KOLEJ YAYASAN PELAJARAN JOHOR

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FINAL EXAMINATION

COURSE NAME	:	**PHYSICS**
COURSE CODE	:	**DEG 1013**
EXAMINATION	:	**JANUARY 2024**
DURATION	:	**2 HOURS 30 MINUTES**

INSTRUCTION TO CANDIDATES/
ARAHAN KEPADA CALON

1. This examination paper consists of **TWO (2)** parts. /
   *Kertas soalan ini mengandungi **DUA (2)** bahagian.*

   PART A : 40 Marks
   BAHAGIAN A : 40 Markah

   PART B : 10 Marks
   BAHAGIAN B : 10 Markah

2. Candidates are not allowed to bring any material to the examination room except with the permission from the invigilator. The formula was attached at the back of the question paper. /
   Calon tidak dibenarkan untuk membawa sebarang bahan/nota ke bilik peperiksaan tanpa arahan/kebenaran daripada pengawas. Rumus dilampirkan di belakang kertas soalan peperiksaan.

3. Please check to make sure that this examination pack consists of: /
   Pastikan kertas soalan peperiksaan ini mengandungi:
   i. Question Paper /
      Kertas Soalan.
   ii. Answering Booklet. /
      Buku Jawapan.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO /
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

This examination paper consists of 9 printed pages including front page
Kertas soalan ini mengandungi 9 halaman bercetak termasuk muka hadapan

PART A (TOTAL: 40 MARKS)

This part contains of FIVE (5) questions. Answer all the questions in the Answering Booklet.

Bahagian ini mempunyai FIVE (5) soalan. Jawab semua soalan di dalam Buku Jawapan.

QUESTION 1

a) Convert units of the following derived quantities into SI units.

i) 150 km/h to m/s.

ii) 200 g/cm^2 to kg/m^2

Tukarkan unit kuantiti terbitan berikut kepada unit SI.

i) 150 km/j kepada m/s.

ii) 200 g/cm^2 kepada kg/m^2.

(4 Marks/ *Markah*)

b) Two vectors have length V_1 = 3.5 km and V_2 = 4.0 km. Identify the maximum and minimum magnitudes of their vector sum.

Dua vektor mempunyai panjang V_1 = 3.5 km dan V_2 = 4.0 km. Kenal pasti magnitud maksimum dan minimum paduan vektor-vektor tersebut.

(4 Marks/ *Markah*)

QUESTION 2

You are driving from campus at 110 km/h for 110 km. It then begins to rain and you slow down to 65 km/h. You arrive home after driving for 3 hours and 12 minutes. Calculate

i) the distance of your home from campus.

ii) your average speed.

Anda sedang memandu dari kampus dengan kelajuan 110 km/j sejauh 130 km. Hujan mula turun dan anda memperlahankan kelajuan kepda 65 km/j. Anda tiba di rumah setelah memandu selama 3 jam 20 minit. Kirakan

i) jarak rumah anda dari kampus.

ii) purata laju anda.

(8 Marks/ *Markah*)

QUESTION 3

a) A 20 kg box rest on a table.

i) Determine the weight of the box and the normal force act on it.

ii) A 10 kg box is placed on top of the 20 kg box. Determine the normal force that the table exerts on the 20 kg box and the normal force the 20 kg exerted on the 10 kg box.

Kotak berjisim 20 kg rehat di atas meja.

i) Tentukan berat kotak dan daya normal yang bertindak ke atas kotak.

ii) Sebuah kotak lain berjisim 10 kg diletakkan di atas 20 kg tadi. Tentukan daya normal yang dikenakan ke atas kotak 20 kg oleh permukaan meja dan daya normal yang dikenakan ke atas kotak 10 kg oleh kotak 20 kg.

