



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Sekolah Pendidikan Profesional dan
Pendidikan Berterusan
(UTMSPACE)

2

DDPB

FINAL EXAMINATION / *PEPERIKSAAN AKHIR*
SEMESTER 1 – SESSION 2016 / 2017
PROGRAM KERJASAMA

COURSE CODE : DDPS 1713
KOD KURSUS

COURSE NAME : PHYSICS/
NAMA KURSUS FIZIK



SECTION A/ BAHAGIAN A (20 marks / markah)

Answer all questions in this section. / Jawab semua soalan dalam bahagian ini.

1. The sun is about 93 million miles from Earth. How many meters is this?

Given that 1 mile = 1609.344 m. Write the answer in:

- (a) standard form
(b) metric prefixes

Matahari berada 93 juta batu dari Bumi. Berapa meterkah ukuran ini?

Diberi 1 batu = 1609.344 m. Tuliskan jawapan dalam:

- (a) bentuk piawai
(b) prefiks metrik.

(2m)

2. What is the weight of a body of mass 20 g if the gravitational acceleration is 9.81 m/s^2 ?

Berapakah berat sebuah jasad berjisim 20 g jika pecutan graviti adalah 9.81 m/s^2 ?

(2m)

3. Explain the meaning of impulse of an object during collision.

Terangkan maksud impuls suatu jasad semasa pelanggaran.

(2m)

4. A ball is thrown upwards, rises to its peak and eventually fall back to the ground as shown in Figure 1. What is the direction of its acceleration at point A and B?

Sebiji bola dilontar tegak ke atas, sampai ke kemuncak dan seterusnya jatuh ke bumi seperti yang ditunjukkan dalam Rajah 1. Apakah arah pecutan pada titik A dan B?

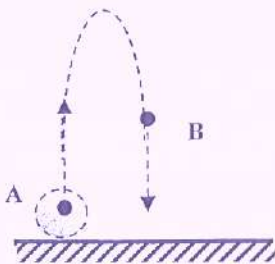


Figure 1/ Rajah 1

(2m)

5. Two cannonballs in Figure 2, A and B, are fired from the ground with identical initial speeds, but with θ_B larger than θ_A . Which cannonball stays longer in the air? Explain your answer with the use of formula.

Dua peluru meriam, A dan B dalam Rajah 2, ditembak dari permukaan bumi pada kelajuan awal yang sama tetapi pada sudut θ_B yang lebih besar dari θ_A . Peluru manakah yang akan berada di udara lebih lama? Jelaskan jawapan kamu dengan menggunakan rumus.

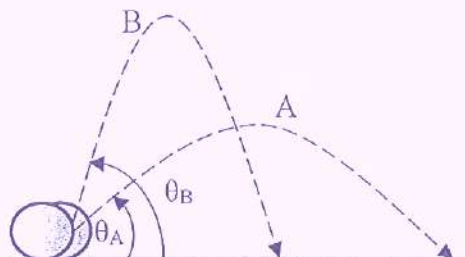


Figure 2/ Rajah 2

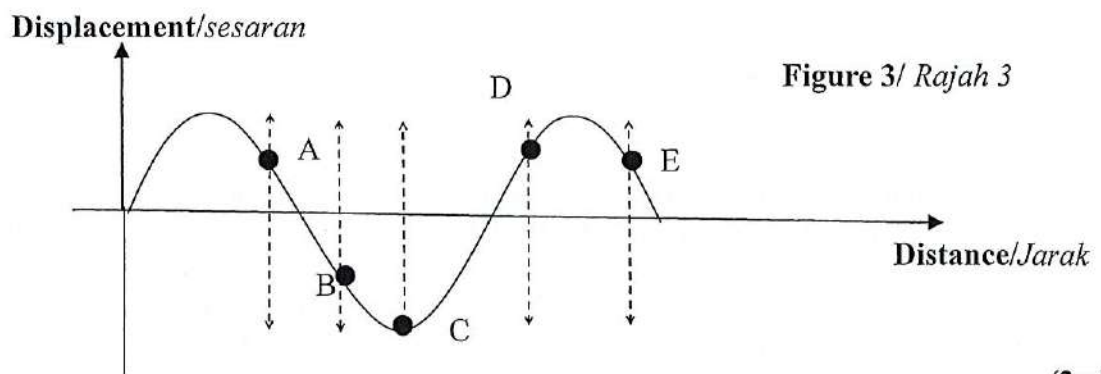
(2m)

