OR

Find $\frac{dy}{dx}$ when $x = a(t - \sin t), y = a(1 - \cos t)$.

Q.3 Show that $x^3 - 3x^2 + 6x + 7$ has no maxima or minima.

OR

Find the equation of the normal at (x, y) to the curve $xy = a^2$.

Q.4 If four whole numbers taken at random are multiplied together, show that the chance that the last digit in the product is 1, 3, 7 or 9 is $\frac{16}{625}$.

OR

Probability that a boy will pass an examination is $\frac{2}{5}$ and that for a girl it is $\frac{3}{5}$. What is the probability that at least one of them passes examination.

Q.5 Calculate the coefficient of correlation for the following ages of husband and wife :

Husband's age	23	27	28	29	30	31	33	35	36	39
Wife's age	18	22	23	24	25	26	28	29	30	32

OR

A perfect cubical dice is thrown a large number of times in sets of 8. The occurrence of 5 or 6 is called a success. In what proportion of the sets you expect 3 successes.

----x----

Roll No.....

Total No. of Section : 03

Total No. of Printed Pages : 04

Code No. : B-402(A)

Annual Examination - 2017

BCA-I

(BCA-101)

THEORETICAL FOUNDATION OF COMPUTER SCIENCE

Paper - II

CALCULUS AND STATISTICAL METHODS

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.

(Section-'A')

(Very short answer type questions. Answer in one or two lines.) (1x10=10)

Q.1 Write the value of the limit $\left(1 + \frac{1}{x}\right)^{1/x}$ as $x \to 0$.

Q.2 Define the differentiability of a function of one variable.

Q.3 Write the differential coefficient of $x^{\sqrt{2}}$ with respect to x

Q.4 Write down the differential coefficient of $x^3 \log x$ with respect to x.

Q.5 What is the condition for a tangent to be perpendicular to the axis of x?

Q.6 Give one example of monotonic decreasing function.

Q.7 What is sample space? Give one example.

Q.8 Give one example of dependent and independent event each.

Q.9 Compute the mean of the binomial distribution with $p = \frac{1}{4}$ and $n = 7$.

Q.10 What is the expression for the probability distribution of a random variable x in Poisson's distribution?

(Section-'B')

(Short answer type questions with word limit 150-200) **(3x5=15)**

Q.1 Find $\lim_{x \to \infty} \frac{x^2 + 3x - 2}{2x^2 + 3}$.

OR

If $f(x) = \begin{cases} \frac{x^2 - 1}{x + 1}, & x \neq -1 \\ -2, & x = -1 \end{cases}$. Is $f(x)$ continuous at $x = -1$.

Q.2 Find $\frac{d}{dx}\left(8x^7 + 3 \sin x\right)$

OR

Find $\frac{d}{dx} \log \left(ax + b\right)^{\tan x}$

Q.3 Find the equation of the tangent at the point (x, y) on $xy = a^2$.

OR

Find the equation of the normal at (x, y) to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

Q.4 The probability that a question can be solved by A is $\frac{1}{3}$ and by B is $\frac{1}{4}$. What is the probability that the question will be solved by any of them.

OR

Four cards are drawn without replacement. What is the probability that they are all aces.

Q.5 Find the average deviation from the mean for the following frequency distribution :

x	3	5	7	9	11	13
f	2	7	10	9	5	1

OR

Find the line of fit to the following data :

x :	0	5	10	15	20	25
y :	12	15	17	22	24	30

(Section-'C')

(Long answer type questions with word limit 300-350) **(5x5=25)**

Q.1 Test the following function for continuity at $x = 1$:

$$f(x) = \frac{x^2 - 1}{x - 1} \quad when \ x \neq 1$$
$$= 0 \quad when \ x = 1$$

OR

Define i) first kind of discontinuity with at least one example and ii) second kind of discontinuity with example.

Q.2 Find the differential coefficient of $x^x + \left(\sin x\right)^{\log x}$.

P.T.O.