



FACULTY OF SCIENCE

SM	
EM	
FM	

DEPARTMENT OF APPLIED PHYSICS AND ENGINEERING MATHEMATICS
NATIONAL DIPLOMA IN
ANALYTICAL CHEMISTRY

MODULE MAT1YE2

CAMPUS DFC

NOVEMBER EXAMINATION

DATE: 14/11/2014

SESSION: 8:30-10:30

ASSESSOR:

MR M P SELOANE

INTERNAL MODERATOR:

MS E KIRCHNER

DURATION: 2 HOURS

MARKS: 65

SURNAME AND INITIALS: _____

STUDENT NUMBER: _____

CONTACT NO: _____

NUMBER OF PAGES: 11

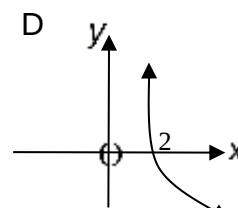
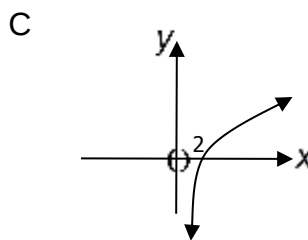
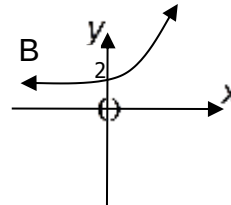
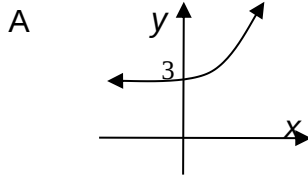
INSTRUCTIONS : ANSWER ALL THE QUESTIONS
 : ENSURE THAT YOUR PAPER HAS ALL THE PAGES

REQUIREMENTS : INFORMATION BOOKLET
 : NON-PROGRAMMABLE SCIENTIFIC CALCULATOR

SECTION A [20]**INSTRUCTIONS**

USE THE TABLE ON PAGE 3 TO MARK THE LETTER (X) CORRESPONDING TO THE CORRECT ANSWER. DO YOUR ROUGH WORK ON THE BLANK PAGES.

1. The graph of $y + 3\ln \frac{x}{2} = 0$ is represented by



2. The expression $\sqrt{25x^2}$ in its simplest form is:

A 25^x

B 5^x

C $5x^2$

D None of the preceding

3. The expression $\frac{\ln y}{\ln x}$ is equivalent to:

A $\log_x y$

B $\ln_x y$

C $\ln y - \ln x$

D None of the preceding

4. The expression $(\log x - 2\log y + 1)$ written as a single term is:

A $\log(10x - y^2)$

B $\log(10xy^2)$

C $\log\left(\frac{yx}{100}\right)$

D $\log\left(\frac{10x}{y^2}\right)$

5. If $e^{1-\ln(e)} = b^{x-2}$, then x is equal to

A 2

B $\ln 2$

C 0

D 1

6. The standard (rectangular) form of the complex number $2 + \sqrt{-9}$, is equal to

A $2 + 3j$

B $2 - 3j$

C $3 + 2j$

D undefined

7. If $2x - j = (y(j)^7 + 2)$ then,

A $x = -2$ and $y = 1$

B $x = 1$ and $y = -1$

C $x = -2$ and $y = -1$

D $x = 1$ and $y = 1$

8. $\tan^{-1}(3,1) + \sin(\cos^{-1}(0,5))$ is equal to:

