



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Examination Answer Books

12 Pages

Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold up and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either 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.

Complete, fold and seal
(see note 2 below)

SURNAME: Davies - Jones

FORENAME(S): Bethan

1	Student Number	2414 322
2	Title of Examination Paper	Physics (OME)
3	Module Code	ACDB4007
4	Date and Time of Examination	07/05/2025 09:00
5	Examination Venue	IQ building SA1
6	Seat Number	2
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
1	15 ✓
2	12 ✓
3	~~20~~ 16 ✓
4	20 ✓
5	12 ✓
Total	75 ✓

75%

NT

1)

$$a) \frac{V}{\sqrt{2E}} = \left[\frac{M}{C} + \frac{3}{5} \right]^{-\frac{1}{2}}$$

$$\frac{V}{3100} = \left[\frac{4}{10} + \frac{3}{5} \right]^{-\frac{1}{2}}$$

No. 5

$$\frac{V}{3100} = 1$$

$$V = 3100 \text{ ms}^{-1}$$

5

b)

$$i) F_t = m(v-u)$$

$$= 2(0-15)$$

$$= -30 \text{ Ns}$$

Direction?

5

ii)

$$F_t = -30$$

k

$$F = \frac{-30}{0.05}$$

$$= -600 \text{ N}$$

5

(15)

2)

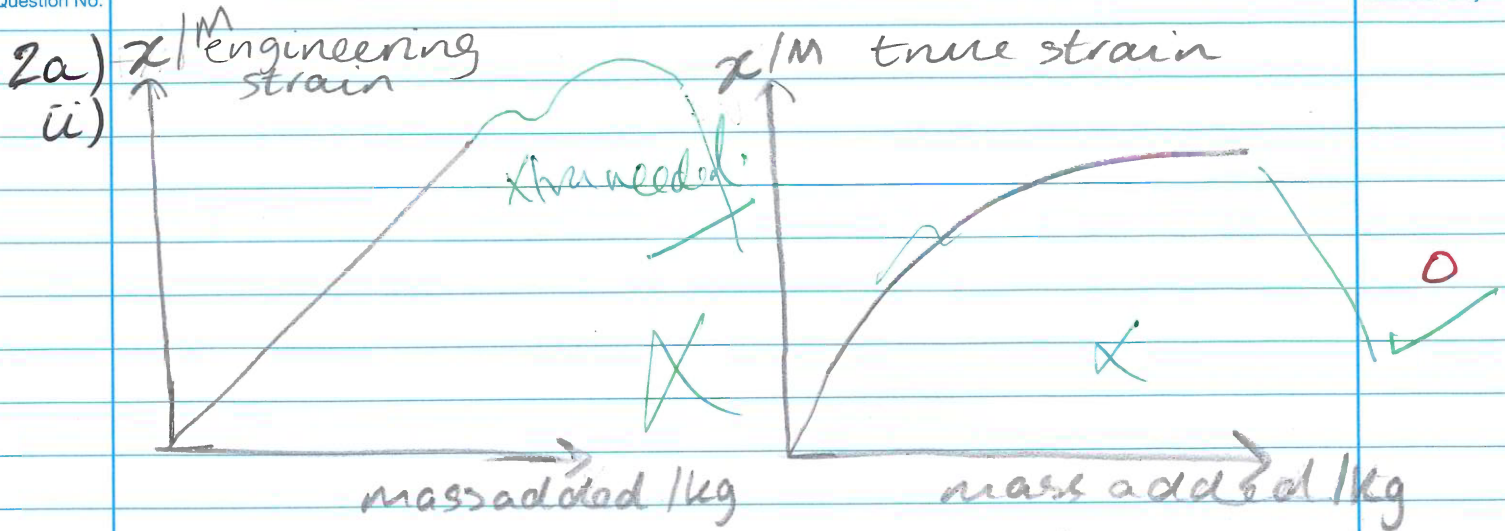
a)

i)

~~transformation~~ engineering strain assumes that the material will proportionally increase. eg. as ~~force increases~~ the mass increases, the extension of the material will increase by the same increments however this is inaccurate. True strain represents the varying increase in extension as the material grows weaker as more mass is applied.

