DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103
End Semester Examination – May - 2019

Branch: Electrical and Electronics Engineering   **Sem.:- IV**
Subject with Subject Code:- Numerical Methods and Programming (BTEEC404)
Date:- 22-05-2019   **Marks: 60**   **Time:- 3 Hr.**

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Instructions to the Students
       1. Each question carries 12 marks.
       2. Attempt **any five** questions of the following.
       3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
       4. If some part or parameter is noticed to be missing, you may appropriately
         assume it and should mention it clearly

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(Marks)

Q.1. Answers the following.   **(12)**
   a) Define variable and what are the rules for giving name to variable in MATLAB?
   b) Define FOR loop, write syntax and explain with example?

Q.2. Solve the following. (4 marks each)   **(12)**
   a) Round off the following numbers correct to four significant figures and compute
Absolute error, Relative error and Percentage error?
     (i) 3.26435   (ii) 865830

   b) Use the series $\log_e \left(\frac{1+x}{1-x}\right) = 2(x + \frac{x^3}{3} + \frac{x^5}{5} + \cdots)$ to compute the value of
$log(1.2)$ correct to four decimal places.
   c) Find the approximate value of $Sin\ 25°$ correct to four significant digits using sine
series.

Q.3. Solve <u>any two</u> of the following (6 marks each)   **(12)**
   a) Evaluate $\int_0^6 \frac{dx}{1+x^2}\,dx$ correct to 3 decimal places by Simpson's 3/8 [th] Rule.
   b) What are MATLAB functions for Numerical integration, explain any one with
example?
   c) Given

x	0	0.1	0.2	0.3	0.4	0.5	0.6
y	30.13	31.62	32.87	33.64	33.95	33.81	33.24

Find $\frac{dy}{dx}$ at $x = 0$,

Q.4. Solve the following . **(12)**

a) Solve the following simultaneous linear equations using Gauss elimination method.

$2x_1 + x_2 + 2x_3 + x_4 = 6$; $4x_1 + 3x_2 + 3x_3 - 3x_4 = -1$;

$6x_1 - 6x_2 + 6x_3 + 12x_4 = 36$; $2x_1 + 2x_2 - x_3 + x_4 = 10$.

b) Find the roots of the equation Newton-Raphson Method $4x^2 - 3 = 0$.

Q.5. Solve <u>any two</u> of the following (6 marks each) **(12)**

a) Use nonlinear regression to fit a parabola to the following data.

x	0.2	0.5	0.8	1.2	1.7	2	2.3
y	500	700	1000	1200	2200	2650	3750

b) An experiment to measure the intensity of light as a function of the distance from the source of the light produced the following data. Find the best fit exponential function $=$ e^{ax+b} , by least squares approximation.

X(distance)	30	35	40	45	50	55	60	65	70
Y (intensity)	0.85	0.67	0.52	0.42	0.34	0.28	0.24	0.21	0.18

c) Explain with example, the following MATLAB functions, (i) pchip, (ii) lsqnonlin .

Q.6. Solve the following. **(12)**

a) Solve the following ordinary differential equation by forth order Runge-Kutta Method.

$\frac{dy}{dx} = \frac{y^2+x^2}{2xy}$, $y(1) = 2$. Find the $y(1.4)$

b) Solve the following ordinary differential equation by Euler's Explicit Method.

$\frac{dy}{dx} = \frac{x-y}{x+y}$, $x_0 = 0, y_0 = 1$. Find the solution at $x = 0.2$ with step-size $h = 0.1$

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103
Supplementary Winter Semester Examination – Dec. - 2019

Branch: Electrical and Electronics Engineering   **Sem.:- IV**
Subject:- Numerical Methods and Programming (BTEEC404)   **Marks: 60**
Date:- 02-12-2019   **Time:- 3 Hr.**

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Instructions to the Students
1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

(Marks)

Q.1. Answer the following (12)
a) What is MATLAB? Explain any six standard functions used in MATLAB.
b) Explain different array operations using MATLAB.

