SAMPEL PERCUMA

Trial STPM 2022 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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Name :..... **I/C :**.....

SEMESTER 1

960/1 **STPM 2022**

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 12 halaman bercetak dan 0 halaman kosong.)

Section A

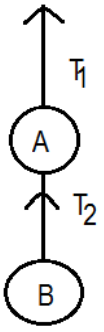
Answer **all** *questions in Section A*

1. The graph is plotted on the x-axis and the y-axis, to obtain straight line graphs from the equation $I = \frac{1}{2}M(R_1^2 + R_2^2)$,where R_1 and M are constants, if values are known for the variables and the graph is to be used to find the constants. What is the gradient and y-intercept of the graph?

	Gradient	y-intercept
A	$\frac{1}{2}MR_1^2$	$\frac{1}{2}MR_2^2$
B	$\frac{1}{2}MR_2^2$	$\frac{1}{2}MR_1^2$
C	$\frac{1}{2}M$	$\frac{1}{2}MR_2^2$
D	$\frac{1}{2}M$	$\frac{1}{2}MR_1^2$

2. An object which is moving vertically upwards passes through a point x at height 70 cm from the ground with speed 3.5 m s^{-1}. Determine the initial velocity of the object when it is launched from the ground

   A 4.15 m s^{-1} B 5.10 m s^{-1} C 17.23 m s^{-1} D 25.98 m s^{-1}

3. 

   Mass A is 15 kg and mass B is 11 kg. If they are given an upward acceleration of 3 m s^{-2} by pulling up on A, find the resultant force of the system.

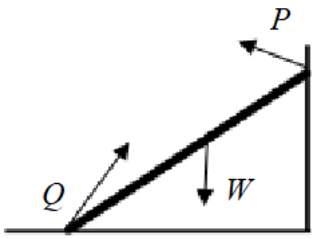
   A 33N B 78N C 141N D 333N

8. A satellite of mass 60 *kg* is orbiting the earth at a height of 700 *km*, it then drops to a lower orbit at the height of 500 *km* from the surface of the earth. What is the change in the gravitational potential energy of the satellite?
(Mass of the Earth = 6.0 x 10^{24} *kg*, radius of the Earth = 6.4 x 10^{6} *m*)

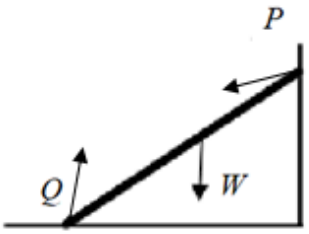
A Increases by 9.80 x 10^{7} *J*
B Decreases by 9.80 x 10^{7} *J*
C Increases by 3.38 x 10^{9} *J*
D Decreases by 3.38 x 10^{9} *J*

9. A ladder of weight W, which is resting on a rough wall and leaning against a rough wall. The forces at the ends of the ladder against the wall and the floor are P and Q. Which of the following the forces shows the correct directions of the forces acting on the ladder?

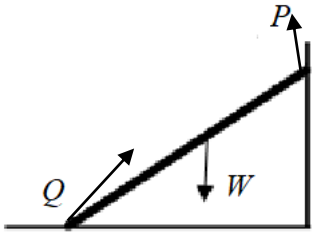
A



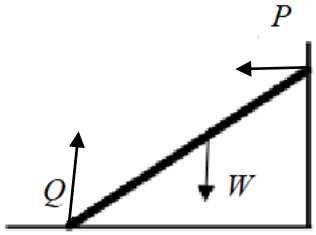
B



C

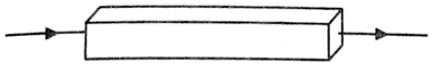


D

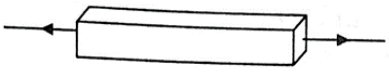


10. Which of the following graphs best represents the situation where the solid's Young Modulus is determined?

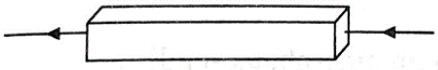
A



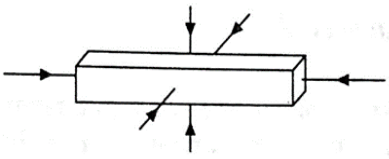
C



B



D



Section B

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

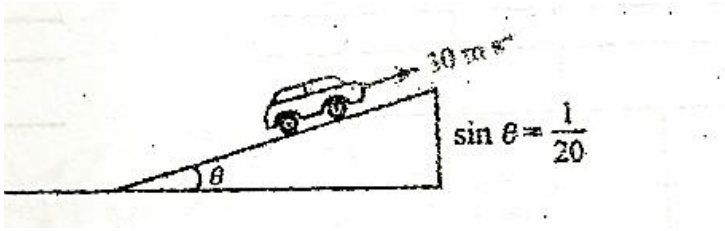
16. a) State the principle of conservation of energy

[1 mark]

b) A car is moving with a uniform velocity, v. The force produced by the engine is F and the distance travelled by the car is s. Define and derive an expression for the power, P of the car.

[3 Marks]

c) The car with mass of 1000 kg, then is moving with a constant velocity of 30 ms^{-1} along a horizontal road and then it climbs a steep road as shown in the figure.



Calculate the additional power required by the car to climb the steep road.

[3 marks]

Section C

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

18 (a) Define *acceleration.*

[1 mark]

(b) A stone is thrown vertically upwards at the same time as another stone is dropped from a height h_0 directly above the first stone. If the initial velocity of the first stone is u, find an expression for time t when they meet. If the two stones were to have the same speed at the time they meet, express u in terms of h_0.

