Affix label with Candidate Code Number here.

If no label, enter candidate code number if known, or name here.

.....

(Supervisor's use only)

No. 262/1

New Zealand Qualifications Authority

University Entrance and Bursaries Examination, incorporating The National Bank of New Zealand Ltd Scholarships

PHYSICS: 1997

ANSWER BOOKLET

INSTRUCTIONS

All answers are to be written in this Answer Booklet.

All questions should be answered.

The spaces provided are a guide to the length of your answers, but it is **NOT** essential to use all of the space available.

If you need more space for any answer, ask the Supervisor for extra paper. Answers on extra paper should be clearly numbered. Write your candidate code number on all extra sheets used. Attach the extra sheets at the appropriate places in this booklet. Write the number of extra sheets used in the box at the top of the back flap of this booklet. Write NIL if you have used none.

Answer spaces for each part begin on the following pages:

INSTRUCTIONS FOR ANSWERING ALL QUESTIONS: To receive full marks for numerical questions:
- working should be clearly set out,
- answers must be accompanied by the correct units, and
- expressed to an appropriate number of significant figures.

For "describe" or "explain" questions, answers must be written as complete sentences.

Check that this booklet contains pages 2 — 17 in the correct order.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

(Turn over

The following formulae may be of use to you:

$\Delta p = Ft$	$d = r\theta$	$E = \frac{1}{2}LI^2$	$n\lambda = d\sin\theta$
$m_1x_1 = m_2x_2$	$v = r\omega$	$V = IX$	$n\lambda = \frac{dx}{L}$
$m_1x = m_2(d - x)$	$E_K = \frac{1}{2}I\omega^2$	$V = -L\frac{\Delta I}{\Delta t}$	$E_K = hf - \phi$
$\theta = \omega_0 t + \frac{1}{2}\alpha t^2$	$y = A\sin(\omega t + \phi)$	$R = \frac{\rho L}{A}$	$f' = f\frac{v_w}{v_w \pm v_s}$
$\omega^2 = \omega_0^2 + 2\alpha\theta$			

SPORT AND FITNESS

(56 marks; 66 minutes)

PLAYING CRICKET

QUESTION ONE: LINEAR MOTION (11 marks)

(a) _____

_____

momentum = _____ (2 marks)

(b) _____

_____

change in momentum = _____ (2 marks)

(c) _____

_____

average force = _____ (2 marks)

(d) _____

absolute uncertainty = _____ (1 mark)

(e) _____

percentage uncertainty = _____ (1 mark)

(f) _____

_____

acceleration = _____ (3 marks)

Q1 11

QUESTION TWO: LINEAR MOTION (9 marks)

Use the value $g = 9.80\ N\ kg^{-1}$.

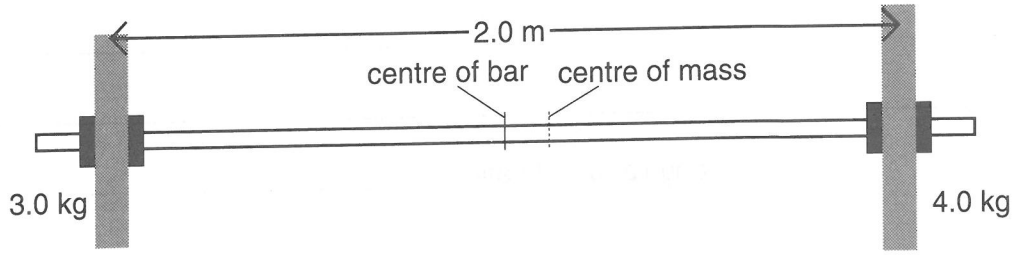
(a) _____

_____

_____

_____ (2 marks)

(b)



(2 marks)

(c) _____

vertical force = _____ (1 mark)

(d) _____

_____

_____

_____

_____

force in Jane's right arm = _____ (2 marks)

(e) _____

_____

_____

_____

total vertical force = _____ (2 marks)

Q2 9

QUESTION THREE: ROTATIONAL MOTION (9 marks)

(a) (i) _____

_____

_____ (1 mark)

(ii) _____

_____

_____

_____

angular acceleration = _____ (2 marks)

(b) (i) _____

_____

_____

torque = _____ (2 marks)

(ii) _____

_____

_____

_____

rotational inertia = _____ (2 marks)

(c) _____

_____

_____

_____ (2 marks)

Q3

9

TRAMPOLINING

QUESTION FOUR: ROTATIONAL MOTION (11 marks)

Use the value $g = 9.80\ N\ kg^{-1}$.