Q.2. Answer the following (12)
a) Illustrate different types of errors with suitable example.

b) Approximate the function $f(x)=\cos(x)$ at $x_{i-1}=\dfrac{\pi}{3}$ on the basis of the value of $f(x)$ and its

derivatives at $x_i=\dfrac{\pi}{4}$. Use Taylors series expansion with n=0 to 6.

Q.3. Answer any TWO the following (6 Marks each) (12)
a) Find the value of $\cos(x)\,at\,x=1.74$ from data given as:

x	1.7	1.74	1.78	1.82	1.86
$\sin(x)$	0.9916	0.9857	0.9781	0.9691	0.9584

b) Illustrate Trapezoidal rule and Simpsons One-Third rule for Numerical Integration.

c) Apply the Trapezoidal Rule to estimate the value of $\int_{0}^{2} e^{x^2}\,dx$ taking the the   number 10 intervals.

Q.4. Answer any TWO the following (6 Marks each) (12)
a) Apply Gauss Elimination method to solve the equations:
$$x+4y-z=-5$$
$$x+y-6z=-12$$
$$3x-y-z=4$$
b) Illustrate Iterative methods for solving Linear equations.

c) Use the Newton-Raphson method to estimate the root of $f(x)=e^{-x}-x$, employing the $x_0=0$.

Q.5. Answer any TWO the following (6 Marks each)　　　　　　　　　　　　(12)
a) Fit a straight line to the following set of data. Also plot the line.

x	1	2	3	4	5
y	3	4	5	6	7

b) Estimate the Lagrange interpolation polynomial to fit the following data

i	0	1	2	3
x_i	0	1	2	3
$e^{x_i}-1$	0	1.7183	6.3891	19.0855

Use the polynomial to estimate the value of $e^{1.5}$.

c) Explain the MATLAB function **spline** and **pchip** with suitable example.

Q.6. Answer the following　　　　　　　　　　　　　　　　　　　　　(12)
a) Determine an approximate value of y corresponding to $x=1$, using Euler's metod.

　Given that $\frac{dy}{dx}=x+y$ and $y=1\ when\ x=0.$

b) Apply Runge-Kutta fourth order method to solve $\frac{dy}{dx}=\frac{y^2-x^2}{y^2+x^2}$ with $y(o)=0$ at $\quad x=0.2, 0.4.$

Paper End

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Semester Examination – May/June - 2019

Branch: Electronics and Telecommunication Engg.   **Sem.:-IV**

Subject with Subject Code:-NMCP (BTBSC406)

Marks:60   **Date: 24-05-2019**   **Time:- 3 Hr.**

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

(Marks)

Q.1.   Solve the following questions (Any3)

 a) Round off the number 37.46381 correct upto four Significant figures and find absolute error, relative error and percentage relative error.   (4)

 b) Find absolute error if the number X= 0.00545828 is
   a) truncated to 3 decimal digits
   b) rounded off to 3 decimal digits.   (4)

 c) Define Inherent error and truncation error with examples.   (4)

 d) Define absolute error in addition operation and absolute error in   (4)

    multiplication operation.

Q.2. Solve the following questions (Any 2)

 a) If $xlog_{10}x = 1.2,$ find real root by Regula-Falsi method.   (6)

 2) If $x^2 - e^{-x} = 0,$ find real root by Newton Raphson method.   (6)

 3) Solve by Gauss Seidal Method the system of equations

$$7x + 2y + 4z = 16$$
$$2x + y + 7z = 10$$
$$2x + 3y + 5z = 2$$

                                                                                        (6)

Q.3. Solve the following questions (Any 3)

 1) Fit the curve of type $y = a + bx^2$ that fits the following data   (4)

x	0	1	2	3
y	2	4	10	15

2) **Find** i)$\Delta^n e^x$ ii) **Prove that** $\Delta = \mu\delta + \frac{1}{2}\delta^2$ (4)

3) **Evaluate f(9) by using Newton's divided difference formula for** (4)

x	5	7	11	13	17
f(x)	150	392	1452	2366	5202

4) **Find cubic polynomial which takes the following values** (4)
and find f(4).

x	0	1	2	3
f(x)	1	2	1	10

Q.4. Solve the following questions (Any 2)

