



NAMIBIAN COLLEGE OF OPEN LEARNING

Private Bag 15008, Katutura, Republic of Namibia

Telephone: + (061) 3205111 Fax: + (061) 216987

NSSCO - GRADE 11

Mathematics

PAPER 2

MOCK EXAMINATION 2022

DATE : AUGUST 2022

MARKS : 120

DURATION : 3 HOURS

NAME :

STUDENT NUMBER :

Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Partial Marks
1(a)	$\frac{9}{9+7+4} \times 680$	1	
1(b)	Barbara 238 Collette 136	3	B2 for 238 or 136 or M1 for $\frac{7}{9+7+4} \times 680$ oe or $\frac{4}{9+7+4} \times 680$ oe seen
1(c)	272	2	M1 for $306 \div 1.125$
1(d)	1.37	3	M2 for $(17.56 - 5 \times 2.69) \div 3$ or M1 for $17.56 - 5 \times 2.69$ or B1 for 13.45 [cost of apples]
Question	Answer	Marks	Partial Marks
1(e)	40.8[0]	3	3FT for $0.3 \times \text{their } 136$ from part (b) or M2 for $\text{their } 136 \left(\frac{1}{2} + \frac{1}{5} \right)$ or better or M1 for $\text{their } 136 \times \frac{1}{2}$ or $\text{their } 136 \times \frac{1}{5}$ or B1 for 68 or 27.2 or $\frac{3}{10}$ or 0.3 seen
2(a)(i)	9	1	
2(a)(ii)	ABCD completed accurately with arcs	2	M1 for intersecting arcs radius <i>their</i> 9 cm or for ABCD completed accurately with no arcs

2(b)	Correct ruled perpendicular bisector of AB with 2 correct pairs of arcs Correct ruled bisector of angle ABC with 2 correct pairs of arcs lines intersecting	2	B1 for correct ruled perpendicular bisector of AB with 2 correct pairs of arcs B1 for correct ruled bisector of angle ABC with 2 correct pairs of arcs or B1 for correct perpendicular bisector without/wrong arcs AND correct bisector of angle ABC without/wrong arcs
3(a)	6.06 or 6.060 to 6.061	2	M1 for $\frac{82500 - 77500}{82500} [\times 100] \text{ oe}$
Question	Answer	Marks	Partial Marks
3(b)	13 674 cao	2	M1 for $12000 \left(1 + \frac{2.2}{100}\right)^6$ A1 for 13673.7
4(a)(i)	Translation $\begin{pmatrix} -8 \\ 2 \end{pmatrix} \text{ oe}$	2	B1 for each
4(a)(ii)	Enlargement $[\text{sf} =] \frac{1}{2} \text{ oe}$ centre $(-4, 0)$	3	B1 for each
4(a)(iii)	Rotation 90° clockwise centre $(1, -1)$	3	B1 for each
4(b)	Triangle with $(1, -1), (5, -1), (1, 7)$	2	B1 for correct size and orientation in wrong position or for 3 correct points not joined
5(a)(i)	$(2n + m)(m - 3)$ final answer	2	M1 for $m(2n + m) - 3(2n + m)$ or $2n(m - 3) + m(m - 3)$
5(a)(ii)	$(2y - 9)(2y + 9)$ final answer	1	
5(a)(iii)	$(t - 4)(t - 2)$ final answer	2	B1 for $(t - 4)(t - 2)$ seen and spoiled or M1 for $t(t - 2) - 4(t - 2)$ or $t(t - 4) - 2(t - 4)$ or $(t - a)(t - b)$ where $a + b = -6$ or $ab = +8$

