Name :..... Form : LOWER Six .....

960/1

PHYSICS (FIZIK)

PAPER 1 (KERTAS 1)

One and a half hours (Satu jam setengah)

SMK ST. PAUL
STPM 2016
TRIAL
(TERM ONE)

SMK ST. PAUL STPM TRIAL TERM ONE

(PEPERIKSAAN PERCUBAAN SEMESTER SATU TINGKATAN ENAM RENDAH)

Instructions to candidates:

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

Answer **all** *questions in Section A. Indicate the correct answer on the Multiple-choice Answer Sheet provided.*
Answer **all** *questions in Section B. Write the answers in the spaces provided.*
Answer **two** *questions only in Section C. You may answer all the questions* **but**, *only the first two answers will be marked. Write the answers on the answer sheets provided.*
All working should be shown. For numerical answers, unit should be quoted wherever appropriate. Begin each answer on a new page of the answer sheet.
Answers may be written either in English or Malay.

For examiner's use only	
Section A	
1 to 15	
Section B	
16	
17	
Section C	
TOTAL	

Arahan kepada calon:

JANGAN BUKA KERTAS SOALAN INI SEHINGGA ANDA DIBENARKAN BERBUAT DEMIKIAN.

Jawab **semua** *soalan dalam Bahagian A. Tandakan jawapan yang betul pada Borang Jawapan Aneka Pilihan yang dibekalkan.*
Jawab **semua** *soalan dalam Bahagian B. Tulis jawapan anda di dalam ruang yang disediakan.*
Jawab **dua** *soalan sahaja dalam Bahagian C. Anda boleh menjawab semua soalan* **tetapi**, *hanya dua jawapan yang pertama akan diperiksa. Tulis jawapan pada ruang helaian jawapan yang disediakan. Semua jalan kerja hendaklah ditunjukkan. Bagi jawapan berangka, unit hendaklah dinyatakan di mana-mana yang sesuai. Mulakan setiap jawapan pada halaman baharu helaian jawapan.*
Jawapan boleh ditulis dalam bahasa Inggeris atau Bahasa Melayu.

This question paper consists of 8 printed pages only.
(Kertas soalan ini terdiri daripada 8 halaman bercetak sahaja)

Section A [15 *marks*]
Answer **all** *questions in this section.*

1. The physical quantity that has the same dimensions with Young Modulus is

A Impulse
B Strain
C Momentum
D Stress

2. The dimension of a rectangular shape of wood are length, ι = (12.6 ±0.1) cm, breath, b = (8.9 ±0.1) cm. The uncertainty in the perimeter of the wood measured is

A ± 0.1 cm
B ± 0.2 cm
C ± 0.3 cm
D ± 0.4 cm

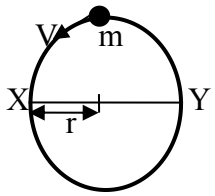
3. Tins of canned food are placed at a constant rate of 3.0 kg s^{-1} onto the conveyor belt which is moving at a constant speed of 0.50 ms^{-1}. The mechanical power needed to keep the belt moving is

A 0.5 W **B** 0.75 W **C** 1.25 W **D** 1.5 W

4. The power needed to change the speed of a 1 600 kg vehicle from 15.0 ms^{-1} to 40.0 ms^{-1} in 4.0 s is

A 10.0 kW **B** 14.0 kW **C** 100 kW **D** 275 kW

5. Figure shows a body of mass 2*m* moves in a horizontal circle of radius *r* at constant angular velocity ω and constant velocity *v*. Which pair of the values correctly gives the work done by the centripetal force and the change in linear momentum of the body when it moves from X to Y where XY is a diameter?



