This question paper contains 3 printed pages.

Roll No. ....

B.C.A. (Part-I)

Bas. Math.

132

B.C.A. (Part-I) EXAMINATION, 2019
(Faculty of Science)

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

BASIC MATHEMATICS - 132

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 number 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 questions.

   (a) Find the domain of the function $\dfrac{|x|}{x}$.

   (b) If $f : \mathbf{R} \to \mathbf{R}$, where $f(x) = x^2$, for all $x \in \mathbf{R}$ then find $f^{-1}(9)$.

   (c) If $A+B = \begin{bmatrix} 5 & 2 \\ 0 & 1 \end{bmatrix}$ and $A-B = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$, then find A and B.

   (d) If $A = \begin{bmatrix} 2 & 4 & -3 \\ 1 & -2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 \\ 4 & -2 \\ 3 & 0 \end{bmatrix}$, then find $(AB)^T$.

   (e) If $y = m_1 x + C_1$ and $y = m_2 x + C_2$ are two straight lines such that $m_1 \cdot m_2 = -1$, find the relation between these lines.

   (f) Solve the equation $x^2 - 2x - 8 = 0$.

   (g) Find the mode of the following data :

   16, 19, 19, 20, 15, 19, 20, 21, 24, 19, 16, 22, 16, 18, 20, 16, 19.

   (h) Define mean square deviation.

   (i) Write down the relation between ^nP_r and ^nC_r.

   (j) Find the probability that there are 53 Sundays in a year.

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P.T.O.

PART - II

2. Attempt all the parts :

(a) Prove that the identity function I_x on the non empty set X is a one-one onto function.

(b) If $A = \begin{bmatrix} 1 & 2 & 3 \\ -4 & 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 0 & 5 \\ -1 & -3 \end{bmatrix}$, then find AB and BA.

(c) Show that the points (2, 5), (4, 6) and (8, 8) are Collinear.

(d) Calculate the mean for the following data :

Class :	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45
Frequency :	5	6	15	10	5	4	2	2

(e) How many Committees consisting of 4 persons including a given Chairperson can be formed from a group of 10 persons ?

PART - III

Attempt **all** the following questions by taking **any two** parts from each question :

3. (a) If $f : R \rightarrow R$ and $g : R \rightarrow R$ are the functions, where $f(x) = 2x + 3$ and $g(x) = x^2 - 1$, for all $x \in R$, then find $(f + g)(x)$, $(f.g)(x)$, $(f + g)(-3)$ and $(f.g)(5)$.

(b) Show that the function $f : R - \{3\} \rightarrow R - \{1\}$, where $f(x) = \dfrac{x - 2}{x - 3}$, for all $x \in R - \{3\}$ is a bijection.

(c) If $f : R \rightarrow R$ and $g : R \rightarrow R$ are two functions such that $(gof)(x) = \sin^2 x$ and $(fog)(x) = \sin x^2$, for all $x \in R$, then find f and g.

4. (a) Evaluate the determinant $\Delta = \begin{vmatrix} x & a & a \\ a & x & a \\ a & a & x \end{vmatrix}$.

(b) Find the inverse of the matrix $A = \begin{vmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{vmatrix}$.

(c) Solve the following system of linear equations by Camer's rule

$x + y + z = 7$, $x + 2y + 3z = 16$, $x + 3y + 4z = 22$.

5. (a) Find the equation of the straight line perpendicular to the line $5x - 2y = 8$ and passing through the point of intersection of the lines $4x + y - 1 = 0$ and $7x - 3y - 35 = 0$.

(b) Find the equation to the circle whose one of the diameter is the line segment joining the centres of the circles $x^2 + y^2 + 6x - 14y - 1 = 0$ and $x^2 + y^2 - 4x + 10y - 2 = 0$.

(c) For what value of k, the equation $(4 - k)x^2 + 2(k + 2)x + (8k - 1) = 0$ will have equal roots ?

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

Less than (x_i) :	20	30	40	50	60	70	80	90	100
Frequency (f_i) :	0	4	16	30	46	66	82	92	100

(b) Calculate the standard deviation for the following frequency distribution :

(x_i) :	5	15	25	35	45	55	65
(f_i) :	1	5	12	22	17	9	4

(c) Calculate the Coefficient of correlation for the following bivariate distribution :

(x_i) :	65	66	67	67	68	69	70	72
(y_i) :	67	68	65	68	72	72	69	71

7. (a) Find the probability of getting a total of atleast 6 in a simultaneous throw of three dice.

(b) One card is drawn from a well-shuffled pack of 52 cards. Find the probability that the card drawn is either red or a king.

(c) Two dice are thrown simultaneously. Find the probability that the total sum on the two faces is divisible by 3 or 4.

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