

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	
2	Title of Examination Paper	TCA 2
3	Module Code	PCFE4000 /PCP04000
4	Date and Time of Examination	17/05/23
5	Examination Venue	Penbroskire College
6	Seat Number	
7	Number of Answer Books handed in	1

Complete, fold and seal
(see note 2 below)

SURNAME: CLEMON

FORENAME(S): KYLE THOMAS

List the numbers of the questions you have attempted	Office Use
2	3
3	1
4	2
5	5
6	10
7	6
8	8
Total	35 ✓

Second Marker
SMC
18/05/23

$$5 \quad \frac{19x-5}{2x(x-1)} = \frac{A}{2x} + \frac{B}{(x-1)} = A(x-1) + B \quad \checkmark$$

$$x=1, \quad 19(x_1)-5 = 2x_B = 14 = \textcircled{1B} \quad \times$$

$$x=0, \quad 19(x_0)-5 = A(x-1) = -5 = A-1 \quad \checkmark$$

$$A = \frac{-5}{-1} = 5 \quad \checkmark, \quad B = \frac{14}{1} = 14 \quad \times$$

⑤

$$\int_3^5 \frac{5+14}{2x(x-1)} dx, \quad \int_3^5 \frac{19}{2x(x-1)} dx$$

$$x = 5, \quad \frac{19}{10 \times (4)} = 0.475$$

$$x = 3, \quad \frac{19}{6 \times (2)} = 1.5833 \quad \times$$

$$0.475 - 1.5833 = \underline{-1.1083}$$

6 3-5, 4 strips

x	3	3.5	4	4.5	5
$\frac{19x-5}{2x(x-1)}$	$\frac{13}{3}$	$\frac{123}{35}$	$\frac{71}{24}$	$\frac{23}{9}$	$\frac{9}{4}$
	$\checkmark_0$	$\checkmark_1$	$\checkmark_2$	$\checkmark_3$	$\checkmark_4$

$$\frac{1}{6} \left[\frac{13}{3} + \frac{9}{4} + 4 \left(\frac{123}{35} + \frac{23}{9} \right) + 2 \left(\frac{71}{24} \right) \right]_3^5 = 6.1299 \quad \checkmark$$

$$-1.1083 + 6.1299 = \frac{5.0216}{-1.1083} = \frac{4.53\%}{-4.53\%} \quad \text{error} \quad \times$$

⑩

f	1	16	26	5	2	
x	1	3	5	7	9	✓
fx	1	48	130	35	18	232 ✓
f(x ²)	~~1~~	~~48~~	~~130~~	~~35~~	~~18~~	~~232~~
	-162	84	6268	1518	668	10440 ✓

$$\bar{x} = \frac{232}{50} = 4.64 \quad \checkmark$$

$$s = \sqrt{\frac{10440^2}{49}} = 1491.429 \quad \times$$

(6) ✓

8 A(0.97) B(0.89)

$$\begin{aligned} \text{a) } P(\text{con}) &= P(A) \times P(B) \\ &= P(0.97) \times P(0.89) = \underline{0.8633} \quad \checkmark \end{aligned}$$

$$\text{b) } P(\bar{A}) \times P(\bar{B})$$

$$\begin{aligned} P(0.03) \times P(0.11) &= 0.0033 \\ 1 - 0.0033 &= \underline{0.9967} \quad \checkmark \end{aligned}$$

(8) ✓

JDP

4

$$a) \int_1^4 (1 + 3x + 5x^2) dx = \int_1^4 (1x^0 + 3x^1 + 5x^2) dx$$

$$\left[\frac{1x^{0+1}}{0+1} + \frac{3x^{1+1}}{1+1} + \frac{5x^{2+1}}{2+1} \right]_1^4 = \left[\frac{1x^1}{1} + \frac{3x^2}{2} + \frac{5x^3}{3} \right]_1^4$$

$$x=4 \quad \left[\frac{4^1}{1} + \frac{12^2}{2} + \frac{20^3}{3} \right] - \left[\frac{1^1}{1} + \frac{3^2}{2} + \frac{5^3}{3} \right] = 2742.67$$

$$x=1 \quad \left[\frac{1^1}{1} + \frac{3^2}{2} + \frac{5^3}{3} \right] + C = 47.17$$

$$2742.67 - 47.17 = \underline{2695.5}$$

$$b) \int_0^{\pi/2} (5 \cos \frac{x}{3} - 2 \sin x) dx = \int_0^{\pi/2} \left(\frac{5}{3} \sin \left(\frac{x}{3} \right) + \frac{2}{1} \cos(x) \right) dx$$

$$x = \frac{\pi}{2} \quad \left[15 \cos \frac{\frac{1}{2}\pi}{3} + 2 \cos \left(\frac{1}{2}\pi \right) \right] + C$$

$$= 7.5$$

$$x=0 \quad \left[15 \sin \left(\frac{0}{3} \right) + 2 \cos(0) \right] + C$$

$$= 2$$

$$7.5 - 2 = \underline{5.5}$$

SDP

2 $12(1 - 7e^{-3t})$

$12 - 84e^{-3t}$ ✓

$\frac{dy}{dt} = -3 \times -84 e^{-3t} = 252e^{-3t}$ ✓

4

(3) ✓

3

$y = 2x^3 - 15x^2 - 84x + 16$

$\frac{dy}{dx} = 3 \times 2x^{3-1} + 2 \times -15x^{2-1} + 1 \times -84^{1-1}$

$= \frac{dy}{dx} 6x^2 - 30x - 84$ ✓

(7) ✓

$x = -(-30) \pm \frac{\sqrt{(-30)^2 - 4 \times 6 \times (-84)}}{2 \times 6} = 30 \pm \sqrt{\frac{2916}{12}}$

$x = \underline{34.5}$ ✓

or $x = 30 - \sqrt{\frac{2916}{12}} = \underline{25.5}$

5DP