



SURNAME: BELTON

FORENAME(S): CHRISTOPHER

Examination Answer Books

12 Pages

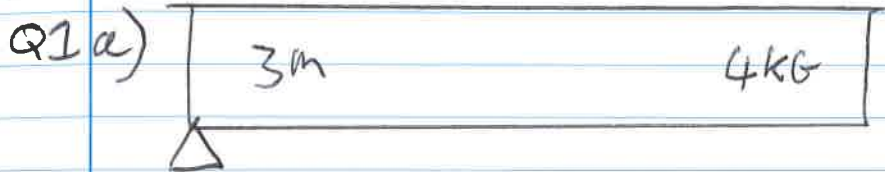
Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over 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.**

1	Student Number	2021887
2	Title of Examination Paper	PHYSICS
3	Module Code	ACDB4007
4	Date and Time of Examination	0900 3/5/2023
5	Examination Venue	UWTSO IQ 103
6	Seat Number	
7	Number of Answer Books handed in	

[illegible]

(Gweler yr ochr arall am y fersiwn Cymraeg)



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

$$\frac{m}{L}$$

$$\sqrt{\frac{m}{L}}$$

$$I = \int_0^L r^2 \frac{m}{L} dr$$

1
①

Q1B) i) 900g - MASS 7.5m - HEIGHT

high $\cancel{0.9} \times 9.81 \times 7.5 = 6224.45$?

