Course Name

Assignment 1

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20ETCS002140

3^{rd} Semester, 2020

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Course Code	:	20XYZ123
Course Title	:	Course Name
Program	:	B.Tech in Computer Science
Department	:	Computer Science
Faculty	:	Dr. etc

RAMAIAH UNIVERSITY OF APPLIED SCIENCES

Faculty of Mathematical and Physical Sciences

Department	:	Mathematics & Statistics
Programme	:	B. Tech.(All Branches)
Semester/Batch	:	3/2020
Course Code	:	20MTB201A
Course Title	:	Engineering Mathemtics - 3

Instructions to students:

i The assignment consists of 5 questions all carries equal marks

ii Maximum marks is 25

iii Answer the assignment questions in a Blue Book

iv **Attach printouts of program codes and graphs in Blue Book**

v **Submit the blue book to respective course leader**

vi **Submission Date: 22nd November 2021**

vii **Submission after the due date is not permitted**

viii **IMPORTANT:** It is essential that all the sources used in preparation of the assignment must be suitably referenced in the text

Assignment

Question No.	Questions	Marks	CO's
1	Determine the half range Fourier cosine series of the following function: $$f(x) = \begin{cases} \frac{1}{4} - x, & 0 < x < \frac{1}{2} \\ x - \frac{3}{2}, & \frac{1}{2} < x < 1. \end{cases}$$	5	3
2	A sinusoidal voltage $E\sin(\omega t)$, where t is time, is passes through a half-wave rectifier that clips the negative portion of the wave. Determine the Fourier series expantion of the resulting period function $$v(t) = \begin{cases} 0 & \text{if } \frac{-L}{2} < t < 0 \\ E\sin(\omega t) & \text{if } 0 < t < \frac{L}{2}, \end{cases} \qquad v(t+L) = v(t).$$	5	3

<table>
<tr><td>3</td><td>The temperature in the big hall is approximated by the function
$$T(x,y,z) = x^2 - 2xyz + z^2 + 5;$$
$$0 \le x \le 2, \quad 0 \le y \le 3 \quad \text{and} \quad 0 \le z \le 2.$$
If a person located at $(1,1,1)$, in which direction he should walk to cool off as rapidly as possibly.</td><td>5</td><td>3</td></tr>
<tr><td>4</td><td>Assume a cricket team is defending the target of 151 runs in T20 world cup. The following table represents overs taken by cricket team to complete different score levels to defend the target 151.
<table><tr><td>Overs</td><td>4</td><td>8</td><td>11</td><td>16</td><td>18</td></tr><tr><td>Score</td><td>24</td><td>52</td><td>80</td><td>128</td><td>151</td></tr></table>
i Obtain the interpolating polynomial of the given data by Lagrange's interpolation
ii Obtain overs taken by cricket team to complete 90 runs
iii Plot the given data points and interpolating polynomial in the same graph using MATLAB
iv Comment on the given data and graph</td><td>5</td><td>3&4</td></tr>
<tr><td>5</td><td>The bacteria concentration in a reservoir varies as
$$C = 4e^{-2t} + e^{-0.1t}.$$
i Write MATLAB Program for Newton-Raphson method
ii Calculate the time required for the bacteria concentration to be 0.5.
iii Plot the bacteria concentration C versus t in the interval $[0, 10]$ and mark the value obtained in i. in the same graph usign MATLAB.
iv Comment on the graph.</td><td>5</td><td>5</td></tr>
</table>

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