(a) from: _____ to: _____ (1 mark)

(b) _____

_____

_____

linear speed = _____ (2 marks)

(c) (i) _____

_____

_____

height = _____ (2 marks)

(ii) _____

_____

rotational kinetic energy = _____ (1 mark)

(d) _____

_____

_____

rotational inertia = _____ (2 marks)

(e) _____

_____

_____

_____ (2 marks)

(f) _____

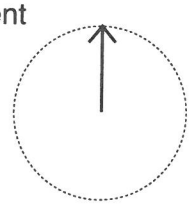
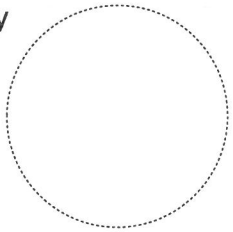
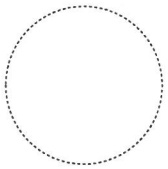
_____ (1 mark)

Q4 11

QUESTION FIVE: SIMPLE HARMONIC MOTION (16 marks)

(a) _____

_____ (1 mark)

(b) displacement  velocity  acceleration 

(2 marks)

(c) velocity is _____

acceleration is _____ (2 marks)

(d) _____ (1 mark)

(e) _____

_____

_____

frequency = _____ (2 marks)

(f) _____

_____

_____

angular frequency = _____ (2 marks)

(g) _____

_____

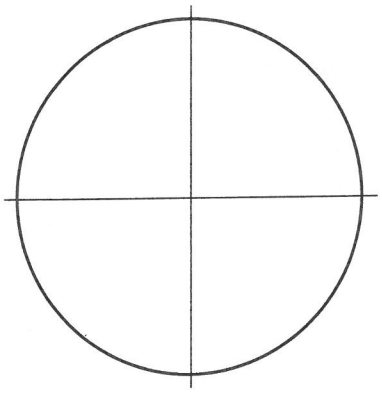
_____

linear speed = _____ (2 marks)

(h) _____

amplitude = _____ (1 mark)

(i)



_____

_____

_____

_____

_____

vertical distance moved = _____ (3 marks)

SHOPPING

(62 marks; 74 minutes)

FRUIT SHOP

QUESTION SIX: DC ELECTRICITY (7 marks)

(a) (i) _____

_____ (1 mark)

(ii) _____

_____ (1 mark)

(b) (i) _____

_____ (1 mark)

(ii) _____

_____ (1 mark)

(c) _____

_____

_____

power = _____ (2 marks)

(d) _____

_____

_____

_____ (1 mark)

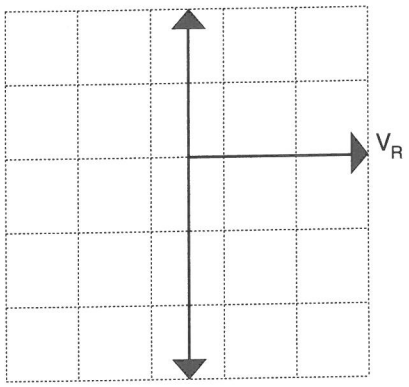
Q6

7

DRESS SHOP

QUESTION SEVEN: AC ELECTRICITY (13 marks)

(a) and (b)



(1 mark)

(2 marks)

(c) _____

_____

_____ (2 marks)

(d) _____

_____ (1 mark)

(e) _____ (1 mark)

(f) (i) _____

_____

_____

voltage across the resistor = _____ (3 marks)

(ii) _____

_____

voltage across the capacitor = _____ (2 marks)