	Work done	Change in linear momentum
A	$2mv^2$	4 *mv*
B	mv^2	4 *mv*
C	zero	zero
D	zero	4 *mv*

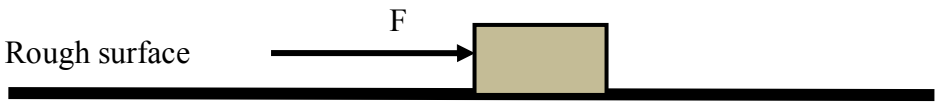
6. Two satellites S_1 and S_2 are orbiting around a planet of radius *R*. S_1 moves just above the surface and S_2 is in an orbit of radius 4*R*. The value of the ratio $\frac{\text{orbit speed of } S_1}{\text{orbit speed of } S_2}$ is

A 2
B ½
C 4
D ¼

7. Assuming that the earth is spherical, what will happen if the earth rotates faster about its axis?

A Gravitational potential at the earth's equator will increase
B All objects on the earth's surface will escape from the earth
C Gravitational acceleration at the poles will decrease
D Weight of objects at the earth's equator will decrease

8. Figure below shows an object at rest on the rough surface of a table and the external force is acting on it. Which statement is true of the static friction between two surfaces?

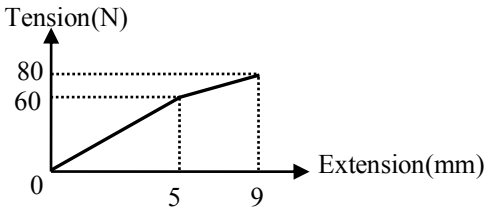


A It will decrease as the external force act on the object increases.
B It depends on the surface area.
C It is not depends on the nature of the surface.
D It depends on the mass of object.

9. A rod of original length ℓ and cross-sectional area A is stretched by e. If E is the Young Modulus of the rod, and the change in cross-sectional area of the rod can be neglected, the energy per unit volume stored in the rod is

A $\frac{Ee^2}{2\ell^2}$ **B** $\frac{EeA}{2\ell^2}$ **C** $\frac{Ee}{\ell^2}$ **D** $\frac{EeA}{\ell}$

10. A wire, inside which the tension increases, extends in the manner as shown in figure below.



The work done in extending the wire 9.0mm is
A 0.72 J
B 0.43 J
C 0.36 J
D 0.29 J

11. In the kinetic theory of an ideal gas, which of the statements is **not** a correct assumption?
A The volume of the molecules is negligible compared the volume in which they move.
B They is no total kinetic energy change of the molecules by collision with each other or with the walls of the container.
C The molecules have negligible momentum change on collision with the container walls.
D The molecules have negligible attraction for each other.

12. A perfectly insulated container attached with a piston contains a diatomic molecule. Which of the following best describes the r.m.s. speed and the degree of freedom of the gas molecules if the gas expands and pushes the piston?

	r.m.s speed	Degrees of freedom
A	Decreases	Unchanged
B	Increases	Unchanged
C	Unchanged	Decreases
D	Unchanged	Increases

13. An ideal gas contained in a cylinder with piston allowed to expand from volume V_1 and pressure P_1 to volume V_2 and pressure P_2. Its temperature is kept constant all the time. The work done by the gas is

A zero, because it obeys Boyle's laws and so $P_2V_2 - P_1V_1 = 0$
B negative, because the pressure has decreased and therefore the force on the piston is decreasing
C zero, because the gas is kept constant temperature and therefore internal energy is unchanged.
D positive, because the volume has increased.

14. An ideal gas is compressed adiabatically in a closed container. The quantity that will decreases is

A Number of molecules per unit volume of the gas
B Most probable velocity for the molecules of the gas
C Frequency of collisions between the molecules of the gas
D Mean time between collision of the molecules of the gas

15. A well-lagged copper bar is heated at one end and the other end is in contact with melting ice. If the rate of heat supply at the hot end is reduced, which of the following is correct about the temperature of the both ends and the temperature gradient?

