



INTERNAL ASSESSMENT APPROVAL FORM (INCLUDING COLLABORATIVE PROVISION)

This form is used to ensure that assessment specifications have been through an internal review process prior to external examination/approval and release to students. It should be completed for each assessment for a particular module. The assessment tasks, criteria and marking scheme should accompany this form.

PARTNER (and taught location if relevant):	Coleg Sir Gar				
EXTERNAL EXAMINER NAME:	Dr Arfan Ghani				
ASSESSMENT AUTHOR :	AINSLEY THOMAS				
MODULE TITLE:	ENGINEERING MATHEMATICS				
MODULE CODE:	PSDE 4003		MODULE LEVEL:	4	
COMPONENT NO. (e.g. 1 of 2):	1 OF 2		COMPONENT WEIGHTING (e.g. 50% of the module):	20	
ASSESSMENT PERIOD	☒ Semester 1	☐ Semester 2	☐ Semester 1 Re-sit	☐ Semester 2 Re-sit	Other, please state
TYPE OF ASSESSMENT:	☐ Coursework		☐ Examination		☒ Practical
LANGUAGE OF ASSESSMENT:	ENGLISH		TRANSLATION REQUIRED (Y/N):	N	
FOR EXAMINATIONS ONLY. SPECIFY BELOW ANY ADDITIONAL MATERIAL(S) TO BE USED IN THE EXAMINATION					
<i>This box will expand as you type</i>					

INTERNAL MODERATOR PLEASE TICK TO INDICATE THAT THE ASSESSMENT INCLUDES:		Please ✓ YES NO		Comments
1	Tasks that are specified clearly, accurately and comprehensibly, with appropriate use of language and neat presentation	✓		
2	Tasks which enable the module learning outcomes to be demonstrated (as per the module syllabus)	✓		
3	Tasks which conform to the assessment described in the module syllabus	✓		
4	Tasks which are written at the appropriate level of the Framework for Higher Education Qualifications (see http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf?sfvrsn=170af781_14).	✓		
5	Clear criteria for assessment and guidance about how marking/grading will be applied	✓		
6	Guidance about expected evidence for submission, e.g. essay or report, word count, bibliography and references			NIA
7	Reference to good academic conduct, for example referencing, plagiarism and Turnitin			NIA.
8	Actions to complete			
<i>This box will expand as you type</i>				
SIGNATURE OF APPROVAL:		SIGNATURE		DATE

INTERNAL MODERATOR: I confirm that this version of the assessment specification is ready to be sent to the Partnership Team Leader	Nigel. H Davies	3/10/18
---	-----------------	---------

ONLY TO BE COMPLETED IF THE ASSESSMENT IS LINKED TO A COLLABORATIVE PARTNER

PARTNERSHIP TEAM LEADER PLEASE TICK TO INDICATE THAT THE ASSESSMENT INCLUDES:		Please ✓		Comments
		YES	NO	
1	Tasks that are specified clearly, accurately and comprehensibly, with appropriate use of language and neat presentation			
2	Tasks which enable the module learning outcomes to be demonstrated (as per the module syllabus)			
3	Tasks which conform to the assessment described in the module syllabus			
4	Tasks which are written at the appropriate level of the Framework for Higher Education Qualifications (see http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf?sfvrsn=170af781_14).			
5	Clear criteria for assessment and guidance about how marking/grading will be applied			
6	Guidance about expected evidence for submission, e.g. essay or report, word count, bibliography and references			
7	Reference to good academic conduct, for example referencing, plagiarism and Turnitin			
8	Actions to complete <i>This box will expand as you type</i>			
SIGNATURE OF APPROVAL:		SIGNATURE		DATE
PTL: I confirm that this version of the assessment specification is ready to be sent to the External Examiner				

UWTSD PROVISION: please submit the completed document to the appropriate Programme Director.

COLLABORATIVE PROVISION: please submit the completed document (or make available electronically) to the Partnership Team Leader. This must be in accord with specific arrangements for sharing electronic documents (e.g. via SharePoint or similar).

The assessment tasks, criteria and marking scheme should accompany this form

THIS DOCUMENT IS ALSO AVAILABLE IN WELSH

LOCATION: Coleg Sir Gar

LEVEL 4

**EXAMINATION PERIOD
NOVEMBER 2018**

LLEOLIAD: Coleg Sir Gar

LEFEL 4

**CYFNOD ARHOLIADAU
TACHWEDD 2018**

MODULE CODE: PSDE4003
Engineering Mathematics
(Practical Exam)

TIME: 1 HOUR

ANSWER ALL QUESTIONS

Equipment or materials required – Calculators are permitted.

Adnoddau neu ddefnyddiau sydd eu hangen - Caniateir cyfrifianellau.

Open a Word file, put your name in a header and at the end of the exam copy your Matlab commands and output to the file.