(iii) _____

_____

voltage across the AC supply = _____ (1 mark)

Q7 13

MUSIC SHOP

QUESTION EIGHT: ATOMIC PHYSICS AND ELECTROMAGNETISM (14 marks)

(a) _____

_____ (1 mark)

(b) _____

_____

_____ (2 marks)

(c) (i) _____

_____

_____ (2 marks)

(ii) _____

_____

_____ (1 mark)

(d) _____

_____

_____

_____

photon energy = _____ (2 marks)

(e) _____

_____

_____

_____

maximum kinetic energy = _____ (1 mark)

(f) _____

_____

_____ (2 marks)

(g) _____

_____ (1 mark)

(h) _____

_____

_____

_____

_____

_____ (2 marks)

NOVELTY SHOP

QUESTION NINE: ELECTROMAGNETISM AND WAVES (18 marks)

(a) _____

_____

_____

_____ (1 mark)

(b) _____

_____

_____

maximum current = _____ (2 marks)

(c) _____

_____

_____

energy = _____ (2 marks)

(d) _____

_____

_____

average voltage = _____ (2 marks)

(e) _____

_____

_____

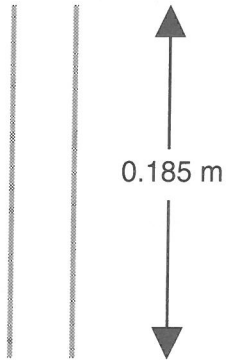
_____ (2 marks)

(f)

(3 mar

(g) wave is _____ (1 mark)

(h)



(1 mark)

(i) wavelength = _____ (1 mark)

(j) _____

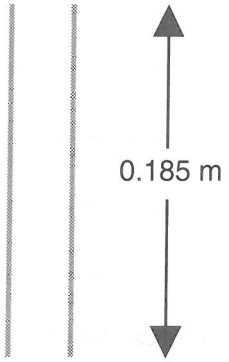
_____

_____

_____

frequency = _____ (2 marks)

(k)



(1 mark)

THE STEREO SHOP

QUESTION TEN: DC ELECTRICITY (10 marks)

(a) (i) _____

voltage = _____ (1 mark)

(ii) _____

_____

_____

_____

current = _____ (2 marks)

(b) _____

voltage = _____ (1 mark)

(c) (i) _____ (1 mark)

(ii) _____ (1 mark)

(d) (i) _____

_____

_____

_____

_____

total resistance = _____ (2 marks)

(ii) _____

_____

_____

_____

voltage = _____ (2 marks)

Q10

THE STARS

(34 marks; 40 minutes)

QUESTION ELEVEN: THE DOPPLER EFFECT (9 marks)

(a) _____

_____ (1 mark)

(b) _____ (1 mark)

(c) _____

_____

_____

_____

_____

_____

_____

velocity = _____ (3 marks)

(d) _____

_____

_____

_____

wavelength = _____ (2 marks)

(e) _____

_____

_____

_____

_____ (2 marks)

Q11 9

QUESTION TWELVE: DIFFRACTION AND INTERFERENCE (14 marks)

(a) _____

_____

_____

_____

angle = _____ (3 marks)

(b) _____

_____

_____

_____ (2 marks)

(c) (i) _____

_____ (1 mark)

(ii) _____

_____

_____ (2 marks)

(d) _____

_____

_____

_____

distance = _____ (3 marks)

(e) maximum angle is _____ (1 mark)

(f) _____

_____

_____ (2 marks)

Q12

QUESTION THIRTEEN: ATOMS AND NUCLEI (11 marks)

(a) _____ (1 mark)

(b) a = _____ (1 mark)

b = _____ (1 mark)

(c) particle Y is _____ (1 mark)

(d) _____

_____

_____ (2 marks)

(e) _____

_____

_____

_____

_____

rest mass of X = _____ (2 marks)

(f) _____

_____ (1 mark)

(g) _____

_____

_____

_____ (2 marks)

Q13

11

■This is the last ad break
you'll see for 3 hours ■■■

■■■ Enjoy it while it lasts ■