OR

Show that the maximum and minimum of radii vectors of the section of the surface

Q.3 Show that $\int_0^\infty \sin x^2\, dx$ is convergent.

OR

Show that the integral $\int_a^{\pi/2} \log \sin x\, dx$ converges.

Q.4 Find the equation of the cone whose vertex is (5,4,3) and base curve $3x^2 + 2y^2 = 6,$

OR

Show that the plane cuts the cone on perpendicular lines if .

Q.5 If a langent to a circle of radius "a" is the initial line, find the equation of the circle.

OR

Show that the two conics and $\frac{l_2}{r} = 1 + e_2 \cos(\theta - \alpha)$ will touch one another if

---x---

Roll No.....................

Total No. of Sections : 03

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Annual Examination - 2019

BCA Part - III

(BCA 301)

CALCULUS, DIFFERENTIAL EQUATION, COMPUTER ARCHITECTURE

Paper - I

CALCULUS & GEOMETRY

Max.Marks : 50

Time : 3 Hrs. **Min.Marks : 20**

Note : Section 'A', containing 10 very short-answer-type questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.

[illegible]

Section - 'A'

Answer the following very short-answer-type questions in one or two sentences : **(1×10=10)**

Q.1 Write the Darboux theorem.

Q.2 Write the first mean value theorem.

Q.3 Define Absolute maximum and Absolute minimum of the functions of two variables.

Q.4 Write the Lagrange's condition for two independent variables.

Q.5 Define proper integral and improper integral.

Q.6 Write Abel's test for convergence of improper integral of second kind.

Q.7 Write the equation of right circular cone whose verterx is at origin O, axis is OY and semi vertical angle is .

Q.8 Write the condition that the cone

P.T.O.

will have three mutually perpendicular tangent planes.

Q.9 Write the polar equation of curve $2x-3y=6$.

Q.10 Write the polar equation of a straight line.

Section - 'B'

Answer the following short-answer-type questions with word limit 150-200 : **(3 5=15)**

Q.1 Let , then show that the function F defined on $[a,b]$

by is continuous on $[a,b]$.

OR

Prove that :

Q.2 Discuss the maximum or minimum values of the function $Z=x^2-y^2-3x$

OR

Find the maxima and minima of where

.

Q.3 Test the convergence of the integral

OR

Test the convergence of $\int_b^\infty \frac{x^{3/2}dx}{x^4-a^4}$

Q.4 Show that the general equation of the cone of the second degree which passes through the co-ordinate axes, is $fyz+gzx+hxy=0$

OR

Find the equation of the cylinder with generators parallel to the x-axis and passing through the curves

$lx+my+nz=\rho$

Q.5 If PSP' is the focal chord of a conic whose focus is S, then show that $\frac{1}{S\rho}+\frac{1}{S\rho'}=\frac{2}{l}$

OR

Show that the condition of the line may touch the conic $\frac{l}{r}=1+e\cos\theta$ is $(A-e)^2+B^2=1$

Section - 'C'

Answer the following long-answer-type questions with word limit 300-350 : **(5 5=25)**

Q.1 Let on then show that f is R-integrable

on and .

OR

Prove that $\left|\int_a^b \frac{\sin x}{x}dx\right| \le 2\left(\frac{1}{a}+\frac{1}{b}\right)$ where $b>a>0$.

Q.2 Find maxima and minima of the function