Print off your Word document and hand in before leaving the exam room

In the event of printer error, email your Word file as an attachment to:
ainsley.thomas@colegsirgar.ac.uk

Marks

1. If $x = 2.3$ and $y = 3.1$, evaluate using 'assignment statements':

a) $x^2 - y$ b) $(4y)^{x-y}$ c) e^{3xy} d) $\log_{10}(y^x - x)$

[10]

2. If $Q = \begin{bmatrix} \frac{2}{\sqrt{8}} & \frac{2}{\sqrt{8}} \\ \frac{2}{\sqrt{8}} & -\frac{2}{\sqrt{8}} \end{bmatrix}$ and the matrix $X = \begin{bmatrix} 3 & 4 \\ -1 & 0 \end{bmatrix}$

- a) Show that $Q^T = Q^{-1}$
b) Show that $(QXQ^T)^6 = QX^6Q^T$

[20]

3. On the same set of axes, plot the graphs of $y = \sin x$ and $y = \cos x$ for $-\pi \leq x \leq \pi$. Copy the figure window and your commands to your Word file. By zooming into the points of intersection, and copying the resultant figures into your Word file, write down the two points of intersection, correct to 2 decimal places.

[25]

4. Use the solve command to find the three roots of the equation $4x^3 = 2x^2 - 3x + 1$. Show that the sum of the roots is $\frac{1}{2}$ and the product of the roots is 0.25. (start with *clear all* and *syms x*)

[20]

5. If $y = 3e^x \sin x$, use Matlab to find $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ and $\frac{d^4y}{dx^4}$

Show that $\left(\frac{d^4y}{dx^4}\right)^2 + \left(\frac{d^2y}{dx^2}\right)^2 + 4y^2 = 180e^{2x}$

[25]



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

LOCATION: Coleg Sir Gar

LEVEL 4

EXAMINATION PERIOD
NOVEMBER 2018

LLEOLIAD: Coleg Sir Gar

LEFEL 4

CYFNOD ARHOLIADAU
TACHWEDD 2018

MODULE CODE: PSDE4003/SGEE4002

Engineering Mathematics

(Practical Exam)

MAIN

SOLUTIONS

Qu 1

```
>> x=2.3;y=3.1;
```

```
>> x^2-y
```

```
ans =
```

```
2.1900
```

```
>> (4*y)^(x-y)
```

```
ans =
```

```
0.1334
```

```
>> exp(3*x*y)
```

```
ans =
```

```
1.9479e+009
```

```
>> log10(y^x-x)
```

```
ans =
```

```
1.0490
```

(2 marks each = 8 + 2 for statements)

Qu 2

```
>> Q=[2/sqrt(8) 2/sqrt(8);2/sqrt(8) -2/sqrt(8)]
```

```
Q =
```

```
0.7071  0.7071
```

```
0.7071 -0.7071    (4)
```

```
>> X=[3 4;-1 0]
```

```
X =
```

```
3  4
```

```
-1  0    (2)
```

```
>> Q'
```

```
ans =
```

```
0.7071  0.7071
```

```
0.7071 -0.7071  (2)
```

```
>> Q^-1
```

```
ans =
```

```
0.7071  0.7071
```

```
0.7071 -0.7071  (2)
```

```
>> (Q*X*Q')^6
```

```
ans =
```

```
-91.0000  45.0000
```

```
-180.0000  44.0000  (5)
```

```
>> Q*X^6*Q'
```

```
ans =
```

```
-91.0000  45.0000
```

```
-180.0000  44.0000  (5)
```

(Qu 2 total = 20)

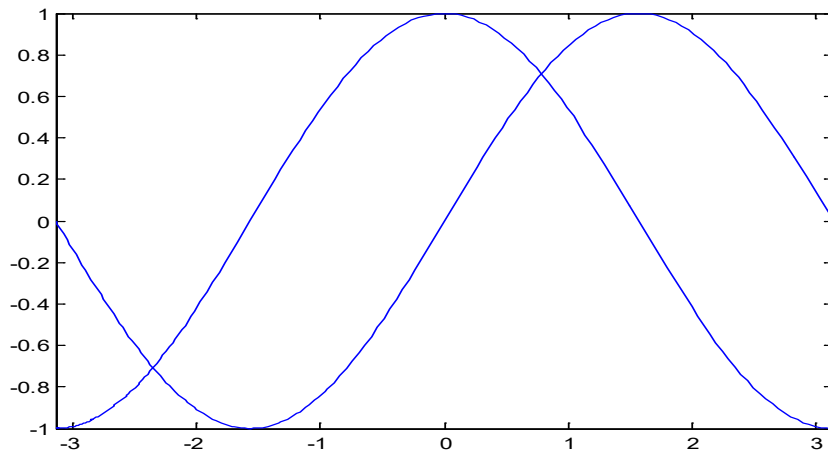
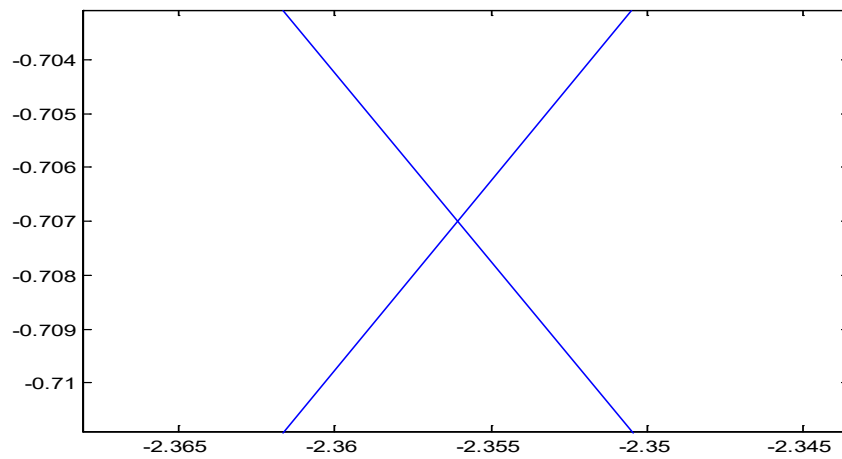
Qu3

```
fplot('sin(x)',[-pi,pi])  (5)
```