A 72,99

B 2,12

C 0,82

D 4,79

9. Given the wave equation, $y = 3\sin \pi(t - \pi)$, the shift is equal to:

A 2

B 3,14

C 3

D 1

10. If $-e\sin \theta = 2$ and $\frac{\pi}{2} \leq \theta \leq \frac{2\pi}{3}$ then θ is equal to:

A -0,81

B -3,88

C 0,74

D 3,97

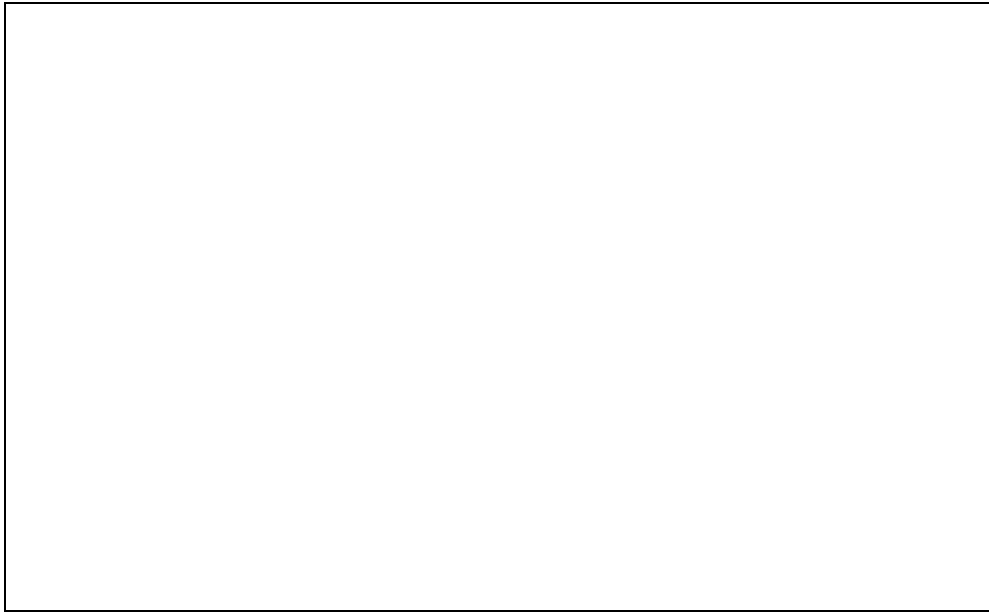
1.	A	B	C	D
2.	A	B	C	D
3.	A	B	C	D
4.	A	B	C	D
5.	A	B	C	D
6.	A	B	C	D
7.	A	B	C	D
8.	A	B	C	D
9.	A	B	C	D
10.	A	B	C	D

SECTION B (17)**INSTRUCTIONS**

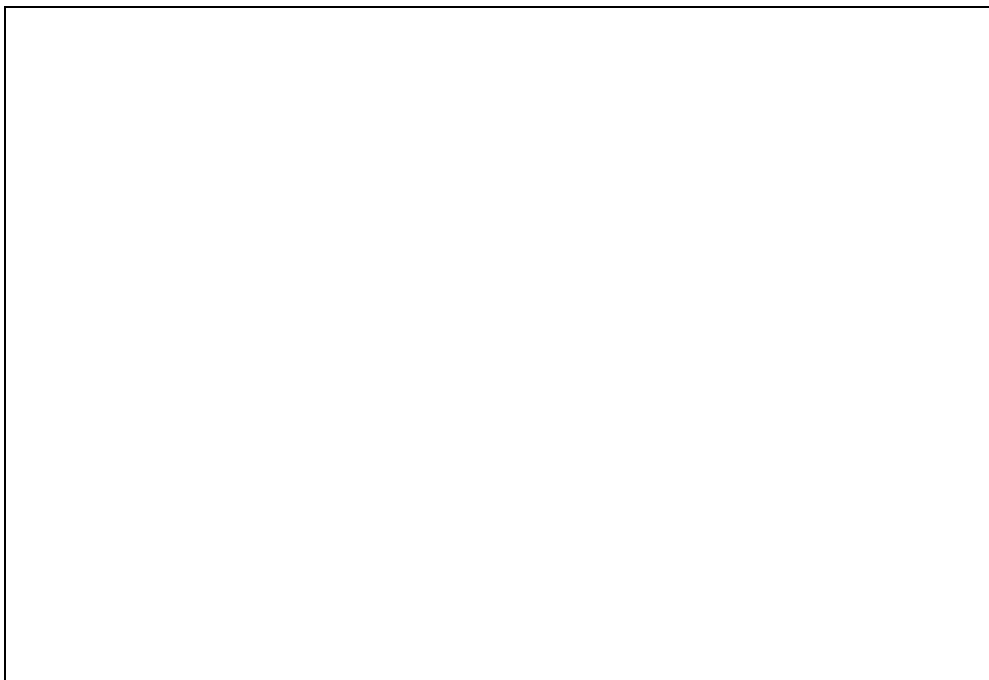
GIVE ONLY THE FINAL SIMPLIFIED ANSWER (CORRECT TO TWO DECIMAL PLACES WHERE APPLICABLE) IN THE SPACE PROVIDED. DO YOUR ROUGH WORK ON THE BLANK PAGES.

