



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 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.**

Complete, fold and seal
(see note 2 below)

SURNAME: John

FORENAME(S): nathan Ryan

1	Student Number	
2	Title of Examination Paper	Mechanical Engineering
3	Module Code	SGEE 4017
4	Date and Time of Examination	20-5-25
5	Examination Venue	Coleg Sir Gar
6	Seat Number	19
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
A1	9
B1	17
B3	8
B4	3
Total	37%

(Gweler yr ochr arall am y fersiwn Cymraeg)

2. $P = \frac{w.D}{T}$ ~~FP = w.D~~
~~w.D = 2T~~

~~w.D =~~

$w.D = \frac{P}{T} = \frac{10 \times 10^3}{40} = 250 \text{ J}$

①

4. $Q = C \times A$ $A = \pi r^2$ $d = 200$ $C = 2 \text{ m/s}$

$A = \pi (0.1)^2 = 0.03 \text{ m}^2$

$Q = 2 \times \pi (0.1)^2 = 6.28 \times 10^{-4} \text{ m}^3/\text{s}$

⑤

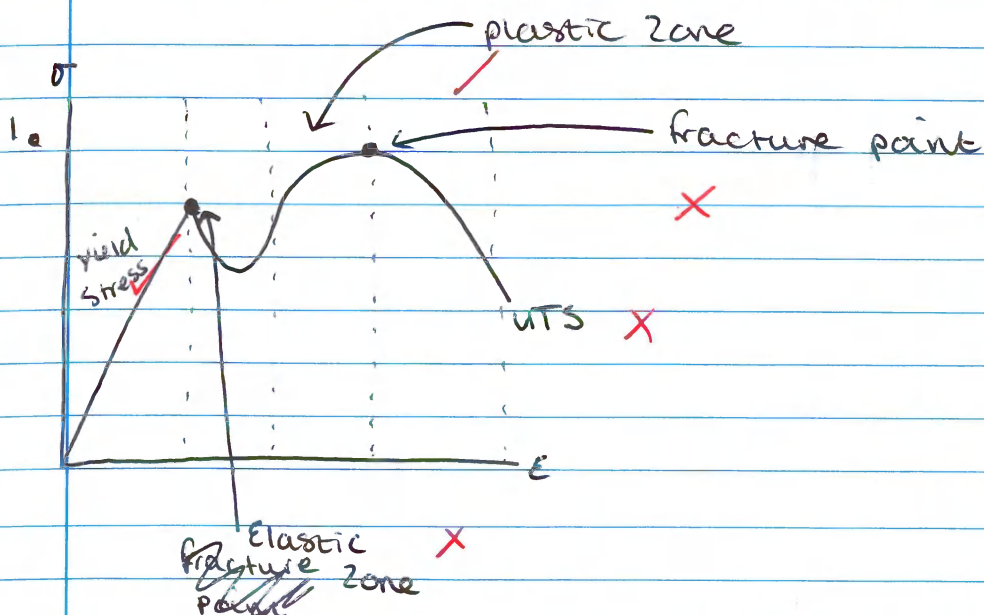
3. $PE = mgh$ $m = 1000$ $h = 100 \text{ m}$

~~$PE = 1 \times 10^3 \times 9.81$~~

$PE = 1 \times 10^3 \times 9.81 \times 100$

$PE = 981000 \text{ J}$

①



②

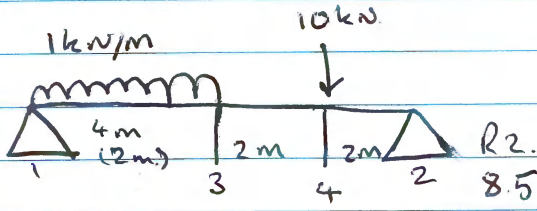
9

total = 14 kN.

Q1.