1) **Evaluate** $\int_0^6 \frac{dx}{1+x^2}$ **by using a) Trapezoidal rule and** (6)
b) Simpson's 1/3 rd Rule

2) **If** $\frac{dy}{dx} = x + y^2$ **, y(0)=1 , then determine y(0.02) and y(0.04)**
by Euler's modified method. (6)

3) **If** $\frac{dy}{dx} = \sqrt{(x+y)}$ **, y(0)=1, then determine y(0.2) by 4th order**
Runge-Kutta method. (6)

Q.5. Solve the following questions (Any 3)

a) **Explain input and output operators cin and cout with the help**
of C++ example (4)

b) **With the help of suitable C++ example explain the concept of**
inline function. (4)

c) **Write a program to explain the concept of class and object** (4)

d) **Explain the concept of function overloading with the help of**
C++ example (4)

Q.6. Solve the following questions in detail.

a) **What is inheritance? What are the different types of inheritance?**
Draw the block diagram of each type of inheritance?
Explain any one type of inheritance in detail. (6)

b) **Write and explain a program for overloading of unary operator**
to overload minus(-) operator. (6)

Course: B. Tech.   Branch : ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Semester : IV   (PATTERN 2017)

Subject Code & Name: BTBSC406 Numerical Methods & Computer Programming

Max Marks: 60

Date: **Duration: 3.00 Hr.**

Instructions to the Students:
   *1. Solve any **FIVE** questions*
   2. Draw neat diagram wherever necessary.
   3. Figures to right indicates full marks
   4. Assume suitable data wherever necessary and mention it clearly

		Marks
Q. 1	**Solve the following.**	
A)	Find absolute error if the number X=0.00599826 is i) Truncated to four decimal digits ii) Rounded off to four decimal digits	**06**
B)	If $X^2 – e^{-X} = 0$, find real root by Newton Raphson method	**06**
Q.2	**Solve the following.**	
A)	Solve the following by Gauss elimination method 2x+y+z = 10 3x+2y+3z =18 X+4y+9z = 16	**06**
B)	Define Errors. Explain different types of errors occur in numerical computations	**06**
Q. 3	**Solve the following.**	
A)	Given the values X : 5 7 11 13 17 F(X) : 150 392 1452 2366 5202 Evaluate f(9) using i) Lagrange's formula ii) Newton's divided difference formula	**12**
Q.4	**Solve the following.**	
A)	Apply Runge kutta 4th order method to find approximate value of y for x =0.2 in steps of 0.1, if dy/dx = x+y^2 given that y=1 where x =0.	**06**
B)	Employ Taylor's method to obtain approximate value of y at x =0.2 for the differential equation dy/dx =2y + 3e^x, y(0) =0	**06**
Q. 5	**Solve the following.**	
A)	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using i) Trapezoidal rule ii) Simpson's 1/3rd rule iii) Simpson's 3/8th rule	**12**
Q.6	**Solve the following.**	
A)	. Apply Lagrange's formula inversely to obtain a root of the equation f(x)=0, given that f(30)= -30,f(34)= -13, f(38) =3, f(42) =18	**06**
B)	Solve the following equations by LU decomposition (Factorization method) 2x+3y+z = 9 X+2y+3z = 6 3x+y+2z =8	

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech.   Branch: Electronics & Telecom./EXTC (Sandwich)   Semester: IV

Subject Code & Name: BTETPE405A/ BTEXPE405A   Numerical Method &

Computer Programming

Max Marks: 60   Date:27/08/2022   Duration: 3.45 Hr.

Instructions to the Students:
1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	An approximate value of is given by $X1=\frac{22}{7}=3.142857$ and its true value is $X=3.1415926$ find the absolute and relative errors.	CO-1	6
B)	Three approximate values of the number $\frac{1}{3}$ are given as 0.30, 0.33, 0.34. which of these three is the best approximation?	CO-1	6
C)	Evaluate the sum $S=\sqrt{3}+\sqrt{5}+\sqrt{7}$ to 4 significant digits and find its percentage error?	CO-1	6
Q.2	**Solve Any Two of the following.**		
A)	Find a root of an equation $f(x)=x^3-3$ using Bisection method	CO-2	6
B)	Find real root of the equation $x=e^{-x}$ using the Newtons Rapson method	CO-2	6
C)	Find a root of an equation $f(x)=x^3-x-1$ using False Position method (Regula false method)	CO-2	6
Q. 3	**Solve Any Two of the following.**		
A)	Find the polynomial f (x) by using Lagrange's formula and hence find f (3) for	CO-3	6