Question	Answer	Marks	Partial Marks
5(b)	$[x =] \frac{2m}{k+1}$	3	<p>M1 for $xk = 2m - x$ or $k = \frac{2m}{x} - 1$</p> <p>M1 for $xk + x = 2m$ or $k + 1 = \frac{2m}{x}$</p> <p>M1 for $x(k + 1) = 2m$</p>
5(c)	correctly eliminating	M1	
	$[x =] 6$	A1	
	$[y =] - 2$	A1	If 0 scored SC1 for 2 values satisfying one of the original equations or SC1 if no working shown, but 2 correct answers given
5(d)(i)	$3m - 4(m + 4) = 6m(m + 4)$	M1	or $\frac{3m - 4(m + 4)}{m(m + 4)} [= 6]$ oe
	$3m - 4m - 16 = 6m^2 + 24m$	M1	removes brackets correctly
	$6m^2 + 25m + 16 = 0$	A1	with no errors or omissions
Question	Answer	Marks	Partial Marks
5(d)(ii)	$\frac{-25 \pm \sqrt{(25)^2 - 4(6)(16)}}{2 \times 6}$ <p>or</p> $\frac{-25}{12} \pm \sqrt{\left(\frac{25}{12}\right)^2 - \frac{16}{6}}$	2	<p>B1 for $\sqrt{(25)^2 - 4(6)(16)}$ or better</p> <p>or B1 for $\left(m + \frac{25}{12}\right)^2$</p> <p>and if in form $\frac{p + \sqrt{q}}{r}$ or $\frac{p - \sqrt{q}}{r}$</p> <p>B1 for $p = -25$ and $r = 2(6)$</p>
	<p>– 0.79 and – 3.38</p> <p>final answer cao</p>	2	<p>B1 for each</p> <p>SC1 for – 0.8 and – 3.4</p> <p>or for – 0.78 and – 3.37</p> <p>or – 0.789.... and – 3.377.....</p> <p>or 0.79 and 3.38</p> <p>or – 0.79 and – 3.38 seen in working</p>
6(a)	4.79 or 4.788 to 4.789	3	<p>M2 for $\sqrt[3]{\frac{230 \times 3}{2 \times \pi}}$ oe</p> <p>or M1 for $230 = \frac{2}{3} \times \pi \times r^3$ oe</p> <p>If 0 scored SC1 for answer 3.8[0....]</p>
6(b)(i)	8.7[0] or 8.702 to 8.704	3	<p>M2 for $(300 - 230) \div (1.6^2 \pi)$</p> <p>or M1 for $\pi \times 1.6^2 \times h$</p>

6(b)(ii)	6.4	3	<p>M2 for $1.6 \times \sqrt[3]{\frac{19200}{300}}$ oe</p> <p>or M1 for sf $\sqrt[3]{\frac{19200}{300}}$ or $\sqrt[3]{\frac{300}{19200}}$ oe</p> <p>or for $\left(\frac{1.6}{r}\right)^3 = \frac{300}{19200}$</p>
Question	Answer	Marks	Partial Marks
7(a)	$x = 0$	1	
7(b)	Tangent ruled at $x = 0.5$	B1	No daylight between tangent and curve at point of contact.
	-9 to -6.5	2	<p>dep on ruled tangent or close attempt at tangent at $x = 0.5$</p> <p>M1 for rise/run also dep on tangent or close attempt at tangent at $x = 0.5$</p>
7(c)(i)	0 2.4 or better 4	3	B1 for each
7(c)(ii)	Correct smooth curve	4	<p>B3 FT for 6 or 7 correct plots</p> <p>or B2 FT for 4 or 5 correct plots</p> <p>or B1 FT for 2 or 3 correct plots</p> <p>FT <i>their</i> table</p>
7(d)	$x^3 + 3x + 4 = 10 - 8x^2$ and correctly completed	1	
7(e)	line $y = -2x + 2$ drawn and -0.45 to -0.35 nfw	3	<p>B2 for ruled $y = -2x + 2$</p> <p>or B1 for $-2x + 2$ seen or for line $y = -2x + c$ drawn or for $y = cx + 2$ ($c \neq 0$) drawn</p> <p>and B1 for -0.45 to -0.35 nfw</p>
8(a)	18	2	<p>B1 for 20 nfw</p> <p>or M1 for $8x + x = 180$ or better</p>
8(b)	32	2	<p>B1 for angle $DBC = 58$</p> <p>or B1 for angle $BCD = 90$</p>

