Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014

COURSE NAME	:	PHYSICS 1
COURSE CODE	:	DAS 14103
PROGRAMME	:	DAA, DAE, DAM, DAU
EXAMINATION DATE	:	JUNE 2014
DURATION	:	2 ½ HOURS
INSTRUCTION	:	**SECTION A** ANSWER **ALL** QUESTIONS
		SECTION B ANSWER **TWO (2)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **SEVEN (7)** PAGES

SECTION A

Q1 (a) State the defination of power.

(2 marks)

(b) Determine the SI units for power and its dimensions.

(4 marks)

(c) Figure **Q1(c)** shows a 50kg block is pushed slowly up an incline. The coefficient of friction between the block and the plane is 0.2.

(i) Calculate the work done in moving the block up the plane a distance of 4m.

(8 marks)

(ii) Describe what happened if the force F is removed.

(1 marks)

(iii) Determine its speed be when it reaches its original position after force F is removed.

(10 marks)

Q2 A stone is swinging in a horizontal circle of 0.8m in diameter, at 30rev/min.

(i) Identify the angular frequency of the motion of the stone.

(4 marks)

(ii) Interpret the amplitude of the motion of the stone.

(2 marks)

(iii) Determine the frequency of the motion of the stone.

(4 marks)

(iv) Interpret the period of the motion of the stone.

(2 marks)

(v) Distinguish the maximum acceleration at a turning point of the motion.

(6 marks)

(vi) Distinguish the speed of the stone at a turning point of the motion.

(2 marks)

(vii) Distinguish the maximum acceleration at equilibrium position.

(2 marks)

(viii) Distinguish the speed of the stone at equilibrium position.

(5 marks)

SECTION B

Q3 (a) Define the following term:

(i) Angular acceleration.

(2 marks)

(ii) Tangential acceleration.

(2 marks)

(iii) Centripetal acceleration.

(2 marks)

(b) Derive the relationship of the tangential and centripetal accelerations.

(3 marks)

(c) A 90cm radius roulette wheel initially turning at 3rev/s then slow down uniformly and finally stop after turning 26revolutions.

Determine the following:

(i) time taken for the wheel to stop.

(4 marks)

(ii) Angular acceleration of the wheel.

(4 marks)

(iii) Initial tangential speed of the wheel.

(4 marks)

(iv) Initial centripetal acceleration of the wheel.

(4 marks)

Q4 (a) A 6kg block rests on a smooth frictionless table. A string is attached to the block passes over a frictionless pulley, and a 3kg mass hangs causing the block to move downward from the string.

(i) Sketch and label the free body diagram to show above situation.

(4 marks)

(ii) Determine the acceleration of the dynamic string.

(5 marks)

(iii) Determine the tension T in the string.

(5 marks)

(b) Figure **Q4 (b)** shown a projectile is fired with a horizontal velocity of 330m/s from the top of a cliff 80m high.

(i) Determine time taken for the projectile to strike the level ground at the base of the cliff.

(4 marks)

(ii) Determine the range will it strike.

(2 marks)

(iii) Determine the velocity will it strike.

(5 marks)

Q5 (a) Differentiate between the vector and the scalar quantities.

(3 marks)

(b) List three (3) types of following quantities involved in dynamic motion:

(i) Vector quantities.

(1.5marks)

(ii) Scalar quantities.

(1.5marks)

(c) Three coplanar forces acted at y-x axis graph. The forces are 300N at 0°, 400N at 30° and 400N at 150°

(i) Plot and label these coplanar forces at y-x axis graph.

(3 marks)

(ii) Determine the resultant force acted by coplanar forces.

(13marks)

(iii) Determine the direction acted by coplanar forces.

(3 marks)

Q6 A sphere with it radius is 400mm is float in density of oil 0.78g/cm^3 under gravity.

(i) Determine the volume of the sphere in mili-meter per cubic.

(3 marks)

(ii) Express the volume of the sphere in scientific notation.

(1 marks)

(iii) Convert the volume of the sphere in SI unit.

(5 marks)

(iv) State the dimension of the volume of the sphere.

(2 marks)

(v) Convert the density of oil in SI unit.

(5 marks)

(vi) Determine the buoyancy force of the sphere.

(5 marks)

(vii) Express the buoyancy force of the sphere in SI unit.

(1 marks)

(viii) State the dimension for the buoyancy force.

(3 marks)

- END OF QUESTION –

FINAL EXAMINATION

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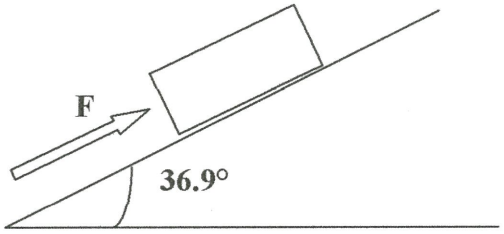

FIGURE Q1(c)

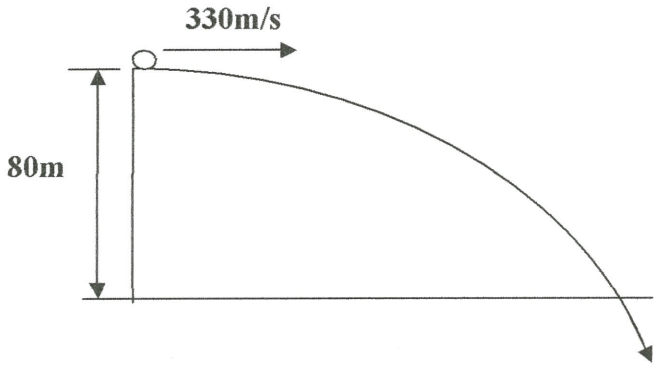

FIGURE Q4 (b)

FORMULA		
SEMESTER/SESSION: SEM II/2013/2014 COURSE NAME : PHYSICS 1		PROGRAMME: DAA, DAE, DAM, DAU COURSE CODE: DAS 14103
Gravity acceleration, $g = 9.81 m/s^2$	$s = r\theta$	$s = ut + \frac{1}{2} at^2$
$P = F v$	$\omega = d\theta / dt$	$v = u + at$
$F = ma$	$\alpha = d\omega / dt$	$s = vt$
$W = mg$	$v = r\omega$	$v^2 = u^2 + 2as$
$w = F s$	$a = r\alpha$	$R_x = R\cos\theta$
$f = \mu N$	$a_c = v^2 / r$ $= \omega^2 / r$	$R_y = R\sin\theta$
$KE = \frac{1}{2} mv^2$	$a_{net} = (\sqrt{a^2 + a_c^2})$	$R = (\sqrt{R_x^2 + R_y^2})$
$\frac{1}{2} mv_1^2 - \frac{1}{2} mv_2^2$ $= -(mgh_1 - mgh_2)$	$f = 1 / T$ $= \omega / 2\pi$	$\theta = \tan^{-1} (R_y / R_x)$
$U = mgh$	$a_{max} = \omega^2 A$	$\omega = \omega_o + \alpha t$
$\theta = \omega_o t + \frac{1}{2} \alpha t^2$	$Fb = \rho g V$	$V_{sphere} = 4/3\ \pi r^3$