x	0	1	2	5
F(x)	2	3	12	147

B) From the following table, estimate the number of students who obtained marks between 40 and 45   CO-3   6

marks	40—50	50—60	60—0	30—40	30—40
No of students	31	42	51	35	31

C) Using Gauss backward difference formula, find y (8) from the following   6

table

x	0	5	10	15	20	25
y	7	11	14	18	24	32

CO-3

Q.4 Solve Any Two of the following.

A) Value of f(x) in the interval [0,4] are given   CO-1   6

x	0	1	2	3	4
F(x)	3	10	21	36	55

Using Simpson's 1/3 rule with the step size of 1. The value of $\int_0^4 f(x)dx =?$

B) The value of solution f(x) at 5 discreate points are given using trapezoidal   CO-1   6

rule with step size of 0.1. find all the value of $\int_0^{0.4} f(x)dx =?$

x	0	0.1	0.2	0.3	0.4
F(x)	0	10	40	90	160

C) Determine the value of y when x=0.1 given that y (0) =1 and   CO-1   6

$\frac{dy}{dx} = x^2 + y$ h=0.05 using modified Euler's method

Q. 5 Solve Any Two of the following.

A) Explain Basic concept of OOPS   CO-6   6

B) Explain data types in c++   CO-6   6

C) What is the basic structure of c++ program? Explain with example.   CO-7   6

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular & Supplementary Summer 2024

Course: B. Tech.   Branch : Electronics & Telecommunication Engineering /

Electronics & Communication Engineering/ Electronics Engineering   Semester : IV

Subject Code: BTETPE405A / BTEXPE405A

Subject Name: Numerical Methods and Computer Programming

Max Marks: 60   Date: 24/06/2024   Duration: 3 Hr.

Instructions to the Students:
1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Explain the term with help of suitable example 1. Round-off error 2. Relative error 3. Truncation error	CO-1	6
B)	Explain the term 1. Error Estimation 2. Error propagation	CO-1	6
C)	An approximate value of π is given by $x1 = 22/7 = 3.142857$ and its true value is $x = 3.1415926$ find the relative error	CO-2	6
Q.2	**Solve Any Two of the following.**		**12**
A)	Find the real root of the equation $e^x \cos x = 1.2$ up to 3 decimal accuracy assume root lies between 0 and 1 . Use Bisection Method	CO-2	6
B)	Use Newton Raphson method find the root $x^4 - x - 10 = 0$ which is near to $= 2$	CO-2	6
C)	Solve the following system by Gauss Seidel Method $10x - 5y - 2z = 3$ $4x - 10y + 3z = -3$ $x + 6y + 10z = -3$	CO-2	6
Q. 3	**Solve Any Two of the following.**		**12**
A)	Using stirling's formula, find y (35) from the following table	CO-2	6

x	20	30	40	50
y	512	439	346	243

B) Using Newton Divided difference formula find the values of f(2), f(8), f(15) form the following table   CO-2   6

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

C) Find y (10) from the following table , by using Lagrange's interpolation formula   CO-2   6

x	5	6	9	11
y	12	13	14	16

Q.4 Solve Any Two of the following.   12

A) Evaluate $\int_0^3 2x - x^2 \, dx$, taking 6 intervals by Trapezoidal rule   CO-2   6

B) Evaluate $\int_{1.3}^{2.5} x + 2sinx \, dx$, taking 12 strips by Simpson's 3/8th rule   CO-2   6

C) Find y (2.2) by using Euler's method for $\frac{dy}{dx} = xy^2$ where y (2) = 1. consider h = 0.1   CO-4   6

Q. 5 Solve Any Two of the following.   12

A) Explain difference between constructor and destructors with example   CO-2   6

B) Explain function overloading   CO-2   6

C) Explain application of OOP   CO-2   6

*** End ***