Total Pages : 4

KN-262

B.C.A. (Part-I) Examination, 2022

THEORETICAL FOUNDATION OF COMPUTER SCIENCE

(Calculus and Statistical Analysis)

[Paper : Second]

Time Allowed : Three Hours

Maximum Marks : 50

Mininum Passing Marks : 17

Note : Attempt **all five** questions. **one** question from each unit is **compulsory**. **All** questions carry **equal** marks.

UNIT-I

1. If

$$f(x)=\begin{cases}\dfrac{x^3+x^2-16x+20}{(x-2)^2}, & x\neq 2\\ k, & x=2\end{cases}$$

is continuous at $x = 2$, find the value k. [10]

OR

Find the value of $\lim_{x \to \frac{\pi}{2}} \left(\sec x - \tan x\right)$.

UNIT-II

2. Find $\frac{dy}{dx}$, when $\sqrt{x^2 + y^2} = \log\left(x^2 - y^2\right)$. [10]

OR

Find $\frac{dy}{dx}$, where $y = x^2 + \left(\sin x\right)^{\log x}$.

UNIT-III

3. Find the equation of tangent and normal to the curve

$x^{2/3} + y^{2/3} = 2$ at $(1,1)$. [10]

OR

Find the points of maxima and minima of a function $y = 2x^3 - 3x^2 + 6$.

UNIT-IV

4. A problem in Statistics is given to the three students A, B and C whose chances of solving it are $\frac{1}{2}, \frac{3}{4}$ and $\frac{1}{4}$ respectively. What is the probability that the problem will be solved if all of them try independently ? [10]

OR

For two events A and B prove that :

$$P(A \cap B) = P(A) \cdot P\left(\frac{B}{A}\right), P(A) > 0$$

$$= P(B) \cdot P\left(\frac{A}{B}\right), P(B) > 0$$

Where $P\left(\frac{B}{A}\right)$ represents the conditional probability of occurrence of B when the event A has already happened and $P\left(\frac{A}{B}\right)$ is the conditional probability of happening of A when B has already happened.

UNIT-V

5. Fit a parabola of second degree to the following data :[10]

x :	0	1	2	3	4
y :	1	1.8	1.3	2.5	6.3

OR

Calculate the correlation coefficient for the following heights (in inches) of fathurs (x) and their sons (y) :

x :	65	66	67	67	68	69	70	72
y :	67	68	65	68	72	72	69	71

----x----