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199106

Sub Code:RAS103



Roll No:

(SEM I) THEORY EXAMINATION 2019-20 **ENGINEERING MATHEMATICS-I**

Time: 3 Hours

1.

2.

Paper Id:

Total Marks: 70

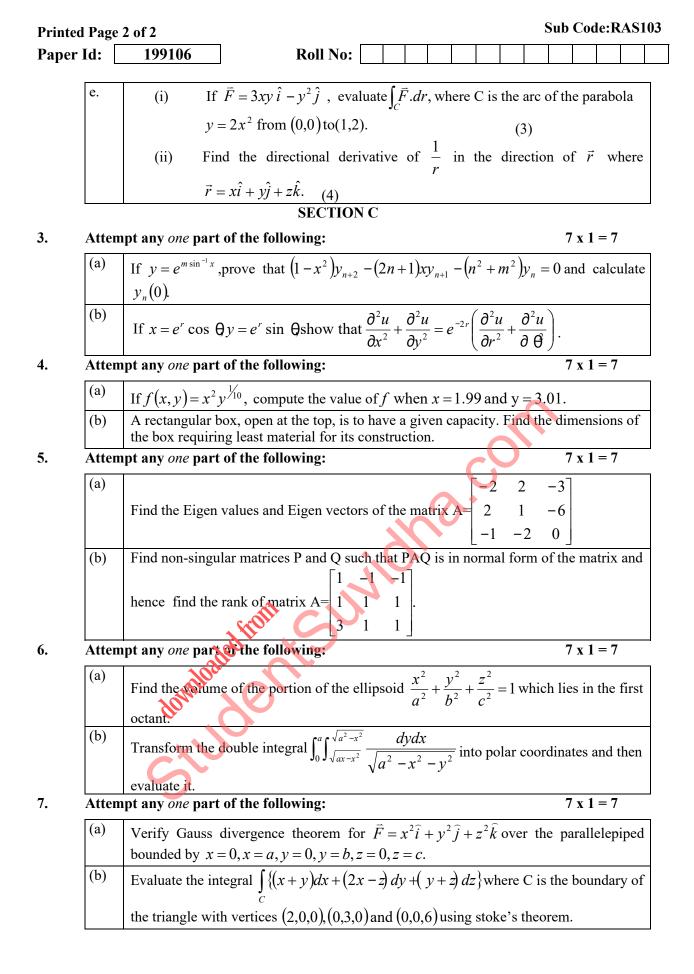
Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

Atte	mpt all questions in brief.	$2 \ge 7 = 14$
a.	For what value of ' λ ', the vectors $(1,-2, \lambda), (2,-1,5)$ and $(3,-5,7, \lambda)$ dependent.	are linearly
b.	If A is a skew-Hermitian matrix, then show that iA is Hermitian.	
c.	Find the maximum value of the function $f(x, y, z) = (z - 2x^2)$ 3xy - z + 7 = 0.	$-2y^2$)where
d.	Evaluate $\int_0^1 \int_0^{x^2} e^{\frac{y}{x}} dy dx$	
e.	Show that the vector field $\vec{V} = (\sin y + z)\hat{i} + (x \cos y - z)\hat{j} + (x - y)\hat{k}$ is	irrotational.
f.	Find the area bounded by the parabola $y^2 = 4ax$ and its latus rectum.	
g.	For the scalar field $u = \frac{x^2}{2} + \frac{y^2}{3}$, find the magnitude of gradient at the po	oint(1,3)
	SECTION B	
Atte		7 x 3 = 21
a.	(i)Express $A^6 - 4A^5 + 8A^4 - 12A^3 + 14A^2$ as a linear polynomial in A w	here
		(3)
	(ii) Reduce the matrix $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$ to diagonal form.	(4)
b.	(i)Trace the curve $r = 2a \cos \theta$ (ii)If $u = \cos ec^{-1} \left(\frac{x^{\frac{1}{2}} + y^{\frac{1}{2}}}{x^{\frac{1}{3}} + y^{\frac{1}{3}}} \right)^{\frac{1}{2}}$ prove that $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = \frac{\tan u}{144} (13 + \tan^2 u).$ (4)	(3)
c.	(i) Divide 24 into three parts such that the continued product of the fit the second and the cube of the third may be maximum. (3)	rst, square o
	(ii) If $u = x^3 + x^2 y + x^2 z - z^2 (x + y + z)$, $v = x + z$, $w = x^2 - z^2 + xy$	<i>∨ − zy</i>
	Prove that u, v and w are connected by a functional relation (4)	
d.	(i) Change the order of integration for I = $\int_{0}^{1} \int_{x^2}^{2-x} xy dx dy$ and hence	e evaluate the
	(ii) Same. (3) (ii) A triangular prism is formed by planes whose each $ay = bx, y = 0$ and $x = a$. Find the volume of the prism planes $z = 0$ and surface $z = c + xy$. (4)	-
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