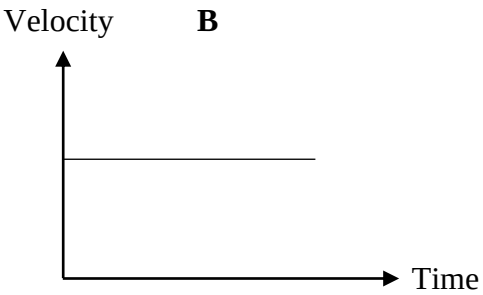
A



B



C



D

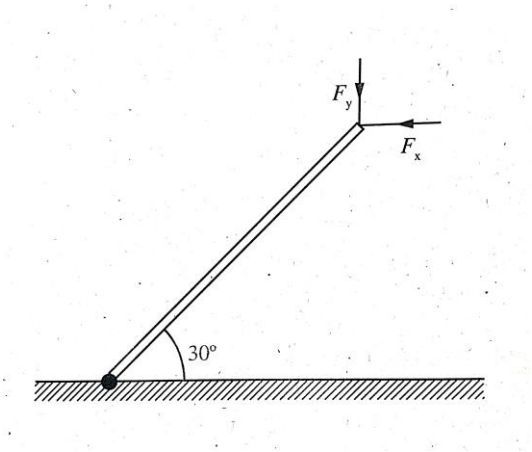
3. When an object is allowed to slide on a surface, the static frictional force will increase when

A a load is placed on top of the object.
B a layer of oil is applied between the surfaces in contact.
C a layer of air is created between the surfaces in contact.
D ball bearings are placed between the surfaces in contact.

4 A lorry of mass 1000 kg accelerates from 40 km h^{-1} to 120 km h^{-1} in 4.0 s. The average power of the lorry is

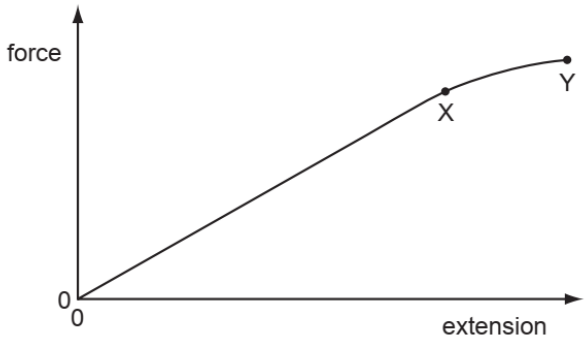
A 1600 k W **B** 139 k W **C** 123 k W **D** 15 k W

9 A light rod is hinged at an angle of 30° to the horizontal and is kept at equilibrium by the F_y and F_x is shown in the diagram above. If F_y is 100N, what is F_x?



A 47 N **B** 91 N **C** 173 N **D** 214 N

10 A sample of metal is subjected to a force which increases to a maximum value and then decreases back to zero. A force-extension graph for the sample is shown.



When the sample contracts it follows the same force-extension curve as when it was being stretched. What is the behaviour of the metal between X and Y?

A both elastic and plastic
B elastic but not plastic
C plastic but not elastic
D not elastic and not plastic

11 The Young modulus of steel is determined using a length of steel wire and is found to have the value E. Another experiment is carried out using a wire of the same steel, but of twice the length and half the cross-sectional area. What value is obtained for the Young modulus in the second experiment?

A $\frac{1}{4}$E **B** $\frac{1}{2}$E **C** E **D** 2E

Section B

Answer **all** *questions in Section B*

16 (a) A projectile is fired with a velocity 60 m s^{-1} at an angel, Θ, from a horizontal Ground towards the roof of a tunnel of height 5.0 m. If the projectile just barely touches the roof, and assume that g = 9.81 m s^{-2}, determine the

(a) angle of projection

[3 marks]

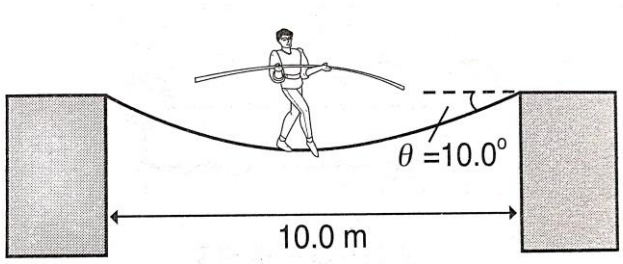
(b) time of flight of the ball from the starting position of his hand to the position horizontally same level to his initial hand.

[2 marks]

(c) range of the projectile

[2 marks]

17 A gymnast walks across a high wire attached horizontally between two buildings, 10.0 m apart. The angle of the sag in the ripe when he is at the mid-point is 10.0^{o} as shown below.



Given that his mass is 50.0 kg.