	Temperature at hot end	Temperature at cold end	Temperature gradient
A	Remains unchanged	Decreases	Decreases
B	Decreases	Remains unchanged	Decreases
C	Decreases	Remains unchanged	Increases
D	Increases	Increases	Increases

Section B [15 *marks*]
A*nswer* **all** *questions in this section.*

16. (a) Define torque. [1 *mark*]

(b) Figure shows a uniform ladder of length 2.0 m and mass 20.0 kg leaning against a smooth wall at an angle of 50^o to the floor. A worker of mass 60.0 kg is three quarter of the way up the ladder. Calculate

(i) the normal reaction of the wall on the end B of the ladder. [2 *marks*]

20. (a)(i) Define *mean speed, most probable speed* and *root mean square speed* for gas molecules. [3 *marks*]

(b) (i) Sketch graphs on the same axes to show the distribution of molecular speeds for a fixed mass of ideal gas at two temperatures T_1 and T_2 ($T_1 > T_2$) and mark on the curve with temperature T_1 graph, the (i) mean speed, (ii) most probable speed and (iii) root mean square speed. [5 *marks*]

(ii) What is represented by the area under the curve? [1 *mark*]

(c) (i) State the law of equipartition of energy. [1 *mark*]

(ii) By using the law of equipartition of energy, derive an expression for the kinetic energy K, in terms of temperature T and degree of freedom f of a gas containing N molecules. [2 *marks*]

(d) A sphere of diameter 100.0 mm is at a temperature of 300K. Assume that it is a black body.

(i) Explain the meaning of black body. [1 *mark*]

(ii) Calculate its power radiated. [2 *marks*]

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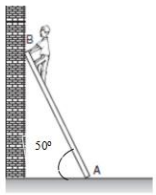
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Section A

1. D	4. D	7. D	10. B	13. D
2. D	5. D	8. D	11. C	14. D
3. B	6. A	9. A	12. A	15. B

Section B [15 *marks*]

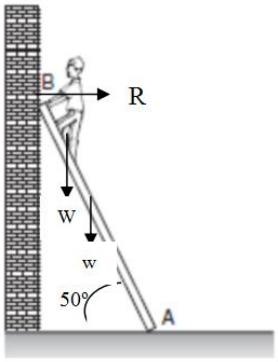
16. (a) Define torque. [1 *mark*]



Force, F x perpendicular distance of the force from the axis of rotation, r
OR $\Gamma = Fd \sin\theta$
OR Moment = Fr

(b) Figure shows a uniform ladder of length 2.0 m and mass 20.0 kg leaning against a smooth wall at an angle of 50° to the floor. A worker of mass 60.0 kg is three quarter of the way up the ladder. Calculate

(i) the normal reaction of the wall on the end B of the ladder. [2 *marks*]



Taking moment about A,

$(R \sin 50^\circ)(2) = (60g)(\cos 50^\circ)(3/4)(2) + (20g)\cos 50^\circ$ (1)

$R = 452.7$ N [1]

(ii) the magnitude and direction of the force acting on the end A of the ladder.[4 *marks*]

Resolving vertically, $(60g) + (20g) = F \sin\alpha$ ---------- (1) [1]

Resolving horizontally, $R = 452.7 = F\cos\alpha$ ---------- (2) [1]

$(1)^2 + (2)^2$ $F^2 = (80g)^2 + (452.7)^2$

$F = 906.0$N [1]

Direction :$\theta = \tan^{-1}(80g)/(452.7) = 60^\circ$ to the horizontal [1]

17. (a) What is meant by a geostationary satellite? [1 mark]

Satellite that appears stationary relative to points on Earth's surface.

(b) State two characteristics of the geostationary satellite. [2 marks]

1. the satellite must orbit the Earth in the same direction as the rotation of the Earth about its axis.
2. the period of its orbit equals the period of the earth's rotation about its axis, I.e 1.0 day
3. the satellite's orbit is in the same plane as the equator because the centripetal force is provided by the gravitational pull of the Earth.
4. Radius of the satellite's orbit, r is about 4.24×10^7 m = 6.6 times of the radius of the Earth.

(Any two)

Suka sampel ini?

Kertas Percubaan STPM

Sem 1 · Fizik

- 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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