* U F - 6 2 0 7 *

UF-6207

B. E. - II (Sem. III) (Electrical) Examination

May / June – 2012

Computer Application For Electrical Engineering

(Old Course)

Time : **3** Hours] [Total Marks : **100**

Instructions : (1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 2 (SEM. 3) (ELECTRICAL)**

Name of the Subject :

☛ **COMPUTER APPLICATION FOR ELECTRICAL ENGINEERING**

☛ Subject Code No. : **6 2 0 7** ☛ Section No. (1, 2,.....) : **NIL**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Answer of each section must be written in separate answer book.

(4) Figures to the extreme right side indicate full marks.

(5) Assume appropriate data if requires.

(6) Support your answers with neat and clean diagrams and waveforms.

(7) Students may use casio MS-100, 100-W or equivalent scientific calculators.

1 (a) Do as directed : **10**

(i) Let x = 0.09735, compute the absolute error if x is truncated to three decimal digit.

(ii) Find the interval that contain the root for the function

$f(x) = x+\log x-2$

(iii) Write general formula for Bi-section method.

(iv) Explain termination criterias for iterative methods.

(v) What is the basic difference between Gauss-Siedel and Gauss Jacobi method ?

(b) (i) The Taylor series expansion for Cos (x) can be given as follow : **6**

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \ldots\ldots\ldots\ldots + (-1)^{n+1} \cdot \frac{x^{2(n+1)}}{[2(n+1)]!}$$

Find n such that the series determines the value of cos (1) correct up to nine decimal places.

(ii) Explain trunction error with example. **4**

2 (a) Develop an algorithm and write a "C" program for Secant method for solving non-linear equation. **10**

OR

(a) Find the root of the following equation correct up to four decimal places using Bi-section method. **10**
$f(x) = x^3 - 2x - 5$

(b) Write an algorithm for Newton-Raphson method. **5**

3 (a) Apply Nodal voltage analysis and write equations for V_1, V_2 and V_3 for the network shown in figure 1 and find the values of V_1, V_2 and V_3 using Gauss elimination method. **10**

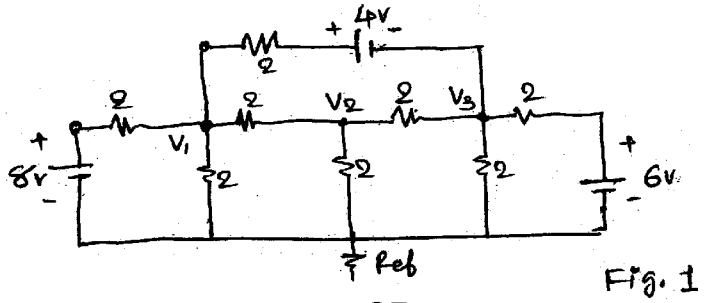


Fig. 1

OR

(a) Apply mesh current analysis and write the equations for i_1, i_2 and i_3 for the network shown in fig-2 and find the values of i_1, i_2 and i_3 using Gauss Jordon method. **10**

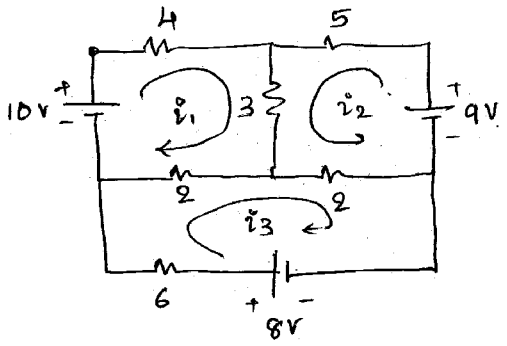


fig. 2.

(b) Solve the following set of equations upto three iterations using Gauss Siedal method.

$9x_1 + 3x_2 - 2x_3 = 7$

$3x_1 + 8x_2 + 2x_3 = 5$

$-2x_1 + 2x_2 + 8x_3 = 9$

4 (a) Attempt all questions : **10**

(i) Define Linear Interpolation. **2**

(ii) What is the condition to select number of strip to solve numerical integration using following methods. **2**

(a) Trapezoidal Methods

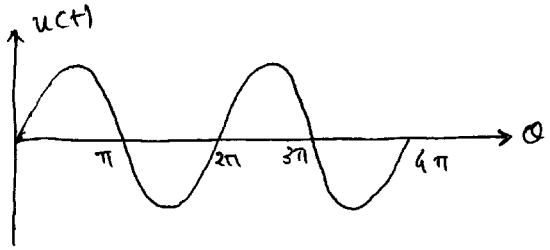
(b) Simpson's 1/3 Rule

(iii) Construct a Newton's Backward Difference Table for the four set of data. **2**

(iv) What is the importance of initial values to solve any ordinary differential equation ? **2**

(v) What is the advantage of Modified Euler's method over Euler's method to solve ordinary differential equation ? **2**

(b) (i) Obtain the Root Means Square value of current with a given waveform. Use Simpson's 3/8 Rule of integration for this. Total number of intervals is equal to six. **5**



(ii) Write an algorithm for Runge-Kutta Forth order method for solving an ordinary differential equation. **5**

5 (a) For a transformer core the following data were obtained for its magnetizing curve. **8**

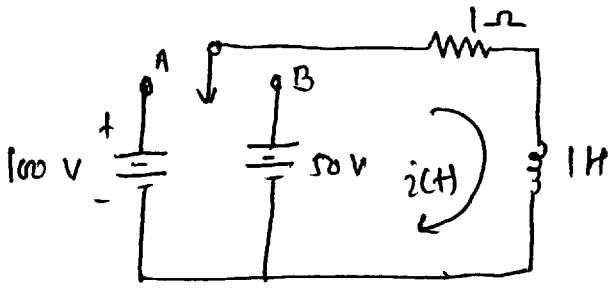
$H \times 10^3$ (at/m)	2	3	4	5	6	7
β $(Tesla)$	0.2	0.364	0.5	0.6	0.61	0.63

If the designer chooses an Ampere Turn of 2.5×10^3 then what should be the approximate value of Flux Density at this operating point ? Use proper Newton's Interpolation Method to solve the same.

(b) Write a "C" programme to solve numerical integration using Trapezoidal Rule. Mention the meaning of each variable used. Write a programme for tabulated data. **7**

OR

5 (a) In the circuit given below, the switch K is put in position A for a long time. At time t=0 the switch k is quickly moved to position B. Find the current through the inductor after a duration of one time constant. Use Euler's method to solve this problem. Step size : 0.01. **8**



(b) Write an algorithm of Newton's Backward Difference Interpolation technique. Mention the meaning of each variable used. **7**

6 Attempt any three questions : **15**

(i) Find the Lagrange Interpolation Polynomial to fit the following data.

X	0	1	2	4
Y	1	1	2	5

(ii) Solve the following ordinary differential equation using Runge-Kutta Second order method.
$dy/dx = (y+x) / (y-x)$ $y(0) = 1$ $0 \leq x \leq 0.4$

(iii) Evaluate the integral of the following function using Trapezoidal rule.

$\int_0^1 1/(1+x^2)\,dx$ No of points equals to five.

(iv) Write an algorithm of Simpson's 1/3 Rule to solve numerical integration.