(a) Draw the forces acting on the mid-point of the rope [2 Marks]

(b) Determine the tension in the rope [2 Marks]

(c) Show and explain whether it is possible to tighten the rope so tightly until θ is zero. [2 Marks]

(d) State the conditions for the equilibrium of a rigid body [2 Marks]

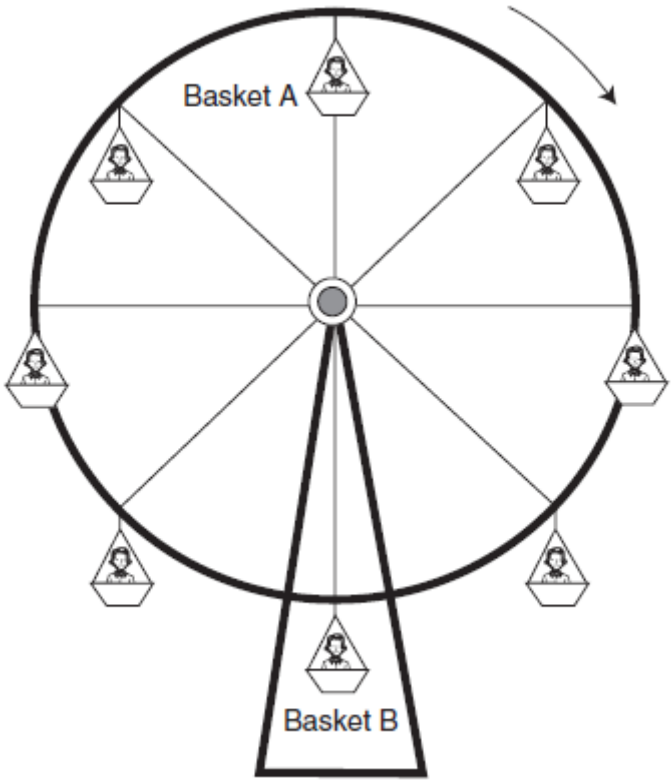
Section C

Answer any **two** *questions in Section C.*

18 (a) Define an angular velocity. A washing machine has a cylindrical drum of radius of 30.0 cm and spins about its axis which is horizontal. What is the minimum angular velocity of the drum, in revolutions per minute, so that the clothes spinning in a vertical circle would not drop from the top of the circle?

[5 marks]

(b) The figure shows a Ferris wheel which has a diameter of 135 m. It takes 1.0 minute to complete a revolution. A person of mass 52 kg takes a ride on the Ferris wheel.



(i) Calculate the linear speed of a basket on the Ferris wheel.

[3 Marks]

(ii) Show on a diagram, the forces on the person in the basket A and in the basket B

[2 Marks]

(iii) compare the reaction between these two points (A and B)

[5 Marks]

19 (a) Explain how the molecules of gas exert a pressure. Give the reasons why the pressure exerted by the molecules of gas, maintained at constant volume, increases as the temperature increases.

[6 marks]

(b) An ideal gas obeys the equation $P = \frac{1}{3}\rho < c^2 >$

Where P is the gas pressure, ρ is the density of the gas and $< c^2 >$ is the mean square speed of the molecules.
Show how this equation leads to the relationship between the mean translational kinetic energy of a molecule and absolute temperature of an ideal gas.

[5 marks]

(c) (i) State the law of equipartition of energy [1 mark]
(ii) Calculate the internal energy of the gas in a container of volume 2.0×10^{-3} m^3 contains 8.0 g of helium gas at pressure 1.01×10^5 Pa.

[3 marks]

20. (a) Explain what is meant by a black body [2 marks]

(b) The Sun with surface temperature of 6000 K may be assumed to be in radiative equilibrium with the Earth. The radius of the sun R = 7.00×10^8 m. The earth is at a distance, r = 1.50×10^{11} m from the Sun.
Calculate

(i) the rate of thermal energy radiated from the Sun's surface per second

[3 marks]

(ii) the intensity of radiation from the sun on the Earth's surface.

[3 marks]

(iii) the equilibrium temperature of the Earth.

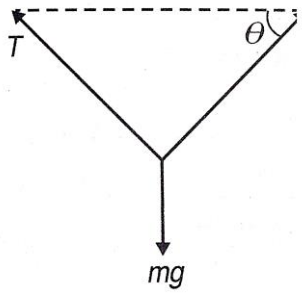
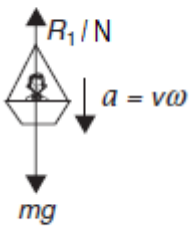
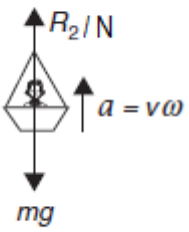
[4 marks]

(c) Suggest other assumptions made in order to obtain the solution.

[2 marks]

(i) Give one reason why the temperature of the Earth is higher than the equilibrium temperature calculated above. [1 mark]

END OF QUESTIONS

17	(a)  	
	(b) $2T \sin\theta = mg$ $2T \sin 10^\circ = 50.0 \text{ x } 9.81$ $T = 1410\ N$	**1** **1**
	(c) If θ = 0° **Then** $2T \sin\theta = mg = 0$ **which is impossible unless the man has zero weight.**	 **1** **1**
	(d) Net force is zero **Net torque is zero**	**1** **1**
	SECTION C	
18	(a) The rate of angular displacement At the top If the clothes do not drop $N(R) + mg = ma_c$ Angular displacement, $\omega = \sqrt{\frac{g}{r}}$ $= \frac{1}{2}\sqrt{\frac{9.81}{0.30}}(60)$rpm $= 54.6$rpm	
	(b)(i) $\omega = 0.105$rad s^{-1} $v = r\omega$ $= 7.09\ m\ s^{-1}$	
	Basket A  Basket B  	

TAMAT SAMPEL

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