

PART-A

S. No	Questions	Marks	UNIT	CO	Cognitive level
1	A) Write Gauss's Backward & Gauss's Forward Interpolation Formula	2	III	C217.4	Remember
	B) Write Trapezoidal rule & Simpson's (1/3) Rule	2	IV	C217.5	Remember
	C) Write normal equations to fit a straight line & parabola	2	IV	C217.5	Remember
	D) Write R-K second order & R-K fourth Order formulae	2	V	C217.6	Remember
	E) Solve numerically using Euler's method $y' = y^2 + x$, $y(0) = 1$. Find $y(0.1)$	2	V	C217.6	Apply

PART-B

S. No	Questions	Marks	UNIT	CO	Cognitive level														
2	A) Using Gauss's Backward difference formula, find $y(8)$ from the following table <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0</td> <td>5</td> <td>10</td> <td>15</td> <td>20</td> <td>25</td> </tr> <tr> <td>y</td> <td>7</td> <td>11</td> <td>14</td> <td>18</td> <td>24</td> <td>32</td> </tr> </table>	x	0	5	10	15	20	25	y	7	11	14	18	24	32	5	III	C217.4	Apply
	x	0	5	10	15	20	25												
y	7	11	14	18	24	32													
B) Using Newton's Forward Interpolation Formula find the value of $f(1.6)$ for the following data <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>1</td> <td>1.4</td> <td>1.8</td> <td>2.2</td> </tr> <tr> <td>f(x)</td> <td>3.49</td> <td>4.82</td> <td>5.96</td> <td>6.5</td> </tr> </table>	x	1	1.4	1.8	2.2	f(x)	3.49	4.82	5.96	6.5									
x	1	1.4	1.8	2.2															
f(x)	3.49	4.82	5.96	6.5															
3	A) Find $y(10)$, given that $y(5) = 12$, $y(6) = 13$, $y(9) = 14$, $y(11) = 16$ using Lagrange's formula	5	III	C217.4	Analyze														
	B) Use Stirling's interpolation formula to find the value of y at $x = 35$ from the following table <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>20</td> <td>30</td> <td>40</td> <td>50</td> </tr> <tr> <td>y</td> <td>512</td> <td>439</td> <td>346</td> <td>243</td> </tr> </table>	x	20	30	40	50	y	512	439	346	243	5	III	C217.4	Apply				
x	20	30	40	50															
y	512	439	346	243															
4	A) Fit a parabola of the form $y = a + bx + cx^2$ to the following data <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td>1</td> <td>1.8</td> <td>1.3</td> <td>2.5</td> <td>6.3</td> </tr> </table>	x	0	1	2	3	4	y	1	1.8	1.3	2.5	6.3	5	IV	C217.5	Evaluate		
	x	0	1	2	3	4													
y	1	1.8	1.3	2.5	6.3														
B) Find the first and second derivatives of the function tabulated below at the point $x = 1.5$ <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>1.5</td> <td>2.0</td> <td>2.5</td> <td>3.0</td> <td>3.5</td> <td>4.0</td> </tr> <tr> <td>y</td> <td>3.375</td> <td>7.0</td> <td>13.625</td> <td>24.0</td> <td>38.875</td> <td>59.0</td> </tr> </table>	x	1.5	2.0	2.5	3.0	3.5	4.0	y	3.375	7.0	13.625	24.0	38.875	59.0					
x	1.5	2.0	2.5	3.0	3.5	4.0													
y	3.375	7.0	13.625	24.0	38.875	59.0													
5	A) Solve $y' = y - x^2$, $y(0) = 1$ by Picard's method up to the fourth approximation. Hence find the value of $y(0.1)$, $y(0.2)$	5	V	C217.6	Apply														
	B) Find $y(0.1)$ and $y(0.2)$ using R-K fourth order formula given that $y' = x^2 - y$ and $y(0) = 1$	5	V	C217.6	Analyze														

PART-A

S. No	Questions	Marks	UNIT	CO	Cognitive level
1	A) Write Stirling's formula	2	III	C217.4	Remember
	B) Write Gauss's Forward & Backward Interpolation Formula	2	III	C217.4	Remember
	C) Write Simpson's (3/8) & Simpson's (1/3) Rule	2	IV	C217.5	Remember
	D) Write normal equations to fit a parabola & Straight line	2	IV	C217.5	Remember
	E) Write the general formula of Picard's method of successive approximations	2	V	C217.6	Remember