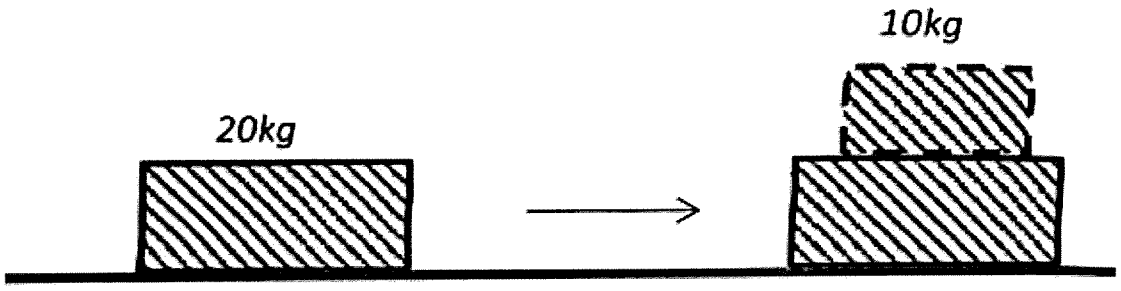

Figure 1 / *Rajah 1*

(6 Marks/ *Markah*)

b) Aiman was very sleepy while driving home from soccer practice. His 1500 kg car hit a few bumps while moving at 19.8 m/s. The first bump delivered a resistive impulse of 5700 Ns. The second bump pushed against his car with a force of 79000 N for 0.12 seconds. The third bump collision lowered the car's velocity by 3.2 m/s. Determine the final velocity of the car.

Aiman sangat mengantuk semasa memandu pulang dari latihan bola sepak. Keretanya berjisim 1500 kg melanggar beberapa bum. Bum pertama memberi impuls halangan sebesar 5700 Ns. Bum kedua menahan keretanya dengan daya 79000 N selama 0.12 saat. Pelanggaran bum ketiga merendahkan halaju keretanya sebanyak 3.2 m/s. tentukan halaju akhir kereta.

(4 Marks/ *Markah*)

QUESTION 4

The electrical unit is always expressed in 'kilowatt-hours'.

i) Shows that 1 kilowatt-hours is equal to 3.6 X 10^6 Joule.

ii) If a family uses 520W of electrical power daily, calculate their electric bills per month in kWh.

iii) Change it into Joules.

iv) If a kWh costs 12 cents, determine the family monthly bills.

Unit elektrik sentiasa ditulis dalam 'kilowatt-jam'.

i) Tunjukkan bahawa 1 kilowatt-jam adalah sama dengan 3.6 X10^6 Joule.

ii) Jika sebuah keluarga menggunakan 520W kuasa elektrik setiap hari, kirakan bil elektrik sebulan dalam kWj.

iii) Tukarkan 520W kepada unit Joule.

iv) Jika 1 kWj berharga 12 sen, tentukan bil elektrik keluarga tersebut sebulan.

(8 Marks/ *Markah*)

QUESTION 5

a) An object with a mass of 100 g is tied to the end of a string 1.0 m long and twisted to make a horizontal circle. Every second it makes 5 full rounds. State the tension in the string.

Satu objek berjisim 100 g diikat pada hujung seutas tali yang panjangnya 1.0 m dan dipusingkan supaya membuat bulatan mengufuk. Setiap saat is membuat 5 pusingan penuh. Kirakan ketegangan dalam tali.

(2 Marks/ *Markah*)

b) An object of mass 0.3 kg is tied to a rope 1.5 m long and rotates in a horizontal circle. Given a linear velocity, v=6 m/s, find

i) Centripetal acceleration.

ii) Tension in the rope.

Objek berjisim 0.3 kg diikat kepada tali yang panjangnya 1.5 m dan berputar dalam bulatan mengufuk. Diberi halaju linear, v=6 m/s, kirakan

i) Pecutan memusat.

ii) Ketegangan dalam tali.

(2 Marks/ *Markah*)

c) A car moves with a tangential velocity of 50 km/h around a circle of radius 300 m. Give the angular velocity of the car.

Sebuah kereta bergerak dengan halaju tangen 50 km/j mengelilingi satu bulatan berjejari 300 m. Kirakan halaju sudut kereta.

(2 Marks/ *Markah*)

PART B (10 MARKS)

This part contains of **TWO (2)** questions. Answer **ONE** question only in the Answering Booklet.

*Bahagian ini mempunyai **DUA (2)** soalan. Jawab **SATU** soalan sahaja di dalam Buku Jawapan.*

QUESTION 1

Given a simple harmonic motion equation $x = 10\ sin\ sin\ 20\pi t$, where x is in meters and t is in seconds. Calculate all the value below:

a) Angular frequency.
b) Frequency.
c) Period.
d) Amplitude / Maximum displacement.
e) Maximum velocity.
f) Maximum acceleration.
g) Displacement at t=10 s and t=0.33 s.
h) Velocity at t=0.33 s.
i) Acceleration at t=0.33 s.
j) Acceleration when displacement at 7.0 m.
k) Time taken to move from balance point to a point of 8.9 m.

