*See back cover for an English translation of this cover*

L2–PHYSMR

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NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

# Ahupūngao, Kaupae 2, 2012

2.00 i te ahiahi Rāapa 14 Whiringa-ā-rangi 2012

PUKA RAUEMI
mō 91170M, 91171M, me 91173M

Tirohia tēnei pepa hei whakautu i ngā pātai o ō Pukapuka Whakautu, Pātai hoki.

Āta tirohia kua tāngia a muri o tēnei pepa.

**KA TAEA TĒNEI PEPA TE PUPURI HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.**

Tērā pea e āwhina ēnei ture i a koe.

**91170M Te whakaatu māramatanga o te ngaru**

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} \qquad s_i s_o = f^2 \qquad \text{rānei}$$

$$m = \frac{d_i}{d_o} = \frac{h_i}{h_o} \qquad m = \frac{f}{s_o} = \frac{s_i}{f} \qquad \text{rānei}$$

$$n_1 \sin\theta_1 = n_2 \sin\theta_2 \qquad \frac{n_1}{n_2} = \frac{v_2}{v_1} = \frac{\lambda_2}{\lambda_1}$$

$$v = f\lambda \qquad f = \frac{1}{T} \qquad v = \frac{d}{t}$$

Te tere o te aho i rō korehau = $3.00 \times 10^8$ m s $^{-1}$

**91173M Te whakaatu māramatanga o te pūhanga manawa**

$$v = \frac{\Delta d}{\Delta t} \qquad a = \frac{\Delta v}{\Delta t} \qquad v_f = v_i + at$$

$$d = v_i t + \frac{1}{2}at^2 \qquad d = \frac{v_i + v_f}{2}t \qquad v_f^2 = v_i^2 + 2ad$$

$$a_c = \frac{v^2}{r}$$

$$F = ma \qquad \tau = Fd \qquad F = -kx$$

$$F_c = \frac{mv^2}{r} \qquad p = mv \qquad \Delta p = F\Delta t$$

$$E_p = \frac{1}{2}kx^2 \qquad E_k = \frac{1}{2}mv^2 \qquad \Delta E_p = mg\Delta h$$

$$W = Fd \qquad P = \frac{W}{t}$$

paenga porowhita = $2\pi r$

ina hiahiatia, whakamahia g = 9.8 m s$^{-2}$

**91173M Te whakaatu māramatanga o te hiko me te autō ā-hiko**

$$E = \frac{V}{d} \qquad F = Eq \qquad \Delta E_p = Eqd$$

$$E_k = \frac{1}{2}mv^2$$

$$I = \frac{q}{t} \qquad V = \frac{\Delta E}{q} \qquad V = IR$$

$$P = IV \qquad P = \frac{\Delta E}{t}$$

$$R_T = R_1 + R_2 + \ldots \qquad \frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \ldots$$

$$F = BIL \qquad F = Bqv \qquad V = BvL$$

You may find the following formulae useful.

## 91170 Demonstrate understanding of waves

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} \quad \text{or} \quad s_i s_o = f^2$$

$$m = \frac{d_i}{d_o} = \frac{h_i}{h_o} \quad \text{or} \quad m = \frac{f}{s_o} = \frac{s_i}{f}$$

$$n_1 \sin\theta_1 = n_2 \sin\theta_2 \qquad \frac{n_1}{n_2} = \frac{v_2}{v_1} = \frac{\lambda_2}{\lambda_1}$$

$$v = f\lambda \qquad f = \frac{1}{T} \qquad v = \frac{d}{t}$$

Speed of light in a vacuum $= 3.00 \times 10^8$ m s$^{-1}$

## 91171 Demonstrate understanding of mechanics

$$v = \frac{\Delta d}{\Delta t} \qquad a = \frac{\Delta v}{\Delta t} \qquad v_f = v_i + at$$

$$d = v_i t + \frac{1}{2}at^2 \qquad d = \frac{v_i + v_f}{2}t \qquad v_f^2 = v_i^2 + 2ad$$

$$a_c = \frac{v^2}{r}$$

$$F = ma \qquad \tau = Fd \qquad F = -kx$$

$$F_c = \frac{mv^2}{r} \qquad p = mv \qquad \Delta p = F\Delta t$$

$$E_p = \frac{1}{2}kx^2 \qquad E_k = \frac{1}{2}mv^2 \qquad \Delta E_p = mg\Delta h$$

$$W = Fd \qquad P = \frac{W}{t}$$

circumference of circle $= 2\pi r$

where needed, use $g = 9.8$ m s$^{-2}$

## 91173 Demonstrate understanding of electricity and electromagnetism

$$E = \frac{V}{d} \qquad F = Eq \qquad \Delta E_p = Eqd$$

$$E_k = \frac{1}{2}mv^2$$

$$I = \frac{q}{t} \qquad V = \frac{\Delta E}{q} \qquad V = IR$$

$$P = IV \qquad P = \frac{\Delta E}{t}$$

$$R_T = R_1 + R_2 + \ldots \qquad \frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \ldots$$

$$F = BIL \qquad F = Bqv \qquad V = BvL$$

*English translation of the wording on the front cover*

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# Level 2 Physics, 2012

2.00 pm Wednesday 14 November 2012

## RESOURCE SHEET
## for 91170, 91171, and 91173

Refer to this sheet to answer the questions in your Question and Answer Booklets.

Check that this sheet is printed on the back.

**YOU MAY KEEP THIS SHEET AT THE END OF THE EXAMINATION.**