This question paper contains 3 printed pages.

B.C.A.(Part - I) Roll No. 252557

000568

132 Bas. Math.

B.C.A. (Part - I) EXAMINATION - 2018

(Faculty of Science)

(Three - Year Scheme of 10 + 2 + 3 Pattern)

Paper - 132

BASIC MATHEMATICS

Time Allowed : Three Hours

Maximum Marks - 100

Answer of all the questions (short answer as well as descriptive) are to be given in the main answer-book only. Answers of short answer type questions must be given in sequential order. Similarly all the parts of one question of descriptive part should be answered at one place in the answer-book. One complete question should not be answered at different places in the answer- book. Write your roll numbers on question paper before start writing answers of questions.

PART - I : **(Very Short Answer) consists of 10 questions of 2 marks each. Maximum limit for each question is up to 40 words.**

PART - II: **(Short answer) consists of 5 questions of 4 marks each. Maximum limit for each question is up to 80 words.**

PART - III: **(Long answer) consists of 5 questions of 12 marks each with internal choice.**

PART - I

1. Very Short Answers Type [10x2=20]

(a) Define one to one function.

(b) Define range of a function.

(c) Define an m x n matrix

(d) If $A=\begin{bmatrix} 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $B=\begin{bmatrix} 0 & 1 & 2 \\ 2 & 1 & 0 \end{bmatrix}$; find AB

(e) Write an equation of straight line in the intercept form.

(f) Solve : $3x^2-5x+1=4x-5$

(g) Define standard deviation

(h) Define the line of regression of y on x.

(i) If ${}^nP_3 = 210$, find n.

(j) If two dice are thrown what is the probability that the sum is greater than 8.

PART - II

2. Attempt all the following parts: [5x4=20]

(a) Show that the function $f: R \rightarrow R$ defined by $f(x) = 3x^3+5$ for all $x \in R$ is a bijection.

(b) Find the value of the following determinant by without expansion:

$$\begin{vmatrix} 13 & 16 & 19 \\ 14 & 17 & 20 \\ 15 & 18 & 21 \end{vmatrix}$$

(c) Prove that the following points are vertices of a right angle triangle:

(2, -2), (-2,1) and (5, 2)

(d) Find the median of the following frequency distribution:

x :	1	2	3	4	5	6	7	8	9
f :	6	8	12	15	22	24	16	9	5

(e) In how many ways can 4 boys and 5 girls be seated in a row so that they are alternate?

PART - III

Attempt all the following five questions by taking any two parts from each question: [5x12=60]

3. (a) (i) Define Identity function and constant function with their graphs.

(ii) If $f: R \rightarrow R$ is a bijection such that $f(x) = 2x+7$. Find the inverse of f.

(b) If $\phi(x) = \log\left(\frac{1-x}{1+x}\right)$, show that $\phi(x) + \phi(y) = \phi\left(\frac{x+y}{1+xy}\right)$

(c) Let the function $f: R \rightarrow R$ and $g: R \rightarrow R$ be defined by

$F(x) = 2x$, $g(x) = x^2+2$, $\forall x \in R$. Find fog (2) and gog(1).

4. (a) Find the inverse of the matrix

$$A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

(b) Solve the following equations by Cramer's rule:

$2x-y+3z = 9$, $x+y+z = 6$ and $x-y+z = 2$

(c) Prove that :

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$$

5. (a) Find the equation of straight line which passes through the point (2,3) and parallel to the line joining the points (1,2) and (7,3).

(b) Find the equation of a circle passing through a point (3,-1) and having its centre at the point of intersection of the lines $4x+y+1 = 0$ and $2x-y+5=0$.

(c) Find a quadratic equation whose roots are reciprocal to the roots of the quadratic equation $ax^2+bx+c=0$

6. (a) Calculate the median for the following distribution :

Class - interval	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40
Frequency	20	24	32	28	20	16	37	18

(b) If each variate value be multiplied by a constant quantity a, then prove that the variance is multiplied by a^2

(c) Find the Karl Pearson's coefficient of correlation between the ages of husband and wife at the time of their marriage :

Age of Husband : x	23	27	28	28	29	30	31	33	35	36
Age of Wife : y	18	20	22	27	21	29	27	29	28	29

7. (a) The odds against a certain event are 5 to 2 and the odds in favour of another event are 6 to 5; if the events are independent, find the probability of the happening of at least one of them.

(b) Four persons are choose at random from a group of 3 men , 2 women and 4 children. Find the probability that the group has exactly two children.

(c) If ${}^{m+n}P_4 = 3024$ and ${}^{m-n}P_4 = 120$, find m and n.