PART-B

S. No	Questions	Marks	UNIT	CO	Cognitive level														
2	A). Using Gauss's backward difference formula, find $y(8)$ from the following table <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0</td> <td>5</td> <td>10</td> <td>15</td> <td>20</td> <td>25</td> </tr> <tr> <td>y</td> <td>7</td> <td>11</td> <td>14</td> <td>18</td> <td>24</td> <td>32</td> </tr> </table>	x	0	5	10	15	20	25	y	7	11	14	18	24	32	5	III	C217.4	Apply
	x	0	5	10	15	20	25												
y	7	11	14	18	24	32													
B) Applying Newton's forward interpolation formula, compute the value of $\sqrt{5.5}$, given that $\sqrt{5} = 2.236$, $\sqrt{6} = 2.449$, $\sqrt{7} = 2.646$ and $\sqrt{8} = 2.828$ Correct up to three places of decimal	5	III	C217.4	Apply															
3	Find $y(12.2)$ by Stirling's formula from the following data <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> </tr> <tr> <td>y</td> <td>0.23967</td> <td>0.28060</td> <td>0.31788</td> <td>0.35209</td> <td>0.38368</td> </tr> </table>	x	10	11	12	13	14	y	0.23967	0.28060	0.31788	0.35209	0.38368	5	III	C217.4	Analyze		
x	10	11	12	13	14														
y	0.23967	0.28060	0.31788	0.35209	0.38368														
4	A) Fit a least squares quadratic curve to the following data <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td>1.7</td> <td>1.8</td> <td>2.3</td> <td>3.2</td> </tr> </table> Estimate $y(2.4)$	x	1	2	3	4	y	1.7	1.8	2.3	3.2	5	IV	C217.5	Evaluate				
	x	1	2	3	4														
	y	1.7	1.8	2.3	3.2														
B) Dividing the range into 10 equal parts, find an approximate value of $\int_0^{\pi/2} \sin x \, dx$ by a) Trapezoidal rule b) Simpson's rule	5	IV	C217.5	Evaluate															
5	A) Solve $y' = x^2 - y$, $y(0) = 1$ using Taylor's series method and compute $y(0.1)$, $y(0.2)$, $y(0.3)$ and $y(0.4)$ (correct to 4 decimal places)	5	V	C217.6	Apply														
B) Solve $\frac{dy}{dx} = x - y$, $y(1) = 0.4$. Find $y(1.2)$ using R-K method	5	V	C217.6	Apply															

PART – A

S. No	Questions	Marks	UNIT	CO	Cognitive level
1.	A) Write Newton's Forward & Backward Interpolation Formula	2	III	C217.4	Remember
	B) Write Gauss's Forward & Backward Interpolation Formula	2	III	C217.4	Remember
	C) Write Trapezoidal rule & Simpson's Rule	2	IV	C217.5	Remember
	D) Write normal equations to fit a straight line & parabola	2	IV	C217.5	Remember
	E) Write R-K second & fourth order formula	2	V	C217.6	Remember

PART-B

S. No	Questions	Marks	UNIT	CO	Cognitive level																
2	A) Find by Gauss's Backward interpolating formula the value of y when $x = 1936$ Using the following table <table border="1" style="margin-left: 20px;"> <tr> <td>X</td> <td>1901</td> <td>1911</td> <td>1921</td> <td>1931</td> <td>1941</td> <td>1951</td> </tr> <tr> <td>Y</td> <td>12</td> <td>15</td> <td>20</td> <td>27</td> <td>39</td> <td>52</td> </tr> </table>	X	1901	1911	1921	1931	1941	1951	Y	12	15	20	27	39	52	5	III	C217.4	Analyze		
	X	1901	1911	1921	1931	1941	1951														
Y	12	15	20	27	39	52															
	B) Given $u_1 = 22, u_2 = 30, u_4 = 82, u_7 = 106, u_8 = 206$, find u_6 . Using Lagrange's formula	5	III	C217.4	Apply																
3	Find $f(16)$ by Stirlings formula from the following data <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0</td> <td>5</td> <td>10</td> <td>15</td> <td>20</td> <td>25</td> <td>30</td> </tr> <tr> <td>y</td> <td>0</td> <td>0.0875</td> <td>0.1763</td> <td>0.2679</td> <td>0.364</td> <td>0.4663</td> <td>0.5774</td> </tr> </table>	x	0	5	10	15	20	25	30	y	0	0.0875	0.1763	0.2679	0.364	0.4663	0.5774	10	III	C217.4	Analyze
	x	0	5	10	15	20	25	30													
y	0	0.0875	0.1763	0.2679	0.364	0.4663	0.5774														
	A) Fit a straight line to the following data <table border="1" style="margin-left: 20px;"> <tr> <td>X</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Y</td> <td>1</td> <td>1.8</td> <td>3.3</td> <td>4.5</td> <td>6.3</td> </tr> </table>	X	0	1	2	3	4	Y	1	1.8	3.3	4.5	6.3	5	IV	C217.5	Evaluate				
X	0	1	2	3	4																
Y	1	1.8	3.3	4.5	6.3																
	B) Evaluate $\int_0^{0.6} e^{-x^2} dx$ using Simpson's one third rule Taking seven ordinates	5	IV	C217.5	Evaluate																
5	A) Using Modified Euler's method find $y(0.2)$ and $y(0.4)$ given $y' = y + e^x, y(0) = 0$	5	V	C217.6	Apply																
	B) Given that $\frac{dy}{dx} = \frac{xy}{1+x^2}, y(0) = 1, h = 0.1$. Find y at $x=0.1$ Using Runge-Kutta method	5	V	C217.6	Apply																

