RV College of Engineering®
Mysore Road, RV Vidyaniketan Post,
Bengaluru - 560059, Karnataka, India

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Department of Mathematics

Academic Year 2023-2024 (Even Semester 2023)

SCHEME

Date	27/06/2024	**Duration**	20 Minutes
Test	Quiz-II	**Maximum Marks**	10
Course Title	Number Theory, Vector Calculus and Computational Methods	**Course Code**	MA221TC
Semester	II	**Programs**	B.E. (AIML, BT, CD, CS, CY, IS)

Instructions: Answer all questions.

Sl. No.	Questions	M	BT	CO
1	The number of positive divisors of the integer 1448 is _____. **Ans: 8**	1	2	2
2	The velocity of a particle moving along the path $x = 1 - t^3$, $y = 1 + t^2$, $z = 2t - 5$, at $t = 1$ is _____. **Ans: $-3\hat{\imath} + 2\hat{\jmath} + 2\hat{k}$**	1	2	3
3	If $\nabla\phi = x^3yz\hat{\imath} - 2zy^2\hat{\jmath} + y^2z^3\,\hat{k}$, then $div(grad(\phi)) =$ _____. **Ans: $3x^2yz - 4yz + 3y^2z^2$**	1	2	1
4	Let $\vec{F} = x\hat{\imath} - z\hat{\jmath} + y\hat{k}$ be a vector field. Then $curl\ \vec{F} =$_____. **Ans: $2\hat{\imath}$**	1	1	2
5	The multiplicative inverse of $7\ (mod\ 23)$ is _____. **Ans: 10**	1	1	2
6	Number of solutions of the congruence $33x \equiv 22\ (mod\ 11)$ is _____. **Ans: 11**	1	2	2
7	The last digit of the integer 7^{497} is _____. **Ans: 7**	2	2	3
8	The temperature at a point (x, y, z) in the space is given by $T(x, y, z) = x^2 + y^2 - z$. A mosquito located at (1,1,2) desires to fly such a direction that it observes a maximum decrease in the temperature. The direction of maximum decrease of temperature is_____. **Ans: $-(2\hat{\imath} + 2\hat{\jmath} - \hat{k})$**	2	3	4

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Instructions: Answer all questions.

Sl. No.	Questions	M	BT	CO
1	The number of positive divisors of the integer 1457 is _____. **Ans: 4**	1	2	2
2	The velocity of a particle moving along the path $x = 1 - t^3,\ y = 1 + t^2\ \ z = 2t - 5$, at $t = 2$ is _____. **Ans:** $\mathbf{-12\hat{\imath} + 4\hat{\jmath} + 2\hat{k}}$	1	2	3
3	If $\nabla\phi = x^2z\hat{\imath} - 2y^3z^2\hat{\jmath} + xy^2z\hat{k}$, then $div(grad(\phi)) =$ _____. **Ans:** $\mathbf{2xz - 6y^2z^2 + xy^2}$	1	2	1
4	Let $\vec{F} = x\hat{\imath} + z\hat{\jmath} - y\hat{k}$ be a vector field. Then $curl\ \vec{F} =$_____. **Ans:** $\mathbf{-2\hat{\imath}}$	1	1	2
5	The multiplicative inverse of $12\ (mod\ 19)$ is _____. **Ans: 8**	1	1	2
6	Number of solutions of the congruence $42x \equiv 50\ (mod\ 76)$ is _____. **Ans: 2**	1	2	2
7	The remainder obtained when 42^{449} is divided by 17 is _____. **Ans: 8**	2	2	3
8	The temperature at a point (x, y, z) in the space is given by $T(x, y, z) = x^2 + y^2 - z^3$. A mosquito located at (1,1,1) desires to fly such a direction that it observes a maximum decrease in the temperature. The direction of maximum decrease of temperature is_____. **Ans:** $\mathbf{-(2\hat{\imath} + 2\hat{\jmath} - 3\hat{k})}$	2	3	4

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Instructions: Answer all questions.

Sl. No.	Questions	M	BT	CO
1	The number of positive divisors of the integer 1252 is _____. **Ans: 6**	1	2	2
2	The velocity of a particle moving along the path $x = 2t^2, y = t^2 - 4t, \quad z = 3t - 5$, at $t = 2$ second is _____. **Ans: $8\hat{\imath} + 3\hat{k}$**	1	2	3
3	If $\nabla\phi = x^3z\hat{\imath} - 2y^2z^2\hat{\jmath} + xy^2z^2\hat{k}$, then $div(grad(\phi)) =$ _____. **Ans: $3x^2z - 4yz^2 + 2xy^2z$**	1	2	1
4	Let $\vec{F} = y\hat{\imath} + 3x\hat{\jmath} + z\hat{k}$ be a vector field. Then $curl\ \vec{F} =$_____. **Ans: $2\hat{k}$**	1	1	2
5	The multiplicative inverse of $9\ (mod\ 31)$ is _____. **Ans: 7**	1	1	2
6	Number of solutions of the congruence $17x \equiv 9\ (mod\ 276)$ is _____. **Ans: 1**	1	2	2
7	The last two digits of the integer 21^{642} is _____. **Ans: 41**	2	2	3
8	The temperature at a point (x, y, z) in the space is given by $T(x, y, z) = x^2 - y^2 - z^2$. A mosquito located at (1,1,2) desires to fly such a direction that it observes a maximum decrease in the temperature. The direction of maximum decrease of temperature is_____. **Ans: $-(2\hat{\imath} - 2\hat{\jmath} - 4\hat{k})$**	2	3	4

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Instructions: Answer all questions.

Sl. No.	Questions	M	BT	CO
1	The number of positive divisors of the integer 3068 is _____. **Ans: 12**	1	2	2
2	For the curve $x = t, y = 2\cos t, z = -2\sin t$, the tangent vector at $t = \pi$ is _____. Ans: $\boldsymbol{\hat{i} + 2\hat{k}}$	1	2	3
3	If $\nabla\phi = x^3y^2\hat{i} - 2xy^2\hat{j} + y^2z^2\hat{k}$, then $div(grad(\phi)) =$ _____. **Ans: $3x^2y^2 - 4xy + 2zy^2$**	1	2	1
4	Let $\vec{F} = y\hat{i} - x\hat{j} + z\hat{k}$ be a vector field. Then $curl\ \vec{F} =$_____. **Ans: $-2\hat{k}$**	1	1	2
5	The multiplicative inverse of $13\ (mod\ 29)$ is _____. **Ans: 9**	1	1	2
6	Number of solutions of the congruence $20x \equiv 12\ (mod\ 30)$ is _____. **Ans: 0**	1	2	2
7	The remainder obtained when 25^{326} is divided by 12 is _____. **Ans: 1**	2	2	3
8	The temperature at a point (x, y, z) in the space is given by $T(x, y, z) = x^2 + y^3 + z$. A mosquito located at (1,1,2) desires to fly such a direction that it observes a maximum decrease in the temperature. The direction of maximum decrease of temperature is_____. **Ans: $-(2\hat{i} + 3\hat{j} + \hat{k})$**	2	3	4

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