

Model Exam II -MAT1011-Calculus for Engineers

Faculty Dr.M.Kaliyappan

Time 11/2 hours

Max.Marks : 50

Answer All questions

1. (a) Plot the following four functions in the interval [0 5] using subplot and find the derivative all the functions (5 Marks)

1. $y = (x^4 - 3x^2 + 5)^3$

2. $y = \cos(\tan x)$

3. $y = \sqrt{x} + \frac{1}{\sqrt[3]{x^4}}$

4. $y = \frac{3x - 2}{\sqrt{2x + 1}}$

- (b) Find the extreme values of the function using MATLAB (5 Marks)

$$f(x) = 4x^4 - 32x^3 + 89x^2 - 95x + 29$$

- (c) Find the inverse transform of F(s) (5 Marks)

(i)

$$F(s) = 3 / (s^2 + s - 6)$$

- d) Plot the following surface and find first and second order partial derivatives (5 Marks)

$$z = f(x, y) = x^4 y^3 + 8x^2 y + y^4 + 5x;$$

2. Debug the following MATLAB code

(a)

```
clc
clear all
format compact
syms
f=inpt('Enter the function f in terms of x and y ');
x0=inpt('Enter the value of x0');
y0=inpt('Enter the value of y0');
L1=lim(substitute(f,Y,y0),X,x0);
L2=lim(substitute(f,X,x0),Y,y0);
```

```

m=input('Enter the value of m as a natural number');
y1=y0+(x-x0)^m;
L3=lim(substitute(f,y,y1),x,x);
n=input('Enter the value of n as a natural number');
x1=x0+(y-y0)^n;

```

(b)

```

clc
clear all
format compact
syms
z = input('Enter the two dimensional function f(x,y): ');
x1 = input('enter the x value at which the derivative has to be evaluated: ');
y1 = input('enter the y value at which the derivative has to be evaluated: ');
z1 = substitute(substitute(z,x,x1),y,y1)
esurf(z,[x1-2 x1+2])
f1 = differentiate(z,x)
slopex = substitute(substitute(f1,x,x1),y,y1);
[x2,z2]=mesh(x1-2:.25:x1+2,0:0.5:10);
y2=y1*ones(size(x2));
hold
h1=surface(x2,y2,z2);
SET(h1,'FaceColor',[0.7,0.7,0.7],'EdgeColor','none')

```

3. Write the built in functions for the following operations/ calculations (10 marks)

- (a) Plotting a surf
- (b) Plotting a curve
- (c) Integrating a function $f(x)$
- (d) Finding Laplace transform of a function
- (e) Plotting three dimensional vector field.