



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2018/2019**

COURSE NAME : PHYSICS
COURSE CODE : BWD 10902
PROGRAMME : BWD
EXAMINATION DATE : DECEMBER 2018 / JANUARY 2019
DURATION : 2 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

Q1 (a) Use your knowledge in dimensional analysis to validate the equation below.

$$v^2 = u^2 + 2as$$

(4 marks)

(b) A long jumper leaves the ground at an angle of 20° to the horizontal and at speed of 11.0 m/s.

(i) How long does it take for him to reach maximum height? (3 marks)

(ii) What is the maximum height he can reach? (3 marks)

(iii) How far does he jump? (3 marks)

(c) A person standing on the edge of a cliff throws a rock straight up with an initial velocity of 13.0 m/s. The rock misses the edge of the cliff as it falls back to earth.

(i) Calculate the position of the rock for time 1.00 s, and 3.00 s after it is thrown. (6 marks)

(ii) Sketch the vertical position versus time and velocity versus time for the rock from the moment it leaves the person's hand until it reaches ground. (6 marks)

Q2 (a) A student pushes on a block, exerting a horizontal force. The block rests on a rough surface and does not move.

(i) State the concept used in this situation. (2 marks)

(ii) Draw a diagram to show the forces acting on the block when the student applies a horizontal force. (5 marks)

(iii) Why does the block not move? (3 marks)



(b) A block of mass 1 kg sits on a rough slope at an angle of 30° to the horizontal. Given the co-efficient of friction between the block and the slope is $\mu = 0.5$.

(i) Draw a free body diagram (FBD) show all forces acting on the block. (5 marks)

(ii) What is the maximum frictional force that can act up the slope? [Hint: Given frictional force $F_{fr} = \mu N$] (10 marks)

- Q3 (a) (i) Define angular velocity. (2 marks)
- (ii) Calculate the angular velocity of a car travelling at 30 km/hr around a roundabout which radius is 50 m. (5 marks)
- (iii) Give three examples of situations in which centripetal forces arise, detailing precisely which forces contribute to the centripetal force. (3 marks)
- (iv) Outline a simple experiment you could perform to explore circular motion (3 marks)
- (b) (i) How does the energy in a hamburger come from the sun? (4 marks)
- (ii) State the law of Conservation of Energy. (2 marks)
- (iii) A 16 kg child descends a slide 2.20 m high and reaches the bottom with a speed of 1.25 ms^{-1} . How much thermal energy due to friction was generated in this process? (6 marks)
- Q4 (a) Define what momentum is. Is it a vector or scalar quantity? Justify your answer. (5 marks)
- (b) Initially, a soccer ball is going 23.5 m/s, south. In the end, it is traveling at 3.8 m/s, south. The ball's change in momentum is 17.24 kg m/s, north. Find the ball's mass. (7 marks)
- (c) Use Newton's second law to explain the impulse of a force. (6 marks)
- (d) Compare and contrast elastic and inelastic collisions. (7 marks)

-END OF QUESTIONS-

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