Question	Answer	Marks	Partial Marks
8(c)(i)	24	1	
8(c)(ii)	29.4 or 29.40 to 29.41	3	<p>M2 for $\frac{360 - 48}{360} \times 2 \times \pi \times 5.4$</p> <p>or B2 for answer (minor arc) 4.52 or 4.523 to 4.524.... or</p> <p>M1 for $\frac{48}{360} \times 2 \times \pi \times 5.4$</p>
9(a)	$\frac{5}{8} \quad \frac{3}{8}$ $\frac{1}{6} \quad \frac{5}{6}$ $\frac{7}{10} \quad \frac{3}{10}$	3	B1 for each pair
9(b)	$\frac{5}{48}$ oe	2	M1FT for <i>their</i> $\frac{5}{8} \times \text{their} \frac{1}{6}$
9(c)	$\frac{304}{480}$ oe	2	<p>M1 for</p> <p><i>their</i> $\frac{5}{8} \times \text{their} \frac{5}{6}$ or <i>their</i> $\frac{3}{8} \times \text{their} \frac{3}{10}$</p>
10(a)	75	2	<p>M2 for $79.5 \div 1.06$ oe</p> <p>or for 79.5 associated with 106 [%]</p>
10(b)	962.5 cao	2	B1 for 35 or 27.5 seen
Question	Answer	Marks	Partial Marks
10(c)(i)	16	1	
10(c)(ii)	50	1	
10(c)(iii)	$\frac{4}{50}$ oe	2	<p>FT <i>their</i> (c) (ii) for 1 or 2 marks</p> <p>B1 for $\frac{4}{k}$, $k > 4$ or $\frac{k}{\text{their} 50}$, $k < 50$</p>
10(c)(iv)	9	1	
11(a)(i)	12.6 or 12.64 to 12.65	2	<p>B1 for $\begin{pmatrix} 12 \\ -4 \end{pmatrix}$</p> <p>or M1 for $(\text{their } 12)^2 + (\text{their } -4)^2$</p>

11(a)(ii)	$\begin{pmatrix} -11 \\ 13 \end{pmatrix}$	2	B1 for $\begin{pmatrix} -11 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 13 \end{pmatrix}$ or for $[\overrightarrow{BA}] = \begin{pmatrix} -8 \\ 7 \end{pmatrix}$
11(b)	$\frac{1}{2}(\mathbf{b} - \mathbf{a})$ oe	2	M1 for correct route or correct unsimplified answer or B1 for $\overrightarrow{QS} = \mathbf{b} - \mathbf{a}$ oe
11(c)(i)	$\begin{pmatrix} 9 & 50 \\ 10 & 69 \end{pmatrix}$	2	B1 for 2 correct elements
Question	Answer	Marks	Partial Marks
11(c)(ii)	$\frac{1}{11} \begin{pmatrix} 8 & -5 \\ -1 & 2 \end{pmatrix}$ oe isw	2	B1 for $k \begin{pmatrix} 8 & -5 \\ -1 & 2 \end{pmatrix}$ or $\frac{1}{11} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or det = 11 soi
12(a)	18 28	2	B1 for each
12(b)	$3n + 3$ oe	2	B1 for $3n + k$ oe or $cn + 3$ oe $c \neq 0$
12(c)	45	2	M1 for identifying 7 th pattern or M1 for <i>their</i> $(3n + 3) = 24$

12(d)	$[a =] \frac{3}{2}$ oe $[b =] \frac{13}{3}$ oe	6	<p>M1 for any correct substitution e.g. $\frac{1}{6} (2)^3 + 2^2a + 2b$</p> <p>A1 for one of e.g $\frac{1}{6} + a + b = 6$ oe $\frac{8}{6} + 4a + 2b = 16$ oe $\frac{27}{6} + 9a + 3b = 31$ oe $\frac{64}{6} + 16a + 4b = 52$ oe</p> <p>A1 for another of the above M1 for correctly eliminating one variable from <i>their</i> equations A1 for $a = \frac{3}{2}$ A1 for $b = \frac{13}{3}$ oe</p>
-------	--	---	--