11. Draw a neat sketch graph of each of the following showing all intercepts with axes if any:

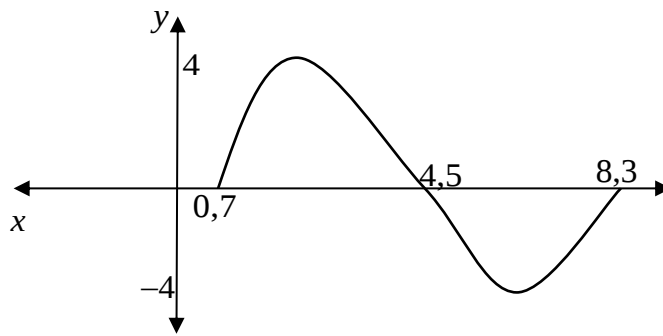
11.1 $y = e^{x-1}$ (2)



11.2 $y = -\log_5\left(\frac{1}{2x}\right)$ (2)



12. The graph below is that of a sinusoidal $y = a \sin(bx \pm c)$.



Use it to find:

12.1 b

 (2)

12.2 c

 (1)

12.3 a

 (1)

12.4 its equation

 (1)

13. Solve for x in each case:

13.1 $5^{x+1} = 1$

 (2)

13.2 $\ln(1-x)^2 = 0$

 (2)

14. If the centre angle $\theta = 30^\circ$ is subtended by an arc of length 6cm in a circle, then the radius of that circle will be: (2)

15. Evaluate: $3\sqrt{45^\circ} + 2\sqrt{210^\circ}$ (answer in rectangular form): (2)

SECTION C (28)**INSTRUCTIONS**

**SHOW ALL THE IMPORTANT STEPS AND GIVE YOUR FINAL ANSWERS
CORRECT TO TWO DECIMAL PLACES WHERE APPLICABLE. USE THE LAST
PAGE TO RE-DO ANY QUESTION YOU MAY HAVE CANCELLED.**

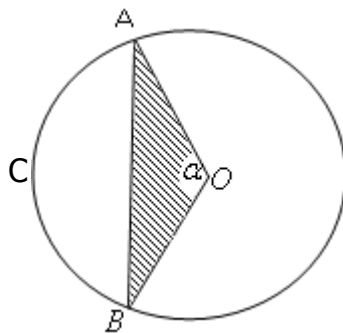
16. Solve for x :

16.1 $3^x - 3^{-x} = 3^{-x}$ (4)

16.2 $\ln(2 - x) + \ln(2 + x) = 1$ (4)

[illegible]

18. A circle with diameter 24 cm is divided into a major and a minor segment by a chord AB and $\angle OAB = 40^\circ$.



- 18.1 Calculate the magnitude of angle α in radians. (3)

- 18.2 Calculate the area of the **segment** ACB . (2)

- 18.3 Calculate the area of the shaded part. (2)

$$\left(\frac{z_1 \times \bar{z}_2}{z_2}\right)^3 \text{ (Answer in exponential form)} \quad (5)$$
[illegible]

20. Determine **all the roots** of the equation $z^2 = 2 - j$ and express your answers in rectangular form. (4)

TOTAL= 65 MARKS

RE-DO ANY QUESTION YOU MAY CANCELLED ON THIS PAGE.