



12 Pages

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.**

List the numbers of the questions you have attempted	Office Use
A1	5
B2	0
B3	11
B4	2
Total	18%

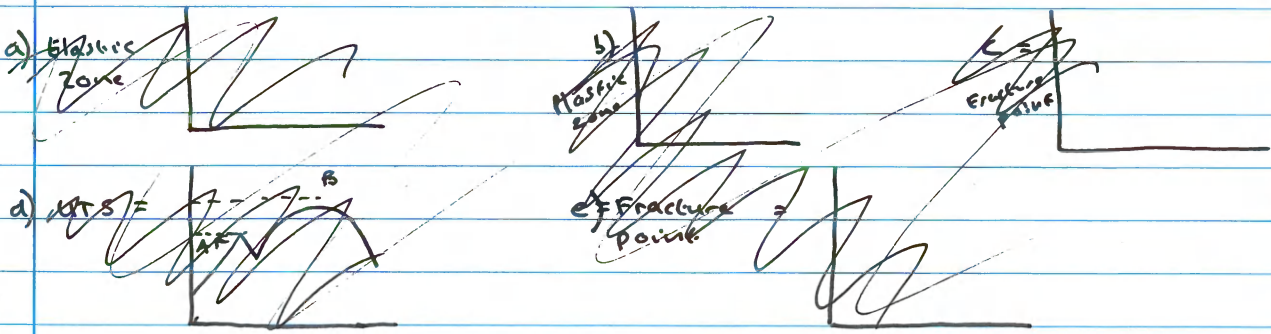
(Gweler yr ochr arall am y fersiwn Cymraeg)

Complete, fold and seal
(see note 2 below)

SURNAME: Gaskell

FORENAME(S): Kenneth Bruce

Section A



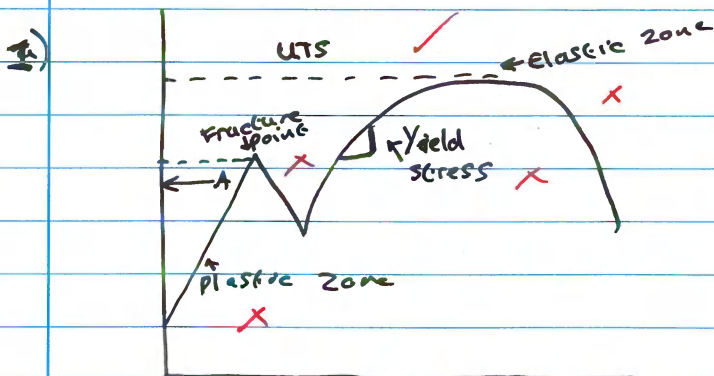
2) ~~$10,000 \times 40 = 400,000$~~ $10,000 \times 40 = 400,000$

3) $PE = mgh = (1000 \times 9.81) \times 100$
 $= 981,000$

4) $\pi \times (0.1)^2 = 0.0314$ $0.0314 \times 2 = 0.0628 = 6.28 \text{ Liters}$

$\approx 1 \text{ mls}$

5)





Question Two

a)

b) wide = 40 mm

Thick = 5 mm

~~0.04 m x 0.005 m = 2 x 10⁻⁷ m²~~

$$(0.04)^2 \times (0.005)^2 = 4 \times 10^{-8}$$

$$385 \times 10^6 \times 0.04 = 15400000 = 15.4 \times 10^6$$

X

10

Question THREE

a) $F = ma$

(2)

b) Potential Energy = mgh , Kinetic Energy = $\frac{1}{2}mv^2$, power = $\frac{W.D}{\text{time}}$

work = $F \times s$

(4)

c) $\frac{20 \times 1000}{3600} = 5.55 \text{ m/s}$ $\frac{85 \times 1000}{3600} = 23.61 \text{ m/s}$

(2)

$23.61 - 5.55 = 18.06$

~~scribbled out~~

$\frac{18.06}{2\pi} = 2.87$

$KE = \frac{1}{2}mv^2 = \frac{1}{2} \times 350 \times 5.55^2 = 5390.4$

~~$\frac{1}{2} \times 350 \times 23.61^2 = 97225$~~

$\frac{1}{2} \times 350 \times 23.61^2 = 97225$

47550.6

(1)

d) $f = \frac{1}{T} = \frac{1}{10} = 0.1$

~~scribbled out~~

(1)

$\frac{1}{0.1} = 10 \text{ Hz}$

$2\pi \times 10 = 62.83$

$\omega_n = 62.83 \sqrt{r^2 - 0.3^2}$

$0.1 = 62.83 \sqrt{r^2 - 0.3^2}$

$\frac{0.1}{62.83} = \sqrt{r^2 - 0.3^2}$

$(0.00159)^2 = r^2 - 0.3^2$

$(0.00159)^2 \approx 0.09$

$= 0.08$

$0.08 \times 50 = 4$

II

Question 4

a)

$$b) 2000 \times \frac{2\pi}{60} = 209.4 \quad \checkmark$$

-1 units

$$4500 \times \frac{2\pi}{60} = 471.3 \quad \checkmark$$

$$471.3 - 209.4 = 261.9$$

$$\frac{261.9}{10} = 26.19 \text{ Rad/s}$$

$$(26.19)^2 (5) = 710.91 \quad \times$$

$$2619 \times 10 = 2619 \text{ revs in 10 sec} \quad \times$$

(2)

2

✓