

## Examination Procedures

- This exam will start at 11:05, and will last 45 minutes.
- Each Question will be worth Either 2 or 3 Marks. There are 15 Marks worth of questions.
- All Questions must be attempted (LENS students please see below)
- Write all of your answers in the exam script. Write the script number on any other documents you submit.
- It is your responsibility to return the script to collection box. An audit of scripts will take place immediately after the exam. If your script is account for in that audit, you are deemed to be absent, and will receive no marks.
- **LENS Student** Specifically approved LENS students have to answer any selection of questions that have an aggregate mark of 12 Marks.
  - They may skip any one of the 3-Mark Questions
  - The mark will be rescaled by 125 %.

## Sample Paper 1 (Still Writing)

- (i) (3 Marks) Determine if the function  $f(x) = x^3 \cos(x)$  is an even function, an odd function or neither.
- (ii) (2 Mark) Given  $f(x) = \sqrt{2x+6}$ , find  $f(3x^2 - 2)$ . Simplify the answer as much as possible.
- (iii) (2 Marks) Find  $g^{-1}(x)$  the inverse of the function  $g(x) = \log_e(3x + 1)$
- (iv) (2 Marks) Given the functions  $g(x) = x^2 - 1$  and  $f(x) = 2x + 1$  determine the values of  $f \circ g(x)$  and  $g \circ f(x)$
- (v) (3 Marks) Find the Maclaurin Series of  $e^x$  up to and including the term containing  $x^6$ . (see *Formula sheet*)  
Use this answer to evaluate  $e^{-0.4}$ .
- (vi) (2 Marks) Find the domain and the range of the function:

$$f(x) = 7 + 2\sin(x)$$

- (vii) (2 Mark) Consider the function  $f(x) = x^2 - 8x + 7$ . Find the y intercept of the function f(x).
- (viii) (2 Marks) Determine the vertical asymptotes of the following function

$$f(x) = \frac{x^2 + 3x^2 - 4}{x^2 + 3x^2 - 4}$$

- (ix) (2 Marks) Determine the horizontal asymptotes of the following function

$$f(x) = \frac{x^2 + 3x^2 - 4}{x^2 + 3x^2 - 4}$$

## Sample Paper 2 (Still Writing)

- (i) (3 Marks) Determine if the function  $f(x) = x^2 \cos(x)$  is an even function, an odd function or neither.
- (ii) (2 Mark) Find  $f(x)$  the inverse of the function  $f(x) = 2x + 3$
- (iii) (2 Marks) Find the domain and the range of the function:

$$f(x) = \log_e(x)$$

- (iv) (2 Mark) Given  $f(x) = \sqrt{2x + 1}$ , find  $f(2x^2 - 1)$  and simplify the answer.
- (v) (2 Marks) Find  $g^{-1}(x)$  the inverse of the function  $g(x) = \log_2(3x)$
- (vi) (2 Marks) Given the functions  $g(x) = x^2 + 1$  and  $f(x) = (x - 1)/2$  determine the values of  $f \circ g(1)$  and  $g \circ f(1)$
- (vii) (3 Marks) Find the Maclaurin Series of  $e^x$  up to and including the term containing  $x^6$ . (see Formula sheet)  
Use this answer to evaluate  $e^2$ .

- (viii) (3 Marks) find the x-intercepts and the y-intercept of the following function

$$y = f(x) = 3x^2 + 6x - 12$$

- (ix) (3 Marks) Determine the vertical asymptotes of the following function

$$f(x) = \frac{2x^2}{x^2 - 1}$$

- (x) (3 Marks) Determine the horizontal asymptotes of the following function

$$f(x) = \frac{2x^2}{x^2 - 1}$$

## Formula

- Horizontal Asymptotes

$$\lim f(x)$$

- Maclaurin Series

$$f(0) + f'(0)x + \frac{f''(0)}{2!}x^2 + \frac{f'''(0)}{3!}x^3 + \dots$$