6. **Satellite in geostationary orbits around the earth is always in the state of free fall towards the Earth. Explain why it never drop and hit the Earth surface.**
Satelit yang berada di orbit pegun bumi sentiasa dalam keadaan jatuh bebas. Terangkan mengapa ia tidak pernah jatuh dan menghentam ke permukaan bumi (2m)

7. **A wall clock has three hands which are the hour hand, the minute hand and the second hand. Calculate the angular speed, ω of both the second and the minute hands.**
Jam dinding ada tiga jarum yang mana adalah jarum jam, jarum minit dan jarum saat. Tentukan laju sudut, ω bagi kedua-dua jarum minit dan jarum saat. (2m)

8. **In a simple harmonic motion, at what position from the center of oscillation or the equilibrium point, is that the:**
(a) kinetic energy is maximum?
(b) acceleration is maximum?
Dalam gerakan harmonik mudah, pada kedudukan manakah dari pusat ayunan atau titik keseimbangan:
(a) tenaga kinetik maksimum?
(b) pecutan maksimum? (2m)

9. **The graph of displacement-distance for a wave moving in a medium where five particles of the medium are oscillating up and down with different phase as shown in Figure 3. Which two particles have the velocity and the acceleration in opposite direction.**
Graf sesaran-jarak bagi suatu gelombang yang merambat dalam medium dimana lima daripada zarah-zarahnya yang berayun ke atas dan ke bawah dengan fasa yang berbeza ditunjukkan dalam Rajah 3. Manakah dua zarah yang mempunyai halaju dan pecutan pada arah bertentangan.



10. **(a) What is a capacitor?**
(b) What is the meaning of capacitance of a capacitor?
(a) Apakah kapasitor?
(b) Apakah maksud kapasitan bagi suatu kapasitor? (2m)

SECTION B / BAHAGIAN B (30 marks / markah)

Answer five (5) questions only / Jawab lima (5) soalan sahaja.

1. An airplane is flying north with the velocity of 600 km/h as shown in Figure 4. A wind blows from northeast at 100 km/h,
- (a) Change 600 km/h to m/s.
 - (b) Calculate velocity of the plane relative to the ground in unit of km/h.
 - (c) The airplane takes 11 hours to arrive at its destination, how far did it traveled?
 - (d) If there is no wind blowing, how much time is saved?

Sebuah kapal terbang terbang ke utara dengan kelajuan 600 km/j seperti ditunjukkan dalam Rajah 4. Terdapat angin bertiup dari arah timur laut selaju 100 km/j.

- (a) Tukarkan 600 km/j kepada m/s.
- (b) Kirakan halaju kapal terbang relatif kepada bumi dalam unit km/j.
- (c) Kapal terbang mengambil masa 11 jam untuk sampai ke destinasi. Berapa jauhkan perjalanan ini?
- (d) Jika tiada angin bertiup, berapa lamakah masa yang dijimatkan?

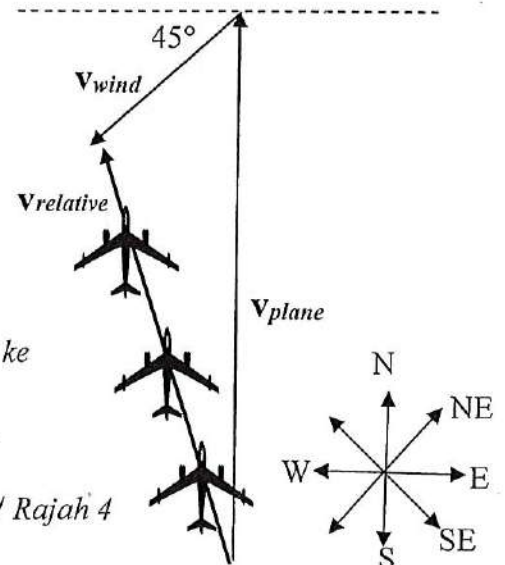


Figure 4 / Rajah 4

(8m)

2. A driver leaves a car without applying a handbrake on a road inclined at an angle of 25°, as shown in Figure 5. The tires of the car starts to roll and after moving 20 m, the speed of the car becomes 5.0 m/s.
- (a) Draw a free body diagram of the car.
 - (b) Determine the acceleration of the car.
 - (c) What is the normal reaction force acted on the car?
 - (d) Find the coefficient of kinetic friction, μ_k between the tires and the road.