R1

8.5



take moments from R1

 $CW = ACW$

$$(4 \times 2) + (10 \times 6) = R2 + 8$$

$$8 + 60 = R2 + 8$$

$$\frac{68}{8} = R2$$

$$8.5 \text{ kN} = R2$$

$$R1 = 14000 - 8500$$

$$R1 = 5500$$

$$\text{max s.f.} = 8.5 \text{ kN}$$

$$\text{bm at 1} = 0$$

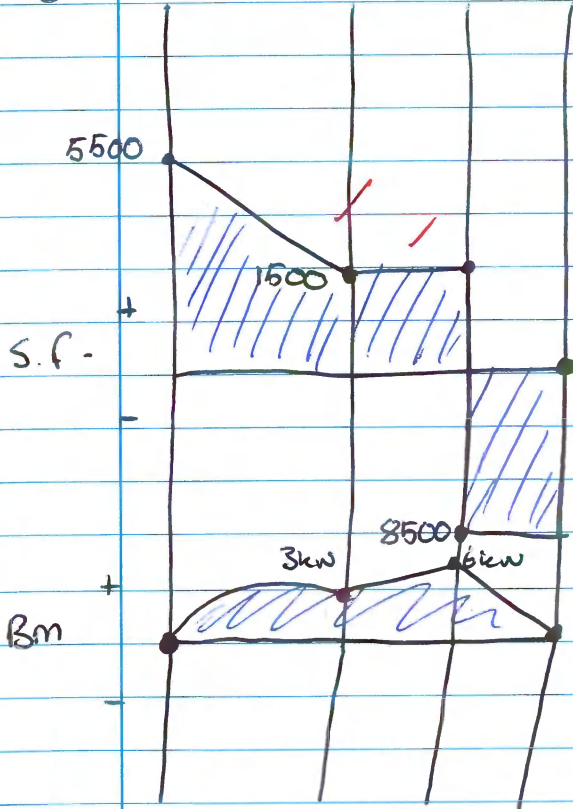
$$\text{bm at 2} = 0$$

$$\begin{aligned} \text{* bm at 3} &= \cancel{5.5 \times 2} - \cancel{(4 \times 2)} \\ &= 5.5 \times 4 - (4 \times 2) \\ &= 6 \end{aligned}$$

$$\begin{aligned} \text{* bm at 4} &= 5.5 \times 4 - 10 \times 6 \\ &= \end{aligned}$$

$$\text{* } 3 = 5.5 \times 2 - 4 \times 2 = 3 \text{ kN}$$

$$\text{* } 4 = (5.5 \times 4) - (4 \times 4) = 6 \text{ kN}$$



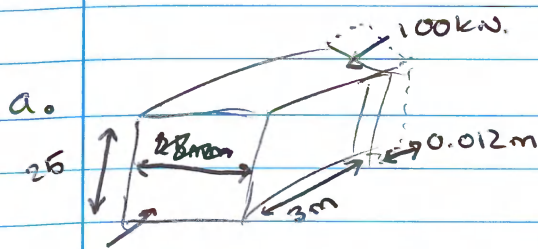
$$b. \quad \tau = \frac{F}{A} \quad A = \pi d t$$

$$F = \tau \times A$$

$$A = \pi \times 0.04 \times 0.005 = 6.28 \times 10^{-4} \text{ m}^2$$

$$\tau = 385 \times 10^6 \text{ N/m}^2$$

$$F = (385 \times 10^6) \times (6.28 \times 10^{-4}) = 241780 \text{ N}$$



$$A = L \times h \quad 0.025 \times 3 = 0.075 \text{ m}^2$$

$$E = \frac{\sigma}{\epsilon} \quad L = \frac{\Delta L}{\epsilon} \quad E = \frac{\Delta L}{L} = 1.004$$

$$E = \frac{\sigma}{\epsilon} \quad E = \frac{\sigma}{\epsilon} = \frac{100 \times 10^3}{1.004}$$

$$\sigma = \frac{F}{A} \quad \frac{100 \times 10^3}{0.075} = 1.3 \times 10^6 \text{ N/m}^2 \quad E = 99601.59 \text{ N}$$

$$E = \frac{\sigma}{\epsilon} = \frac{1.3 \times 10^6}{1.004} = 1328021.24 \text{ N}$$

Question 3.

a. Newton's law of motion is $F = ma$ ✓

①

which states the force is equal to the mass $\times$ acceleration of an object.

b. work, power, Potential energy and kinetic energy
~~eg time~~

work $\rightarrow$ the output of energy measured in Joules.

Power $\rightarrow$ the output of work done in Watts ✓

①

Potential energy $\rightarrow$ stored energy in an object. ✓

①

Kinetic energy $\rightarrow$ energy used/exerted.

c. mass 850 kg 85 km/hr travelling
 20 km/hr braking

Constant force = 350 N

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

✓ ②

$$\frac{85}{1000} \times 3600$$

✓

3

✓