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Uva Wellassa University

Uva Wellassa University

Faculty of Management

Degree of Bachelor of Business Management in Entrepreneurship and Management

THIRD YEAR FIRST SEMESTER EXAMINATION –FEBRUARY \MARCH2012

EMG 337-1 IT for Actuarial Science I

Instructions to candidates:

No. of pages : Six (06)
No. of questions : Five (5)
Time allocation : Two(2) Hours
Marks allocation : Hundred (100) Marks

Index Number:

Answer **only Four (04)** questions **including Question number (01)**

Instructions:

- Create a folder with 'YOUR INDEX NUMBER' on the desktop.
- Copy the Excel sheet provided to you, in to the folder that you created
- Set MATLAB path to this folder.
- Save all the M-files in this folder.
- Just after opening MATLAB command window type and enter the following commands.

diary index_no.out
diary on

After finishing all the work (at the end of the exam) type and enter the following command on the Matlab command window

diary off

- Before you leave out the exam hall please make sure that you have saved all your Excel files M-files and 'diary files' in the folder that you have created before.
- 'You are entirely responsible for saving these files in the folder.

1.

a) Consider the work sheet that you have provided

i). Get the summation of height of all people in the data set at the cell D34.

ii). Get the average age of all people in the data base at the cell C34.

iii). Short the dataset to get the data of all females to the front of the data base.

iv). Get the number of males in the data set to the cell B34.

v). If column F =weight^2/ height -18, then fill the column F.

(15 marks)

b) Do the following calculation within Matlab command window.

i). Let x=3,y=4 and z=2.5,Get the value of p where p= x^2+2y+3z

ii). Let $Q = 5\sin\frac{\pi}{6}$ and $R = 6\cos\frac{\pi}{6}$, get the values of Q and R.

iii). If sin x=0.5 find x

iv). Let x=9

Find

a. $\sqrt{x}$

b. e^x

c. ln x

(25 marks)

2. Create an Interest rate work sheet. You may use following steps

Step 01: Design the following Excel Sheet

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Interest Rate Table			
Interest rate(i)	6%		
Time	v(t)	a(t)	s(t)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

We want to calculate the interest rate functions for values of Time t from one to ten.

Step 02: v(t) is equal to $(1+i)^{-t}$ at each t. Fill the column v(t).

Step 03: a(t) is equal to $\frac{1-(1+i)^{-t}}{i}$ at each t. Fill the column a(t).

Step 04: s(t) is equal to $\frac{(1+i)^{t}-1}{i}$ at each t. Fill the column s(t).

Show that $v(t)=\frac{a(t)}{s(t)}$.

(20 marks)

3.

a)

i). Write a Matlab command to get raw vector W which is started at 1 incremented by -1 end with -5.

ii). Write a Matlab command to get vector V=[1 -8 $\sqrt{2}$]

iii). Let a=3, get the vector V1= [a a^2 2a+2] within the command window.

iv). If x is equal to 2nd element of W , y is equal to 3rd element of vector Vand z is equal to the 3rd element of vector V1,then get the value of b where $b=x+2y+z^2$.

(12 marks)

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b)

i). Write a Matlab program to get values of f(x) where $f(x)=x^2+2x+1$ for x= 0,1,2,3,4,5,6,7,8,9.

ii). Write a Matlab command to plot function $f=x^2+3x+6$ where x□[-1,1], In your ,

Plot name: $f(x)= x^2+3x+6$

x-axis name: 'x-axis'

y-axis name: 'y-axis'

color of the plot must be green.

(8 marks)

4.

a) Let $f(x) = x^3+2x^2+3x+1$

i). Write a Matlab function to get f(x) value for given x_0.

ii). Get the value of f(x) when

a. x = -2

b. x = 2

(5 marks)

b) You are given:

Annual interest rate = i

Period = n years

Annual payment amount which will be done at the end of each year = P

i). Write a Matlab function to get the present value of this annuity.

a. Function name must be "annuityannual"

b. Output name must be "PV"

(5 marks)

ii). Suppose that John will repay a loan by equal annual payment of Rs.100 in next 10 years. If the annual effective rate of interest is equal to 6% find the loan amount that barrowed by John using tha Matlab function that you have created in part (i).

(5 marks)

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c) If the payments will be done at the end of each month, create a Matlab function by editing the function that you have write in part b, to get the present value of n-year annuity. Assume that the interest rate is convertible 12 times per year.

a. Function name must be "annuitymonth"

b. Output name must be "PV"

(5 marks)

5. Let consider a loan of Rs.20000/= with the annual effective rate of interest i=12%.

a) Design the following Excel Sheet

Principal		Principal		
Interest rate		Interest rate		
Total No of Payment		Total No of Payment		
First month Priciple payment		First year Priciple payment		
Interest payment in 1st Month		Interest payment in 1st year		

i). If the borrower agreed to repay the loan within two years with monthly payments and annual interest rate is convertible 12 times per month, fill the above table for monthly payment.

(5 marks)

ii). If the borrower agreed to repay the loan within four years with annual payments, fill the above table for annual payment.

(5 marks)

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b) Design the following Excel Sheet

	Monthly Payments		Annual Payments	
Period	PRINCIPAL PAYMENT	INTEREST PAYMENT	PRINCIPAL PAYMENT	INTEREST PAYMENT
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			

i). If the borrower agreed to repay the loan within two years with monthly payments and annual interest rate is convertible 12 times per month .Fill the above table by calculating the interest payment and principle payment in each month within two years.

(5 marks)

ii). If the borrower agreed to repay the loan within four years with annual payments .Fill the above table by calculating the interest payment and principle payment in each year within four years.

(5 marks)