Diberi persamaan gerakan harmonik mudah $x = 10\ sin\ sin\ 20\pi t$, dimana x didalam meter dan t didalam saat. Kirakan semua nilai berikut:

a) Frekuensi sudut.
b) Frekuensi.
c) Tempoh.
d) Amplitud / Sesaran maksima.
e) halaju Maksima.
f) Pecutan maksima.
g) Sesaran pada masa t=10 s dan t=0.33 s.
h) Halaju pada masa t=0.33 s.

i) Pecutan pada masa t=0.33 s.

j) Pecutan apabila sesaran pada 7.0 m.

k) Masa yang diperlukan untuk menggerakkannya dari titik keseimbangan ke titik 8.9 m.

(10 Marks/ *Markah*)

QUESTION 2

Based on Figure 2 below, determine

a) Electric potential at C.

b) Work done to bring a point charge of q=-0.05 μC from infinity to C with uniform velocity.

c) Potential difference between B and D.

d) Work done to bring a point charge of q=-0.05 μC from B to D with uniform velocity.

Berdasarkan pada Rajah 2 di bawah, dapatkan

a) Potensi elektrik pada C.

b) Kerja yang dilakukan untuk membawa cas q=-0.05 μC dari infiniti kepada titik C dengan halaju seragam.

c) Beza potensi antara B dan D.

d) Kerja yang dilakukan untuk membawa cas titik q=-0.05 μC dari B hingga D dengan halaju seragam.

(10 Marks/ *Markah*)

[50 MARKS / *MARKAH*]

END OF QUESTION PAPER/ *KERTAS SOALAN TAMAT*

Formula / *Rumus*

$$Area = \frac{Length}{Width}, m^2$$
$$Speed = \frac{Distance}{Time}, ms^{-1}$$
$$Velocity = \frac{Displacement}{Time}, ms^{-1}$$
$$Acceleration = \frac{Change\ of\ velocity}{Time}, ms^{-2}$$
$$Momentum = Mass \times velocity, kgms^{-1}$$
$$Impulse = Force \times \Delta Time, Ns$$
$$Force = Mass \times Acceleration, kgms^{-2}$$
$$Pressure = \frac{Force}{Area}, kgm^{-1}s^{-2}$$
$$Work = Force \times Displacement, kgm^2s^{-2}$$
$$Power = \frac{Energy}{Time}, kgm^2s^{-3}$$
$$Density = \frac{Mass}{volume}, kgm^{-3}$$
$$Charge = Electric\ current \times Time, As^{-1}$$
$$v = u + at$$
$$v^2 = u^2 + 2aS$$
$$S = ut + \frac{1}{2}at^2$$
$$S = \frac{1}{2}(u + v)t$$
$$f_s = \mu_s N$$
$$f_k = \mu_k N$$
$$1° = \left(\frac{\pi}{180}\right), rad$$
$$1rad = \left(\frac{180}{\pi}\right), °$$
$$s = r\theta$$
$$v = r\omega$$
$$\omega = \frac{\theta}{t} = 2\pi f$$
$$f = \frac{1}{T}, Hz$$
$$E = \frac{F}{m} = \frac{\frac{GMm}{r^2}}{m} = \frac{GM}{r^2}, N/kg$$

$$U = -\frac{GMm}{r}, J$$

SHM

$$a = -\omega^2 x$$
$$f = \frac{\omega}{2\pi}$$
$$\omega = \frac{2\pi}{T}$$

$$v_{max} = \omega A$$
$$a_{max} = \omega^2 A$$
$$x = A\,sin(\omega t \pm \emptyset)$$
$$v = A\omega\,cos(\omega t \pm \emptyset)$$
$$a = -A\omega^2\,sin(\omega t \pm \emptyset)$$
$$E = \frac{1}{2}kA^2$$

ELECTROSTATIC

$$F = k\frac{Q_1 Q_2}{r^2}$$
$$E = \frac{kQ}{r^2}$$
$$U = qV$$