DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING
(ODL)

ENGINEERING MATHEMATICS 1
DEE 4133

WRITTEN TEST

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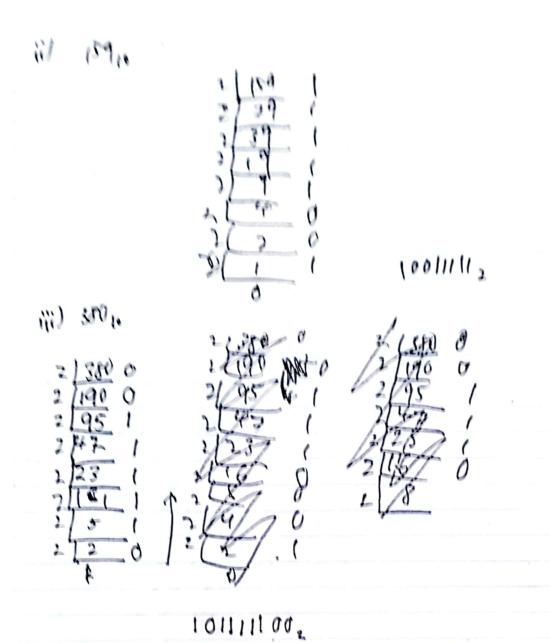ID Number: 1125240324610

Question 1

a) i) 11000_2

$2^4, 2^3, 2^2, 2^1, 2^0$

$2^4 + 2^3 = 16 + 8 = 24$

ii) 0111_2

$2^2, 2^1, 2^0$

$2^2 + 2^1 + 2^0 = 4 + 2 + 1$

$= 7$

b) i) 5062_{10}

		Reminder
2	5062	0
2	2531	1
2	1265	1
2	632	0
2	316	0
2	158	0
2	79	1
2	39	1
2	19	1
2	9	1
2	4	0
2	2	0
2	1	1
	0	

1001111000110_2

ii) 159_{10}

2	159	1
2	79	1
2	39	1
2	19	1
2	9	1
2	4	0
2	2	0
	1	1
	0	

10011111_2

iii) 380_{10}

2	380	0
2	190	0
2	95	1
2	47	1
2	23	1
2	11	1
2	5	1
2	2	0
	1	

101111100_2

2	380	0
2	190	0
2	95	1
2	47	1
2	23	1
2	11	1
2	5	1
2	2	0
	1	

2	380	0
2	190	0
2	95	1
2	47	1
2	23	1
2	11	1
2	5	1
2	2	0
	1	

Q2

a)

i) $z = 2 - 2i$ $\quad$ $w = -2 + 3i$

$$(2 - 2i)(-2 + 3i)$$
$$= -4 + 6i + 4i - 6i^2$$
$$= -4 + 10i + 6$$
$$= 2 + 10i$$

ii) $3(-2 + 10i)$

$$= -6 + 30i$$

iii) $6i(5 + 7i)$
$$= 30i + 42i^2$$
$$= 30i - 42$$

b) i) $(1 + 2i)(3 + i)$
$$= 3 + i + 6i + 2i^2$$
$$= 3 \quad + 7i - 2$$
$$= 1 + 7i$$

ii) $(4 + i)(7 - 3i)$

$$= 28 - 12i + 7i - 3i^2$$
$$= 28 - 5i + 3$$
$$= 25 - 5i.$$

Q3/

a)

i) $12x^2 - 7x + 1$

we quadratic equation

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4 \cdot 12 \cdot 1}}{2 \cdot 12}$$

$$= \frac{-(-7) \pm 1}{2 \cdot 12} = \frac{7 \pm 1}{24}$$

~~formula~~

$$x_1 = \frac{8}{24} \quad 4 \qquad x_2 = \frac{8}{24} \; 3$$

$$x_1 = \frac{1}{4} \qquad x_2 = \frac{1}{3}$$

ii) $x^3 - 3x^2 - 9x - 5$

use rational root theorem

$$= (x+1) \frac{(x^3 - 3x^2 - 9x - 5)}{(x+1)}$$

$$= \frac{x^3 - 3x^2 - 9x - 5}{x+1} = x^2 - 4x - 5$$

$$= (x+1)(x^2 - 4x - 5)$$

$$= (x+1)(x+1)(x-5)$$

$$= (x+1)^2(x-5)$$

$$\frac{-8 - 4 \pm \sqrt{16 - 4(1)(-5)}}{2}$$

$$= \frac{4 \pm \sqrt{16 + 4}}{2}$$

$$= \frac{2 \pm \sqrt{20}}{2}$$

b)

$$\frac{Surface}{area} = 6x^2$$

$$\frac{ax}{x} = 6x^2$$

$3.5 \times 3.5 = 12.25 \text{ inche}^2$ (surface area)

since it has 6 surface for the dice will
equal surface area therefore

$$6(12.25) = 73.5 \text{ inche}^2$$

$x = 3.5$
$x^2 = 12.25$
$6x^2 = 6(12.25)$
$= 73.5 \text{ inche}^2$