Seorang pemandu kereta meninggalkan keretanya tanpa mengenakan brek tangan di atas sebatang jalan yang condong pada sudut 25°, seperti yang ditunjukkan dalam Rajah 5.

Tayar kereta mula bergolek dan setelah kereta bergerak sejauh 20 m, lajunya menjadi 5.0 m/s.

- (a) Lakarkan rajah bebas jasad bagi kereta.
- (b) Tentukan pecutan kereta.
- (c) Apakah daya tindakbalas normal pada kereta?
- (d) Dapatkan pekali geseran kinetik, μ_k antara tayar dan jalan.

(8m)

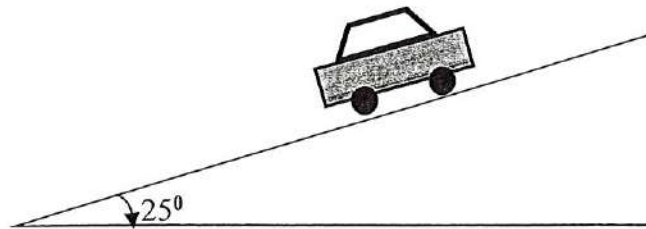


Figure 5 / Rajah 5

3. Abu rides his bicycle down the slope of a hill 3 m high at an initial velocity of 2 ms^{-1} , without pedaling (no kinetic friction, but only static friction). At the foot of the hill, his velocity becomes 6 ms^{-1} as shown in Figure 6. Given that the mass of Abu with his bicycle is 75 kg, find:
- (a) the kinetic energy of Abu and his bicycle on the hill.
 - (b) the potential energy of Abu and his bicycle on the hill.
 - (c) the energy of Abu and his bicycle at the foot of the hill.
 - (d) the decrease of energy (lost as heat due to friction) going down the slope.

Abu menaiki basikalnya menuruni cerun bukit setinggi 3m dengan halaju awal 2 ms^{-1} tanpa mengayuh (tiada geseran kinetic, tetapi hanya geseran statik). Di kaki bukit, halajunya menjadi 6 m/s seperti dalam Rajah 6. Diberi jisim Abu dan basikalnya 75 kg, dapatkan:

- (a) tenaga kinetik Abu dan basikalnya di atas bukit
- (b) tenaga keupayaan Abu dan basikalnya di atas bukit
- (c) tenaga Abu dan basikalnya di kaki bukit
- (d) tenaga yang hilang semasa menuruni cerun bukit. (hilang sebagai tenaga haba oleh geseran)

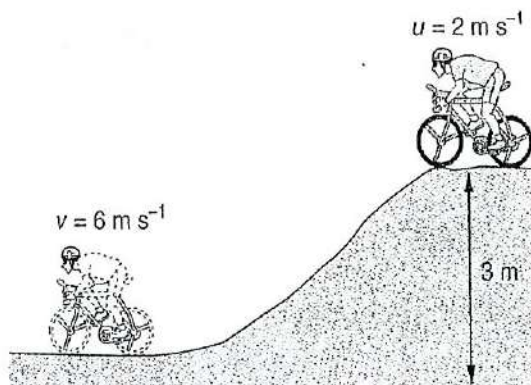


Figure 6 / Rajah 6

(8m)

4. A particle oscillates with simple harmonic motion, so that its displacement varies according to the expression $x = 5 \cos\left(2t + \frac{\pi}{6}\right)$ where x is in centimeters and t is in seconds. At $t = 0$ second find:
- (a) the displacement of the particle,
 - (b) its velocity and its acceleration.
 - (c) the period and amplitude of the motion.

