



Complete, fold and seal
(see note 2 below)

Gray

Lewis Stephen

12 Pages

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners cannot read or ignore illegible script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. **Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.**

1	Student Number	2224230
2	Title of Examination Paper	Physics
3	Module Code	ACDB4007
4	Date and Time of Examination	03/05/23 9:00
5	Examination Venue	106 Computer ~~106~~
6	Seat Number	
7	Number of Answer Books handed in	

[illegible]

15
16
11
14
20

~~76 N~~



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Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Examination Answer Books

12 Pages

Instructions to Candidates

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SURNAME:

Gray

FORENAME(S):

Lewis Stephen

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Better to show workings

$$ML^2/3 \text{ for } \int mv^2 dr$$

$$I = \frac{1}{3}mr^2$$
~~$$= \frac{1}{3} \times 3 \times 4^2$$

$$= 16 \text{ kgm}^2$$

$$16.00 \text{ kgm}^2$$~~

$$I = \frac{1}{3}mr^2$$

$$= \frac{1}{3} \times 4 \times 3^2$$

$$= 12.00 \text{ kgm}^2$$

b) $E_k = E_p$ due to conservation of energy

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

$$v = \sqrt{2gh}$$

$$= \sqrt{2 \times 9.8 \times 1.5}$$

$$= 12.12 \text{ ms}^{-1}$$

ii) $E_w = E_k$ due to conservation of energy

$$F = \frac{E_w}{d}$$

$$= \frac{12.12}{0.1}$$

$$= 121.20 \text{ N}$$

should be K.E. not velocity

2) $\omega = \frac{7(2\pi)}{60}$

$$= 0.73 \text{ rad s}^{-1}$$

b) $F_v = 8\cos 30 + 5\sin 45 - 6\cos 60$

$$= 7.46 \text{ N}$$

$$F_H = -8\sin 30 + 5\cos 45 + 6\sin 60$$

$$= 4.73 \text{ N}$$

$$F_r = \sqrt{F_v^2 + F_H^2}$$

$$= \sqrt{7.46^2 + 4.73^2}$$

$$= 8.83 \text{ N}$$

3) $\Delta Q = \Delta U + \Delta W$ $20^\circ\text{C} = 293 \text{ K}$

$$PV = nRT$$

$$E_i = nRT$$

$$= 2 \times 8.31 \times 293$$

$$= 4869.66 \text{ J}$$

$$P_i = \frac{nRT}{V_i}$$

$$= \frac{4869.66}{1}$$

$$= 4869.66 \text{ J m}^{-2}$$

$$P_2 = \frac{4869.66}{2} = 2434.83 \text{ J m}^{-2}$$

$$\Delta W = 4869.66 - 2434.83 = 2434.73 \text{ J}$$

10

(8)

4 (4)

3

(3)

(17) (15)

4

(4)

4

(4)

4

(4)

4

(4)

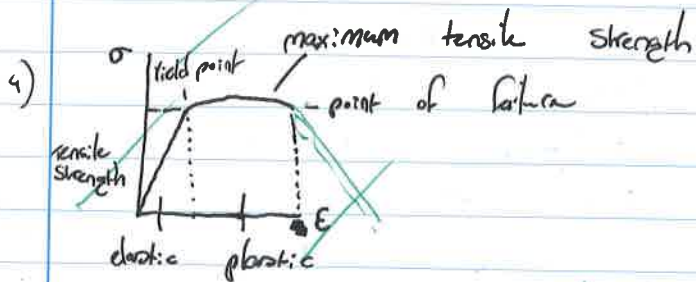
0

(16)

!

0

(1)



6)

$$l_0 = \frac{\epsilon}{\sigma}$$

$$= \frac{0.02}{7 \times 10^{-3}}$$

$$= 2.86 \text{ m}$$

c)

$$F = mg$$

$$= 100 \times 9.8$$

$$= 980 \text{ N}$$

$$\sigma = \frac{F}{A}$$

$$= \frac{980}{0.4 \times 10^{-4}}$$

$$= 2.45 \times 10^7 \text{ Pa}$$

$$\epsilon = \frac{\sigma}{E}$$

$$= \frac{2.45 \times 10^7}{460 \times 10^9}$$

$$= 5.44 \times 10^{-5}$$

5)

$$q = \epsilon \sigma T^4$$

$$= 0.9 \times 5.67 \times 10^{-8} \times 1673^4$$

$$= 399769.20 \text{ W m}^{-2}$$

$$P = 399769.20 \times 2$$

$$= 799538.4 \text{ W}$$

b)

$$L(T) = L(T_0) [1 + \alpha (T - T_0)]$$

$$= 0.5 [1 + 5 \times 10^{-4} (393 - 303)]$$

$$= 0.52 \text{ m}$$

c)

$$P = \frac{E}{t}$$

$$P = \frac{5}{8 \times 10^{-6}}$$

$$= 6.25 \times 10^5 \text{ W}$$

3b)

~~$Q = mc\Delta T$~~

~~$250 = 40 \times 10^{-3} \times 900 \times \Delta T$~~

~~$\Delta T =$~~

$$\Delta Q = \Delta U + \Delta W$$

$$= 250 - 60$$

$$= 200 \text{ J}$$

~~$Q = mc\Delta T$~~

~~$200 = 40 \times 10^{-3} \times 900 \times \Delta T$~~

~~$\Delta T =$~~

$$Q = mc\Delta T$$

$$200 = 40 \times 10^{-3} \times 900 \times \Delta T$$

$$\Delta T = 5.56 \text{ K}$$

3
5
2

3
5
2

11