



RN-6207

**B. E. II (Sem. III) (Electrical) Examination**  
**May / June – 2010**  
**Computer Application for Electrical Engg.**

Time : 3 Hours]

[Total Marks : 100

**Instruction :**

(1)

नीचे दर्शाविए निशानीवाणी विगतो उत्तरवही पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. 2 (Sem. 3) (Electric)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Computer Application for Electrical Engg."/>	<input type="text"/>
Subject Code No. : <input type="text" value="6"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="7"/>	<input type="text"/>
Section No. (1, 2,.....) : <input type="text" value="1&amp;2"/>	
	Student's Signature

- (2) Attempt **all** questions.
- (3) Answer to both the sections must be written in **separate** answer books.
- (4) Assume suitable data if required.
- (5) Figures to the **right** indicate full marks.
- (6) Students may use casio MS-100, 100-W or equivalent scientific calculators.
- (7) Use radian mode whenever it is required.

**SECTION - I**

- 1 (a) (1) Write down rules to round off a number to n-significant digits. 2
- (2) Write down the types of equations : 2
  - (i)  $xe^x - x\sin x = 0$
  - (ii)  $x^5 + 2x^4 + 3x^3 + x^2 + 1 = 2$ .
- (3) For  $f(x) = x^3 + x - 1$ , find the interval that contain the root. 2
- (4) Define the term relative error. 2
- (5) Write the formula for  $(i+1)^{th}$  approximation for false position method. 2
- (b) (i) Explain Bisection method for finding the roots of a polynomial. 4

(ii) The function  $\exp(x) = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots + \frac{x^{(n-1)}}{(n-1)!}$ . Find **6**  
 n such that series determines,  $\exp(0.3)$  correct up  
 to 9 decimal places.

**2** (a) Develop an algorithm and "C" program to determine **10**  
 root of non-linear equation using secant method.

**OR**

**2** (a) Use bisection method to determine the root of **10**  
 $x^3 - 4x - 9 = 0$  in interval (2.625, 2.75) correct to 4  
 significant digits.

(b) Calculate first three iterations using Newton-Raphson **5**  
 method for  $x^3 - x - 4 = 0$ . Take initial approximation as 2.

**OR**

(b) Develop an algorithm to find root of non-linear **5**  
 equation using Bisection method.

**3** (a) Solve the following set of equations using Gauss- **8**  
 elimination method and find  $x_1, x_2, x_3$  correct to 3 decimal  
 points :

$$2x_1 + 8x_2 + 2x_3 = 14$$

$$x_1 + 6x_2 = x_3 = 13$$

$$2x_1 - x_2 + 2x_3 = 5$$

**OR**

**3** (a) Solve the above numerical of Q;3(a) with **8**  
 Gauss-Jordan method and find  $x_1, x_2$  and  $x_3$  correct to  
 3 decimal point.

(b) Solve the following system of equations by Jacobi's **7**  
 method and find  $x_1, x_2$  and  $x_3$  correct up to four significant  
 digits :

$$20x_1 + x_2 - 2x_3 = 17$$

$$3x_1 + 20x_2 - x_3 = -18$$

$$2x_1 - 3x_2 + 20x_3 = 25.$$

**OR**

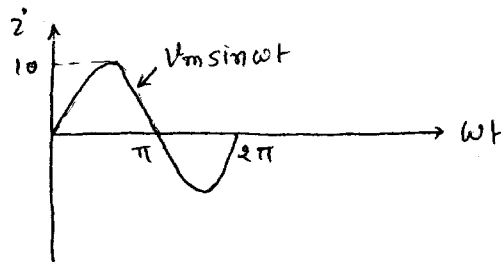
(b) Solve the above set of equation from Q.3(b) using **7**  
 Gauss-Seidel method. Find the value of  $x_1, x_2$  and  $x_3$   
 correct up to four significant digits.

## SECTION – II

- 4 (A) Attempt ALL questions. 10
- 1 What is the condition to select number of strip to solve numerical integration using following methods. 2
    1. Simpson's 1/3 Rule
    2. Simpson's 3/8 Rule
  - 2 Construct a Newton's Forward Difference Table for the four set of data. 2
  - 3 Define Term Interpolation & Extrapolation. 2
  - 4 What is the advantage of Runge Kutta Second Order Method over Runge Kutta Second Fourth method to solve ordinary differential equation? 2
  - 5 What is the importance of initial values to solve any ordinary differential equation? 2

- 4 (B)
- 1 Find the average value of the following waveform. Use Trapezoidal Rule of Integration for this. 5

Fig : Q-1(B) I



- 2 Write an algorithm for Modified Euler's method for solving an ordinary differential equation. 5
- 5 (A) The following test results were obtained from a test on 400 volt D.C. series motor. 8

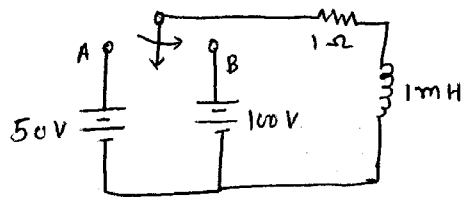
Current (Amp)	15	25	35	45	55
Torque (N-M)	125	228.5	340	450	565

Find torque when current is 46 Amp. Use Proper Newton's difference interpolation formula.

- 5 (B) Write a "C" programme to solve numerical integration using Simpson's 1/3 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 Runge Kutta Second order method to solve this problem. Step Size : 0.1 8



5 (B) Write an algorithm of Newton's Divided Difference Interpolation technique. 7  
Mention the meaning of each variable used

6 1 Find the Lagrange Interpolation Polynomial to fit the following data. 15

X	1	3	4	6
Y	-3	0	30	132

2 Solve the initial value problem using Euler's Method.

$$y \, dy / dx = x + y \quad y(0) = 1.5 \quad \text{Step size : } 0.1 \quad 0 < x < 0.2$$

3 Evaluate the integral of the following function using Simpson's 3/8 rule.

$$\int_0^1 \frac{1}{(1+x^2)} \, dx. \quad \text{No of intervals equals to three.}$$

4 Write an algorithm to solve ordinary differential equation using Runge Kutta Forth order method.