Hall Ticket Number:

Code No. : 14701

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (CBCS) IV-Semester Bridge Course Examinations, August-2022

Matrix theory and Vector Calculus

(Common to Civil, Mechanical)

Time: 3 hours Max. Marks: **50**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10× 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Find the second derivative of $x^2 sinx$	2	2	1	1,12
2.	Evaluate $\int e^x x\, dx$	2	1	1	1,12
3.	Define Scalar point function and Gradient.	2	1	2	1,12
4.	Find the divergence of $\bar{F} = (y+z)\bar{\imath} + (z+x)\bar{\jmath} + (x+y)\bar{k}$	2	2	2	1,12
5.	State Green's theorem in the plane.	2	1	3	1,12
6.	Evaluate $\int_0^1 \int_0^2 xy\, dydx$	2	2	3	1,12
7.	Write any two elementrary row operations.	2	1	4	1,12
8.	Write any two properties of Eigen values.	2	1	4	1,12
9.	If $z = cosxy$ then find total derivative of z.	2	2	1	1,12
10.	Define Curl of a vector point function.	2	1	2	1,12
	Part-B (5×6 = 30 Marks)				
11.	If $Z = e^{ax+by}.f(ax-by)$, then Prove that $b\frac{\partial z}{\partial x} + a\frac{\partial z}{\partial y} = 2abz$	6	3	1	1,12
12. a)	Find the Directional derivative of $\emptyset = x^3 + y^3 + 3xyz$ at (1,1,1) in the direction of the vector $\bar{\imath} + 2\bar{\jmath} + \overline{k}$.	4	3	2	1,12
b)	For what value of "β" vector $\bar{F} = (x+3y)\bar{\imath} + (y-2z)\bar{\jmath} + (x+\beta z)\bar{k}$ is solenoidal vector.	2	1	2	1,12
13.	Evaluate by Stoke's theorem $\int_c \bar{F}.d\bar{r}$ where $\bar{F} = y^2\bar{\imath} + xy\bar{\jmath} - xz\bar{k}$ and c is boundary of hemi sphere $x^2 + y^2 + z^2 = a^2$ *and* $z \geq 0$	6	3	3	1,12
14.	Find Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 4 & 2 & -2 \\ -5 & 3 & 2 \\ -2 & 4 & 1 \end{bmatrix}$	6	3	4	1,12
15. a)	By using implicit differentiation Find $\frac{dy}{\partial x}$ given that $x^3 + y^3 + 3xy - 1 = 0$	3	2	1	1,12

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b)	Find the angle between the surfaces $x^2 + y^2 + z^2 - xy = 1$ *and* $x^2y + y^2z + z = 1$ at the point (1, 1, 0).	3	3	2	1,12
16. a)	Evaluate by Green's theorem $\int_c (x^2 - 2xy)dx + (x^2y + 3)dy$ Where c is boundary by $y = x^2$ *and* $y = x$.	3	3	3	1,12
b)	Solve the system $x + 2y - z = 1, x + y + 2z = 9, 2x + y - z = 2$.	3	2	4	1,12
17.	Answer any ***two*** of the following:				
a)	Evaluate $\int e^{sinx} sin2x\, dx$	3	2	1	1,12
b)	*If* $\bar{F} = y^2\bar{\imath} + xy\bar{\jmath} - xz\bar{k}$, *then* find curl of $\bar{F}$.	3	2	2	1,12
c)	Evaluate $\int_0^a \int_0^x e^{x+y}\, dydx$	3	2	3	1,12

i)	Blooms Taxonomy Level – 1	21.55%
ii)	Blooms Taxonomy Level – 2	35.38%
iii)	Blooms Taxonomy Level – 3 & 4	43.07%

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