

Roll No.

CD-2852 (SE)

B. C. A. (Part I) EXAMINATION, 2020

Paper Second

CALCULUS AND STATISTICAL METHODS

Time : Three Hours

Maximum Marks : 50

Note : Attempt any *two* parts from each question. All questions carry equal marks. Only simple calculator is allowed.

Unit—I

1. (a) Evaluate the right hand limit and left hand limit of the function :

$$f(x) = \frac{\sin x}{x}, \text{ if } x \rightarrow$$

- (b) Test for continuity of the following function at $x =$:

$$f(x) = \begin{cases} + & x \neq \\ & x = \end{cases}$$

(c) If $f(x) = \begin{cases} \left(\right) & x \neq \\ & \text{when } x = \end{cases}$

show that $f(x)$ is continuous and differentiable at $x =$.

[2]

Unit—II

2. (a) If $x = \frac{1}{2} + \frac{1}{2} \cos 2\theta$ and $y = \frac{1}{2} - \frac{1}{2} \cos 2\theta$
show that $\frac{dy}{dx} = \tan \theta$.
- (b) Find the differentiation of the function x^{5x^3} .
- (c) If $y = \ln^{-1} x$, then prove that :

$$1 - \frac{x^2}{dx^2} - \frac{x}{dx} + \frac{1}{x} = 0$$

Unit—III

3. (a) Find the equation of the tangent line to the curve
 $x = \cos \theta$ at $\theta = \frac{\pi}{4}$.
- (b) Find the equation of the normal to the curve
 $ay^2 = x^3$ at the point (am^2, am^3) .
- (c) Investigate for what value of x ,
 $5x^6 - 3x^5 + 2x^4 - 7x^3 + 4x^2 - 1$ is a maximum or minimum.

Unit—IV

4. (a) From a bag containing 5 white, 7 red and 4 black balls a man draws 3 at random. Find the probability of being all white.
- (b) Four persons are chosen at random from a group containing 3 men, 2 women and 4 children. Show that the chance that exactly two of them will be children is $\frac{10}{21}$.

[3]

- (c) A speaks the truth in 60% and B in 75% of the cases. In what percentage of cases are they likely to contradict each other in stating the same fact.

Unit—V

5. (a) Find the mean deviation from the arithmetic mean for the following frequency distribution :

Class	Frequency
0—6	8
6—12	10
12—18	12
18—24	9
24—30	5

- (b) Find the standard deviation of the following two series. Which of these shows more variation ?

Series A	Series B
192	83
288	87
236	93
229	109
184	124
260	126
348	126
291	101
330	102
243	108

[4]

- (c) Fit a second degree parabola to the following data regarding x as an independent variable :

x	y
0	1
1	5
2	10
3	22
4	38