Hall Ticket Number:

Code No. : 13711B

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (CBCS) III-Semester Main Examinations, December-2018

Bridge Course: Fundamentals of Linear Algebra and Calculus
(CSE & IT)

Time: 3 hours   Max. Marks: 50

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

Q.No.	Stem of the question	M	L	CO	PO
	Part-A (5 × 2 = 10 Marks)				
1.	Find the derivative of $y = \frac{(x+4)^2}{x-3}$	2	1	1	1
2.	Evaluate $\int_0^{\frac{\pi}{2}} \cos^8 x \sin^4 x\, dx$	2	2	2	1
3.	Define Rank of the matrix and find the Rank of $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$	2	3	3	1
4.	Find a_0 value for the function $f(x) = e^{-x}$ *in the interval* $0 < x < 2\pi$	2	3	4	1
5.	Define Half-range Sine and cosine series.	2	4	5	1
	Part-B (5 ×8 = 40 Marks)				
6. a)	Find $\frac{dy}{dx}$ if $x^4 + y^4 - a^2xy=0$	3	3	1	1
b)	If H=f(y-z ,z-x, x-y),prove that $\frac{\partial H}{\partial x} + \frac{\partial H}{\partial y} + \frac{\partial H}{\partial z} = 0$	5	4	1	1
7. a)	$\int_0^{\Pi} \log(1 + \cos x)\, dx = \Pi \log \frac{1}{2}$	4	3	2	1
b)	Evaluate $\int_0^{\Pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}} dx$	4	3	2	1
8. a)	Reduce the matrix to normal form and find its rank $\begin{bmatrix} 0 & 1 & 2 & -2 \\ 4 & 0 & 2 & 6 \\ 2 & 1 & 3 & 1 \end{bmatrix}$	4	3	3	1
b)	Show that the system of equations $\begin{bmatrix} 4 & 9 & 3 \\ 2 & 3 & 1 \\ 2 & 6 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ 2 \\ 7 \end{bmatrix}$ is inconsistent	4	4	3	1
9. a)	Obtain the Fourier series for the function $f(x) = x \sin x$ in the interval $(0, 2\pi)$.	3	3	4	1
b)	Find the Fourier series expansion for the function $f(x) = \begin{cases} \pi x, & 0 \leq x \leq 1 \\ \pi(2-x), & 1 \leq x \leq 2 \end{cases}$	5	4	4	1
10. a)	Find the Half-range sine series for $f(x) = x(\pi - x)$ in $0 < x < \pi$.	4	3	5	1
b)	Obtain the Fourier series expansion of $f(x) = 2x - x^2$ in $(0,3)$ and $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \cdots = \frac{\pi^2}{12}$	4	4	5	1

				M	L	CO	PO
11. a)	If $z = e^{ax+by} f(ax - by)$, then prove that $b\frac{\partial z}{\partial x} + a\frac{\partial z}{\partial y} = 2abz$.			4	3	1	1
b)	Prove that $\int_0^{\pi/2} sin2x\, logtan2x\, dx = 0$			4	4	2	1
12.	Answer any *two* of the following:						
a)	Find the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$			4	4	3	1
b)	Obtain the Fourier series for f(x) =e^{-x} in the interval 0 < x <2Π.			4	3	4	1
c)	Find the Half-range cosine series for the function f(x)=(x-1)^2 in the interval 0 < x <1			4	3	5	1

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	40
2	Knowledge on application and analysis (Level-3 & 4)	60
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	---

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