[4 marks]

(c) In order to check the time for which a camera shutter stays open, a metal sphere is photographed as it is released from rest. It is noted that the sphere falls *2.0 m* before the shutter opens. If the ball falls *0.15 m* while the shutter was open, calculate

(i) the speed of the ball after falling *2.0 m*

[1 mark]

(ii) the period the shutter was open.

[2 marks]

19. (a) State Newton's law of universal gravitation.

[1 mark]

(b) Use Newton's law of gravitation to deduce an expression for the period *T* of a satellite in terms of radius *r* of the orbit, the mass M of the Earth, and gravitational constant G.

[2 marks]

(c) A satellite of mass 200 kg is in circular orbit at an altitude 2000 km above the surface of the Earth. Given that the mass of the Earth is 6.0×10^{24} kg and the radius of the Earth is 6400 km, calculate

(i) the period of the satellite round the Earth,
(ii) the speed
(iii) the kinetic energy of the satellite
(iv) the gravitational potential energy of the satellite

[8marks]

(d) The diagram 19.1 shows a satellite *S* orbits the Earth *E* once every 97.3 minutes. The radius of the orbit is 1.10 times the radius of the earth. Given that the radius of the earth is 6.37×10^{6} m.



Diagram 19.1

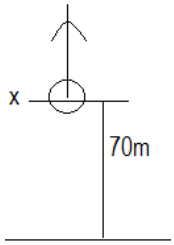
(i) Redraw the diagram and show the arrow representing the linear velocity of S and label this as ***v***. Draw a second arrow representing the direction of the force acting on S. Label this as ***F.***

[2 marks]

(ii) calculate the acceleration due to gravity acting on the satellite.

[2 marks]

Answer STPM2022 Percubaan
Section A

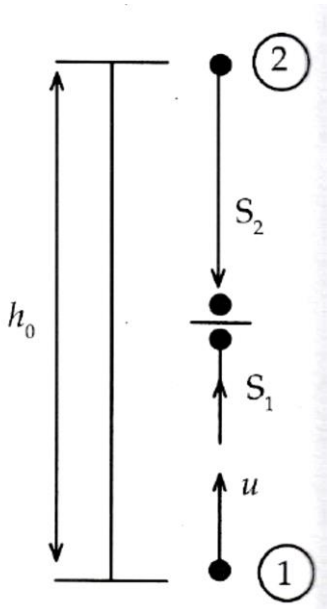
<table>
<tr><td>1.</td><td>D</td><td>Rearrange the equation to $I = \frac{1}{2}MR_2^2 + \frac{1}{2}MR_1^2$ where I and R_1 are the variable, then compare them with $y = mx + c$</td></tr>
<tr><td>2.</td><td>B</td><td>

<table>
<tr><td>s</td><td>u</td><td>v</td><td>a</td><td>t</td></tr>
<tr><td>0.7</td><td>?</td><td>3.5</td><td>-g</td><td>x</td></tr>
</table>
Eq no. 4 ($v^2=u^2+2as$)
u =5.10ms^{-1}</td></tr>
<tr><td>3.</td><td>B</td><td>Apply NSL on RHS
Number of mass = 2,
Total mass of the system = $m_1 + m_2$
Common ,a = 3

$ma = (m_A + m_B)a = 78N$</td></tr>
<tr><td>4.</td><td>A</td><td>Energy output + initial K.E = final K.E + P.E</td></tr>
<tr><td>5.</td><td>D</td><td>The tension in the string enables the mass to move in a circular path.</td></tr>
<tr><td>6.</td><td>A</td><td>$F = kx = 40(0.35 - 0.30) = 2.0\ N$
$F = \frac{mv^2}{r}$
$v = \sqrt{\frac{2(0.35)}{0.025}} = 5.29\ m\ s^{-1}$</td></tr>
<tr><td>7.</td><td>C</td><td>$g_1 = \frac{2Gm}{(2r)^2} = \frac{Gm}{2r^2}$ $\quad g_2 = \frac{4Gm}{(r)^2}$
$g_2 - g_1 = \frac{7Gm}{2r^2}$</td></tr>
<tr><td>8.</td><td>B</td><td>$\Delta U = U_2 - U_1$
$= -(6.67\ x\ 10^{-11})(6.0\ x\ 10^{24})(60)\left[\frac{1}{(6.4+0.50)x10^6} - \frac{1}{(6.4+0.70)x10^6}\right]$
$= -9.80\ x\ 10^7\ J$</td></tr>
</table>

Section C

18 (a)	Acceleration is rate of change of velocity. 1 OR $a = \frac{\Delta v}{\Delta t}$, symbol defined	1
(b)	$\boldsymbol{S = ut + \frac{1}{2}at^2}$ $S_1 = ut - \frac{1}{2}gt^2$ $S_2 = \frac{1}{2}gt^2$ $\boldsymbol{S_1 + S_2 = h_0}$ $ut - \frac{1}{2}gt^2 + \frac{1}{2}gt^2 = h_0$ $\therefore \ ut = h_0$ $\therefore \ t = \frac{h_0}{u}$ $V_1 = u - gt$ $V_2 = gt$ If $V_1 = V_2$, $u - gt = gt$ $\therefore u = 2gt$ $= 2g\left(\frac{h_0}{u}\right)$ $u = \frac{2gh_0}{u}$ $\therefore u^2 = 2gh_0$ $\therefore \boldsymbol{u = \sqrt{2gh_0}}$	4



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