



DEPARTMENT OF MATHEMATICS

Course: NUMBER THEORY, VECTOR CALCULUS AND COMPUTATIONAL METHODS	TEST-I	Maximum marks: 50
Course code: 22MA21C	Second semester 2022-2023 Physics Cycle Branch: AI, BT, CD, CS, CY, IS, SPARK-C	Time: 9:30AM-11:00AM Date: 10-07-2023

Sl. No.	Questions	M	BT	CO														
1	<p>Details regarding marks scored by 280 candidates in an examination are given by the following table. Using Newton- Gregory interpolation formula estimate the number of candidates who secured marks between 45 and 65.</p> <table><tr><td>Marks:</td><td>Below 30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td><td>70-80</td></tr><tr><td>Number of Students:</td><td>35</td><td>49</td><td>62</td><td>74</td><td>40</td><td>20</td></tr></table>	Marks:	Below 30	30-40	40-50	50-60	60-70	70-80	Number of Students:	35	49	62	74	40	20	10	L2	2
Marks:	Below 30	30-40	40-50	50-60	60-70	70-80												
Number of Students:	35	49	62	74	40	20												
2. (a)	<p>The following table gives the relation between steam pressure and temperature.</p> <table><tr><td>T°C</td><td>361</td><td>367</td><td>378</td><td>387</td><td>399</td></tr><tr><td>P</td><td>154.9</td><td>167.9</td><td>191</td><td>212.5</td><td>244.2</td></tr></table> <p>Using suitable interpolation formula find the pressure at the temperature 372°C.</p>	T°C	361	367	378	387	399	P	154.9	167.9	191	212.5	244.2	6	L2	3		
T°C	361	367	378	387	399													
P	154.9	167.9	191	212.5	244.2													
2. (b)	<p>Given the following table of values of x and y, find using inverse interpolation the value of x when $y = 100$.</p> <table><tr><td>x</td><td>1</td><td>3</td><td>5</td><td>8</td></tr><tr><td>y</td><td>10</td><td>24</td><td>54</td><td>129</td></tr></table>	x	1	3	5	8	y	10	24	54	129	4	L2	3				
x	1	3	5	8														
y	10	24	54	129														
3. (a)	<p>The following table gives corresponding values of pressure p and specific volume v of superheated steam:</p> <table><tr><td>v</td><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td></tr><tr><td>p</td><td>105</td><td>42.7</td><td>25.3</td><td>16.7</td><td>13</td></tr></table> <p>Find the rate of change of p with respect to v at $v = 4$ and $v = 8$.</p>	v	2	4	6	8	10	p	105	42.7	25.3	16.7	13	6	L2	1		
v	2	4	6	8	10													
p	105	42.7	25.3	16.7	13													
3. (b)	<p>Solve $\frac{d^3x}{dt^3} - 8\frac{d^2x}{dt^2} + 5\frac{dx}{dt} + 50x = 0$.</p>	4	L1	1														
4	<p>Obtain the general solution of the differential equation:</p> $2\frac{d^2y}{dx^2} + \frac{dy}{dx} - y = e^{\frac{x}{2}} + \sin^2(2x) + x^2.$	10	L3	2														
5. (a)	<p>Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 13y = e^{2x} \sin(3x)$.</p>	5	L3	2														
5. (b)	<p>Solve the initial value problem $\frac{d^2x}{dt^2} + \mu x = 0$ ($\mu > 0$) given that $x = a$ and $\frac{dx}{dt} = 0$ when $t = \frac{\pi}{\sqrt{\mu}}$.</p>	5	L2	3														

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	10	25	15	00	04	31	15	--	--	--