0

X Area constant needed & Engineering strain



b) $E = \frac{\sigma}{\epsilon}$ $\sigma = \frac{F}{A}$ $\epsilon = \frac{x}{L}$

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

$$= \frac{mg}{A}$$

$$= \frac{150 \times 9.81}{(5 \times 10^{-2})^2 \times 10^{-4}}$$

$$= 2.943 \times 10^8$$

$$= 2.94 \times 10^8 \text{ Nm}^{-2}$$

$$5 \times 10^{-2} \text{ cm}^2$$

$$= (5 \times 10^{-2})^2 \times 10^{-4} \text{ m}^2$$

$$= 2.943 \times 10^8$$

$$= 2.94 \times 10^8 \text{ Nm}^{-2}$$

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

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

$$= \frac{2.94 \times 10^8}{200 \times 10^9}$$

$$= 1.4715 \times 10^{-3}$$

$$= 1.47 \times 10^{-3}$$

(12)

3)

$$a) E = mc\Delta T$$

$$= 2 \times 400 \times 30$$

$$= 24000 \text{ J}$$

$$Q = mc\Delta T$$

$$= 2 \times 400 \times 30$$

$$= 24000 \text{ J}$$

8

$$b) E = \frac{WD}{t}$$

$$Q = mc\Delta T \quad + \text{DW}$$

$$600 = 0.7 \times 150 \times \Delta T$$

$$600 = 105 \Delta T$$

$$\Delta T = 5.7142 \dots$$

$$\Delta T = 5.71 \text{ K}$$

$\Delta Q = \Delta u + \Delta y$
needed

2.38K

8

4)

$$a) T = I \ddot{\theta}$$

$$\ddot{\theta} = \frac{T}{I}$$

$$= \frac{200}{200}$$

$$= 1 \text{ radians}^{-2}$$

total = 16

b)

$$p = \frac{h}{\lambda}$$

$$\lambda = \frac{h}{p}$$

$$= \frac{h}{mv}$$

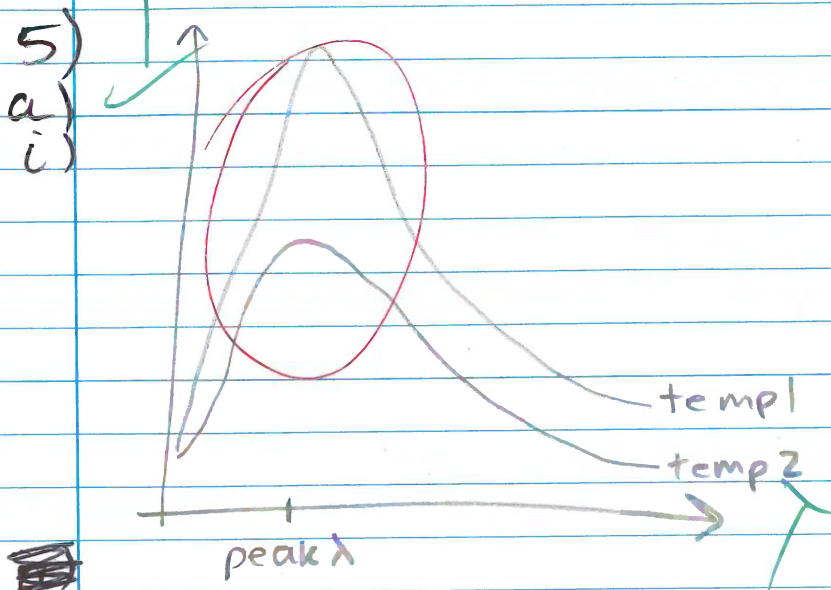
$$= \frac{6.626 \times 10^{-34}}{9.109 \times 10^{-31} \times 1.6 \times 10^6}$$

$$= 4.5463 \dots \times 10^{-10}$$

$$= 4.55 \times 10^{-10} \text{ m}$$

12

total = 20



ii) $\lambda_{\text{peak}} = \frac{2.898 \times 10^{-3}}{T}$
 $= \frac{2.898 \times 10^{-3}}{1500 + 273.15}$
 $= 1.6343 \dots \times 10^{-6}$
 $= 1.63 \times 10^{-6} \text{ m}$

b) $\dot{q} = A \epsilon \sigma T^4$
 $= 0.7 \times 0.8 \times 5.67 \times 10^{-8} \times (500 + 273.15)^4$
 ~~$= 0.7 \times 0.8 \times 5.67 \times 10^{-8} \times (500 + 273.15)^4$~~
 ~~$= 0.7 \times 0.8 \times 5.67 \times 10^{-8} \times (500 + 273.15)^4$~~
 $= 11345.56 \dots$ *2dp*
 $= 11300 \text{ W}$

(12)