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S. No	Questions	Marks	UNIT	CO	Cognitive level
1	A) Write Newton's Forward & Backward Interpolation Formula	2	III	C217.4	Remember
	B) Write Gauss's Forward & Backward Interpolation Formula	2	III	C217.4	Remember
	C) Write Simpson's (1/3) & Simpson's (3/8) Rule	2	IV	C217.5	Remember
	D) Write normal equations to fit a parabola & Straight line	2	IV	C217.5	Remember
	E) Write Taylor's series expansion	2	V	C217.6	Remember

PART-B

S. No	Questions	Marks	UNIT	CO	Cognitive level													
2	A) Applying Newton's forward interpolation formula, compute the value of $\sqrt{5.5}$, given that $\sqrt{5} = 2.236$, $\sqrt{6} = 2.449$, $\sqrt{7} = 2.646$ and $\sqrt{8} = 2.828$ Correct up to three places of decimal	5	III	C217.4	Apply													
	B) Find $f(22)$ from the Gauss's Forward difference formula <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>20</td> <td>25</td> <td>30</td> <td>35</td> <td>40</td> <td>45</td> </tr> <tr> <td>$f(x)$</td> <td>354</td> <td>332</td> <td>291</td> <td>260</td> <td>231</td> <td>204</td> </tr> </table>	x	20	25	30	35	40	45	$f(x)$	354	332	291	260	231	204	5	III	C217.4
x	20	25	30	35	40	45												
$f(x)$	354	332	291	260	231	204												
3	A) Find the parabola passing through points $(0,1)$, $(1,3)$, $(3,55)$ using Lagrange's interpolation formula	5	III	C217.4	Analyze													
	B) Using Simpson's $\frac{3}{8}$ rule evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by dividing the range into 6 equal parts	5	IV	C217.5	Evaluate													
4	A) Compute $f'(1)$ using the data <table border="1" style="margin-left: 20px;"> <tr> <td>y</td> <td>1.0</td> <td>1.5</td> <td>2.0</td> <td>2.5</td> <td>3.0</td> </tr> <tr> <td>x</td> <td>27</td> <td>106.75</td> <td>324</td> <td>783.75</td> <td>1621</td> </tr> </table>	y	1.0	1.5	2.0	2.5	3.0	x	27	106.75	324	783.75	1621	5	IV	C217.5	Evaluate	
	y	1.0	1.5	2.0	2.5	3.0												
x	27	106.75	324	783.75	1621													
B) Obtain a relation of the form $y = ae^{bx}$ for the following data by the method of least squares <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>y</td> <td>8.3</td> <td>15.4</td> <td>33.1</td> <td>65.2</td> <td>127.4</td> </tr> </table>	x	2	3	4	5	6	y	8.3	15.4	33.1	65.2	127.4	5	IV	C217.5	Evaluate		
x	2	3	4	5	6													
y	8.3	15.4	33.1	65.2	127.4													
5	Given $\frac{dy}{dx} = 1 + xy$, $y(0) = 1$. Find $y(0.1)$, $y(0.2)$, $y(0.3)$ using Taylor's series method	5	V	C217.6	Apply													
	B) Given that $\frac{dy}{dx} = y - x$, $y(0) = 2$, $h = 0.2$. Find $y(0.2)$ Using Runge-Kutta method	5	V	C217	Apply													