$$0.5mv^2$$

$$\text{MASS} \times \text{VELOCITY}^2$$

$$\Delta KE = \Delta PE$$

$$0.5 \times 0.9 \times v^2 = \cancel{0.9} \times 9.81 \times 7.5$$

$$0.5 \times 0.9 \times v^2 = 6224.45$$

$$v^2 = 6224.45 - 0.5 \times 0.9 = 6214.95$$

$$v^2 = 6214.95$$

$$v = \sqrt{6214.95} = 78.83 \text{ ms}^{-1}$$

ii) ~~0.9 \times 78.83~~

$$\cancel{0.9} \times 78.83 = 70.95$$

$$\text{MOMENTUM} =$$

follow through

4
④

0

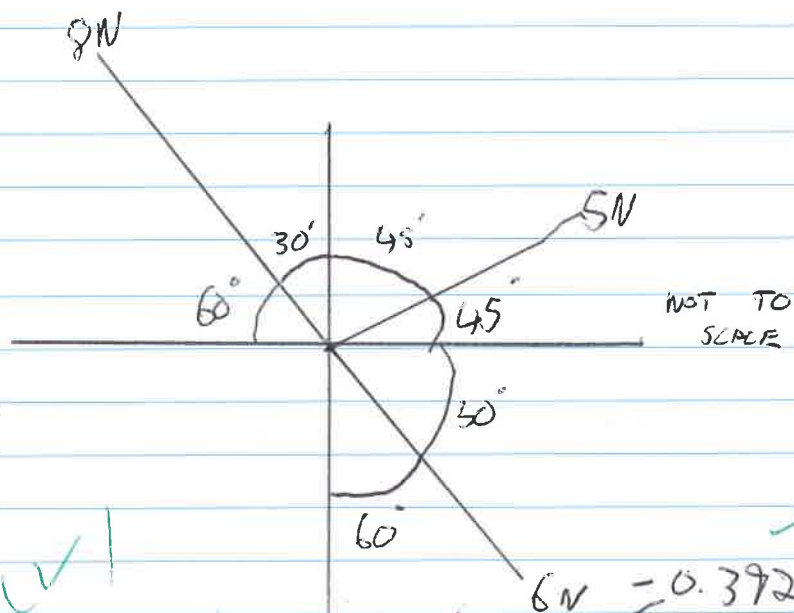
⑤

Q2a) 7 RPM CALCULATE ANGULAR VELOCITY IN RADIAN PER SE

$$7 \text{ RPM} \times 2\pi = 43.9822 \text{ RADIAN PER MIN}$$

$$\frac{43.9822}{60} = 0.73 \text{ RADIAN PER SECOND}$$

b) RESULTANT FORCE



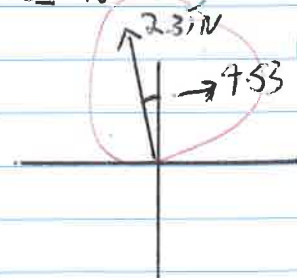
$$\theta = \tan^{-1} \frac{F_V}{F_H}$$

$$F_V = -8 \cos 30 + 5 \cos 45 + 6 \cos 60 = -0.3927$$

$$F_H = 8 \cos 60 + 5 \cos 45 + 6 \cos 30 = 2.3394 \text{ N}$$

$$F_R = \sqrt{-0.3927^2 + 2.3394^2} = 2.31 \text{ N}$$

$$\theta = \tan^{-1} \frac{F_V}{F_H} = -9.53 \text{ DEGREES}$$



Q3a) 2 moles ^{INITIAL} 1 m^3 20°C ^{NEW} 2 m^3 WORK DONE? $\int P dV$

$PV = nRT$ ✓ FIRST CAL = $\Delta Q = \Delta U + \Delta W$ ✓
~~1000~~
~~40~~

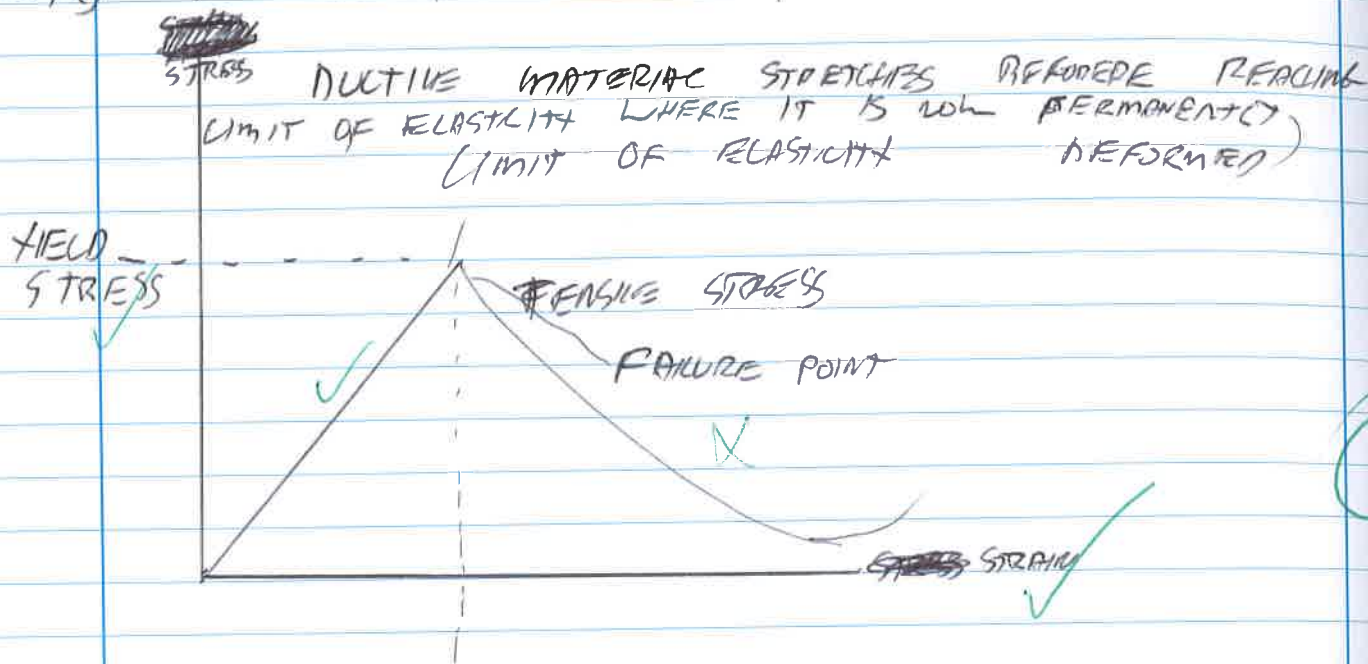
b) 250 J HEAT ENERGY 40g GAS 900 $\text{J kg}^{-1} \text{K}^{-1}$
 50 J WORK WHAT IS CHANGE IN TEMP?

$Q = mc\Delta T$ ✓ $Q = 0.04 \times 900 \times \underline{\hspace{1cm}}$ $PV = nRT$

$\Delta T = \frac{Q}{mc} = \frac{250 - 50}{0.04 \times 900} = 5.56 \text{ K}$ ✓

(11) ✓

Q4a) YIELD STRESS, FAILURE POINT, TENSILE STRESS



b) ORIGINAL LENGTH $7 \times 10^{-3} \text{ m}$ STRAIN = 0.02

$E = \frac{\text{EXTENSION}}{\text{ORIGINAL LENGTH}} \times \text{ORIGINAL LENGTH}$ $\checkmark$ $\text{ORIGINAL LENGTH} = \frac{0.02 \times 7 \times 10^{-3}}{0.001} = 1.4 \times 10^{-4} \text{ m}$

$\text{ORIGINAL LENGTH} = 0.02 \times 7 \times 10^{-3} = 1.4 \times 10^{-4} \text{ m}$

$\text{ORIGINAL LENGTH} = \frac{E}{\text{EXTENSION}} = 2.85 \text{ m}$ $\checkmark$

$\frac{0.02}{7 \times 10^{-3}} = 2.85 \text{ m}$ $\checkmark$

c) $E = 450 \times 10^9 \text{ Pa}$ AREA = 0.4 cm^2 LENGTH = 45 m
100 kg WEIGHT MASS $\checkmark$ STRESS + STRAIN

$\text{STRESS} = \frac{\text{FORCE}}{\text{AREA}}$ $\text{FORCE} = \frac{m \times g}{\text{AREA}} = \frac{24500 \text{ Pascals}}{245 \times 10^3 \text{ Pascals}}$

$E = \frac{\text{STRESS}}{\text{STRAIN}}$ $\checkmark$ $E = \frac{24500}{?} =$

$\text{STRAIN} = \frac{E}{24500} = 1836734.69$
 1.84×10^6 NO UNIT