Sebuah objek berayun dengan gerakan harmonik mudah, dengan sesarannya berubah dengan ungkapan $5\cos\left(2t + \frac{\pi}{6}\right)$ di mana x dalam unit sentimeter dan t dalam unit saat. Pada $t = 0$ saat, dapatkan:

- (a) sesaran objek
- (b) halaju dan pecutannya
- (c) tempoh dan amplitudnya.

(8m)

5. Graph A in Figure 7 shows the displacement versus distance of a progressive transverse wave at time $t = 0$ s. The wave is traveling to the right. Graph B shows the same wave, 50 milliseconds later. (a quarter cycle later or a quarter period later)
- (a) Determine the wavelength, the period and the speed of the wave,
 - (b) Write the wave equation for graph B

Graf A dalam Rajah 7 menunjukkan sesaran melawan jarak bagi gelombang melintang pada masa $t = 0$ s. Gelombang merambat ke kanan. Graf B pula menunjukkan gelombang yang sama 50 milisaat kemudian. (suku kitaran atau suku tempoh kemudian)

- (a) Tentukan jarak gelombang, tempoh dan halaju gelombang
- (b) Tuliskan persamaan gelombang bagi graf B.

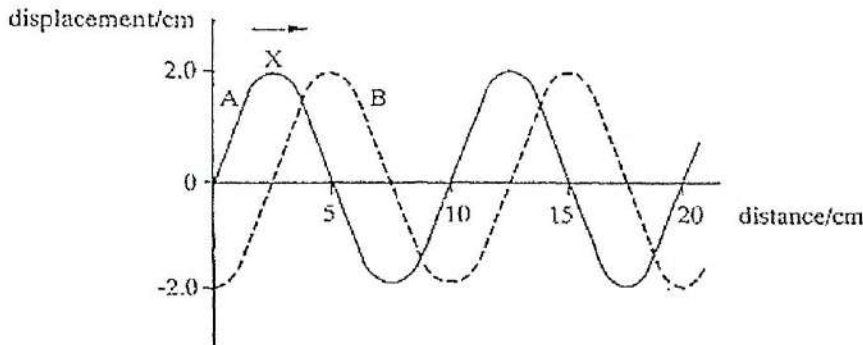


Figure 7 / Rajah 7

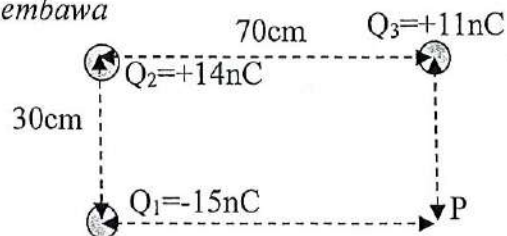
(8m)

6. Three charges are arranged as shown in Figure 8. Given that $1 \text{ nC} = 1 \times 10^{-9} \text{ C}$.
- (a) What is the magnitude and direction of total force exerted on Q_2 ?
 - (b) Find electrostatic potential at P
 - (c) What is the work done to bring 5 nC charged particle from infinity to point P?

Tiga cas di susun seperti yang ditunjukkan dalam Rajah 8. Di beri $1 \text{ nC} = 1 \times 10^{-9} \text{ C}$.

- (a) Apakah magnitud dan arah jumlah daya dikenakan ke atas Q_2 ?
- (b) Dapatkan potensi elektrostatik di P
- (c) Apakah kerja yang dilakukan untuk membawa cas 5 nC dari infiniti ke titik P?

Figure 8/ Rajah 8



(8m)

SELECTED FORMULA/ RUMUS PILIHAN

KINEMATICS

$$v = u + at$$

$$v^2 = u^2 + 2aS$$

$$S = ut + \frac{1}{2}at^2$$

$$S = \frac{1}{2}(u + v)t$$

FREE FALL

$$v = u + gt$$

$$v^2 = u^2 + 2gH$$

$$H = ut + \frac{1}{2}gt^2$$

$$S = \frac{1}{2}(u + v)t$$

MOMENTUM

$$F = \frac{m(v - u)}{t} = ma$$

$$P = mv$$

$$I = Ft = mv - mu$$

SATELLITE

$$P.E. = \frac{Gm_1m_2}{r_{12}}$$

$$K.E. = \frac{Gm_1m_2}{2r_0}$$