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

Complete, fold and seal
(see note 2 below)

SURNAME: Hill

FORENAME(S): Emma

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	Hil17833867
2	Title of Examination Paper	Dynamics Control and Instrumentation
3	Module Code	GOEE4002
4	Date and Time of Examination	Wednesday 24th may 2023
5	Examination Venue	Ty Coch
6	Seat Number	E6

7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
1	1
2	1
3	13.5
4	0
Total	15.5/60

= RK

= 26%

(Gweler yr ochr arall am y fersiwn Cymraeg)

Question No.

Examiner Only

1(1) 50 N
20kg
10N

~~50 - 20 = 30~~
50 - 10 = 40N
$\frac{40}{20}$ = 2kg

(2) V = 25m/s
a = 10m/s²
t = 5s
u = 2
S = ~~67.5~~ 135s

$V = u + at$
$V - u = at$
$u = \frac{at}{v}$

$S = \left(\frac{u+v}{2}\right)t$

$\frac{10 \times 5}{25} = 2$

$\frac{2+25}{2} \times 5$

$= 67.5s$

$S = ut + \frac{1}{2}at^2$

$2 \times 5 + \frac{1}{2} \times 10 \times (5)^2$
$= 135s$

(3) $TF(S) = \frac{1}{\Delta}\left(\sum_{i} P_i \Delta_i\right)$
1
Distance

S = Distance
T = Time
Δ = acceleration

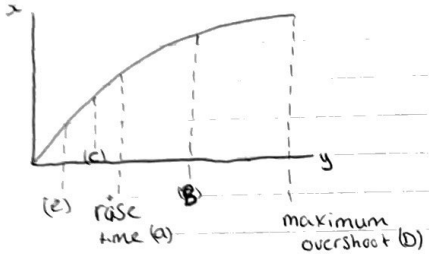
Arholwr yn unig

Rhif y Cwestiwn

1

Question No

2.



a - rise time
b - settling time
c - steady state error
d - maximum overshoot
e - delay time

The rise time is when it starts ~~to~~ to have a bend in the line.

The settling time is when the line stays the same as its having the same result.

Steady state error is when the line is showing a bit of a ~~bend~~ bend.

maximum overshoot is when the line stays the same and when it reaches its maximum.

Delay time is when the result has a delay that causes it to bend, as it starts to bend it will start picking up and showing results faster.

Examiner Only

Question No

3. Particle A - $Sa = 3t^2 + 10t - 8$ $S = m$
Particle B - $Sb = 7t^3 + 4t^2 + 4$ $t = S$
Particle C - $Sc = 10t^3 - 30t + 2$

(1^{st})	(2^{nd})
$6t + 10$ (Sa)	6 m/s (Sa)
$21t^2 + 8t$ (Sb)	$42t + 8$ m/s (Sb)
$30t^2 - 30$ (Sc)	$60t$ m/s (Sc)

a) $VB = 3VA$

$21t^2 + 8t = 3(6t + 10)$
$21t^2 + 8t = 18t + 30$
$21t^2 + 8t - 18t = 30$
$21t^2 - 10t - 30 = 0$
$a \quad b \quad c$

$t = \cancel{0.98\ m/s}$ $1.46\ m/s$
$\cancel{= 1.46\ m/s}$ $-= -0.98\ m/s$

$\frac{-b \pm \sqrt{(b)^2 - 4ac}}{2a}$

$\cancel{\frac{21 \pm \sqrt{(21)^2 - 4}}{}}$
$\frac{-10 \pm \sqrt{(-10)^2 - 4(21)(-30)}}{2(21)}$

5

b) $aB = ac$

$42t + 8 = 60t$
$42t + 8 - 60t = 0$
$a \quad b \quad c$

$\frac{-8 \pm \sqrt{8^2 - 4(42)(-60)}}{2(42)}$

$t = 1.104\ m/s^2$
$-= -1.294\ m/s^2$ method.

2

(1)

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7

Question No

3C) $t = 0$ to $t = 4$

$3(4)^{(2)} + 10(4) - 8$ ✓
$3(8) + 10(4) - 8$
$= 56s$
$Sa = 56s$ ✗

$7(4)^{(3)} + 4(4)^2 + 4$ ✓
$7(12) + 4(8) + 4$
$= 120s$
$Sb = 120s$ ✗

$10(4)^{(3)} - 30(4) + 2$ ✓
$10(30) - 30(4) + 2$
$= 182s$
$Sc = 182s$

D) Velocity of 10 m/s (B)

$21t^2 + 8t = 10$ ✓

$21t^2 + 8t - 10 = 0$
$a \quad b \quad c$

$$\frac{-8 \pm \sqrt{(8)^2 - 4(21)(-10)}}{2(21)}$$ ✓

$+ = 0.53 m/s^2$
$- = -0.91 m/s^2$ ✓

Examiner Only

Question No

1.5

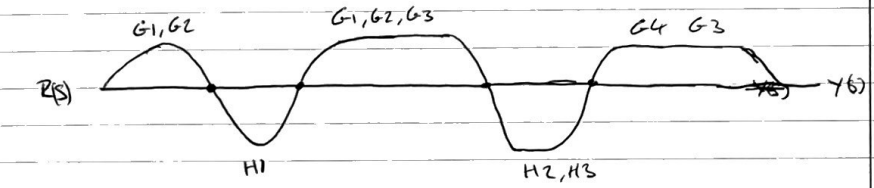
5

6.5

Arholwr yn unig

Rhif y Cwestwn

4. G1, ~~G2~~, ~ H1
G1, ~~G2~~, ~~G3~~, ~ H2
H3, G3, G5
G4, ~~G3~~
G3



0 ✓

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Rhif y Cwestwn