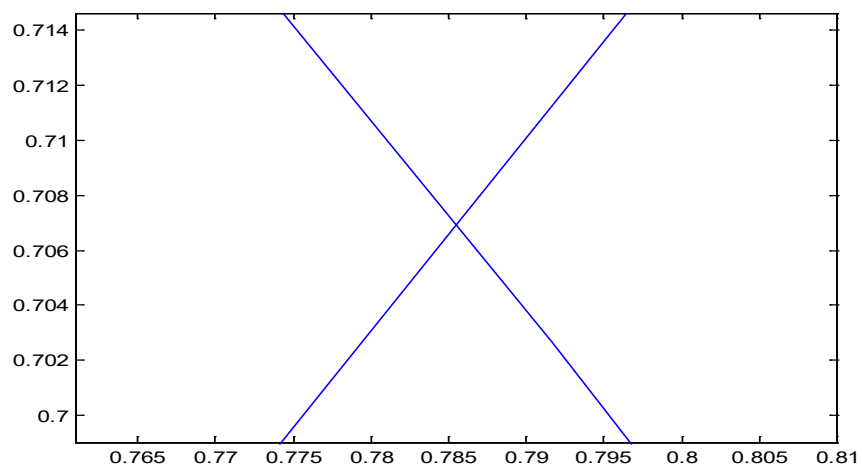
```
>> hold  (2)
```

Current plot held

```
>> fplot('cos(x)',[-pi,pi])  (5)
```

**(3)****(2)**

Point of intersection (-2.68, -0.89)

(3)**(2)**

Point of intersection (0.79, 0.71)

(3)

(Qu 3 total = 25)**Qu4**

```
>> clear all
```

```
>> syms x
```

```
>> ans=solve(4*x^3-2*x^2+3*x-1)      (4)
```

```
ans =
```

```

((107^(1/2)*6912^(1/2))/6912 +
29/432)^(1/3) - 2/(9*((107^(1/2)*6912^(1/2))/6912 + 29/432)^(1/3)) + 1/6
```

```

(3^(1/2)*(2/(9*((107^(1/2)*6912^(1/2))/6912 + 29/432)^(1/3)) + ((107^(1/2)*6912^(1/2))/6912 +
29/432)^(1/3))*i)/2 + 1/(9*((107^(1/2)*6912^(1/2))/6912 + 29/432)^(1/3)) -
((107^(1/2)*6912^(1/2))/6912 + 29/432)^(1/3)/2 + 1/6
```

```

1/(9*((107^(1/2)*6912^(1/2))/6912 + 29/432)^(1/3)) -
(3^(1/2)*(2/(9*((107^(1/2)*6912^(1/2))/6912 + 29/432)^(1/3)) + ((107^(1/2)*6912^(1/2))/6912 +
29/432)^(1/3))*i)/2 - ((107^(1/2)*6912^(1/2))/6912 + 29/432)^(1/3)/2 + 1/6
```

```
>> roots=double(ans)      (4)
```

```
roots =
```

```
0.3576
```

```
0.0712 + 0.8331i
```

```
0.0712 - 0.8331i
```

```
>> sum(roots)      (6)
```

```
ans =
```

```
0.5000
```

```
>> prod(roots)      (6)
```

```
ans =
```

```
0.2500
```

(Qu 4 total = 20)

Qu 5

```
>> clear all
```

```
>> syms x
```

```
>> y=3*exp(x)*sin(x)          (6)
```

```
y =
```

```
3*exp(x)*sin(x)
```

```
>> y1=diff(y)                 (3)
```

```
y1 =
```

```
3*exp(x)*cos(x) + 3*exp(x)*sin(x)
```

```
>> y2=diff(y,2)              (3)
```

```
y2 =
```

```
6*exp(x)*cos(x)
```

```
>> y4=diff(y,4)              (3)
```

```
y4 =
```

```
-12*exp(x)*sin(x)
```

```
>> y4^2+5*y2^2+4*y^2        (6)
```

```
ans =
```

```
180*exp(2*x)*cos(x)^2 + 180*exp(2*x)*sin(x)^2
```

```
>> simplify(ans)            (4)
```

```
ans =
```

```
180*exp(2*x)
```

(Qu 5 total = 25)