BSc & BCA DEGREE EXAMINATION MAY 2018
(Second Semester)

Common to Branches - INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

MATHEMATICS

Time : Three Hours **Maximum : 75 Marks**

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks (10x2 = 20)

1 **Find the rank of A =** $\begin{vmatrix} 1 & -2 & -1 \\ 2 & - & \\ -1 & 2 & 1 \end{vmatrix}$

2 **Find the eigen values for the matrix A =** $\begin{matrix} 5 & 3 \\ 1 & 3 \end{matrix}$

3 **Solve $(D^2 + 2D + l)y = 0$.**

4 **Solve the equation p + q = x + y.**

5 **Write the procedure for the backward substitution.**

6 **What is the condition for the convergence of Gauss - Jacobi & Gauss - Seidel methods?**

7 **Write** down **the Newton's forward** interpolation **formula.**

8 **Expand $A^5u_0 = 0$.**

9 **Write down the Newton's backw ard difference formula.**

10 **Write down the Simpson's one third rule.**

SECTION - B (25 Marks)
Answ'er ALL Questions
ALL Questions Carry EQUAL Marks (5x5= 25)

11 a **Show that the following equations, 2x - y +z = 7; 3x + y - 5z = 13 x + y + z = 5 are consistent and solve them.**

OR

b **Find the rank of the matrix.**

$$A = \begin{vmatrix} 6 & 1 & 1 & 1 \\ 16 & 1 & -1 & 5 \\ 7 & 2 & 3 & 0 \end{vmatrix}$$

12 a **Solve $q = xp + p^2$.**

OR

b **Solve $z^4q^2 - z^2p = 1$.**

13 a **Solve by Gauss - elimination method for the following equations**
2x f y + 4z = 12; 8x - 3y + 2z = 20; 4x ■+• 1 ly - z = 33.

OR

b **Using Gauss - Seidel method, solve the following system of equations**
8x - y + z - 18 = 0; x + y - 3z -f 6 = 0; 2x + 5y - 2z - 3 = 0.

Cont..

14 a The following data gives the melting point of an alloy of lead and zinc. Where t is the temperature in dec - C and P is the percentage of lead in the alloy.

P:	40	50	60	70	80	90
t:	184	204	226	250	276	304

using Newton's interpolation formula, find the melting point of the alloy containing 84 percent of lead.

OR

b Construct Newton's forward interpolation polynomial for the following data:

x:	4	6	8	10
y:	1	3	8	16

Use it to find the value of y for x = 5.

15 a From the values in the table given below, find the value of Sec 31 ° using numerical differentiation.

0:	31	32	33	34
tan 9:	0.6008	0.6249	0.6494	0.6745

OR

b Dividing the range into 10 equal parts, find the approximate value of

$\int_0^{7t} \sin x \, dx$ by Simpson's rule,

SECTION - C (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 10 = 30)

16 Find the eigen vectors of the following matrix $A = \begin{pmatrix} 1 & 3 \\ 1 & 5 & 1 \\ & 1 & 8 & 1 \end{pmatrix}$.

17 Solve $(x^2 - yz)p - r(y^2 - zx)q = z^2 - xy$.

18 Solve, by Gauss - Jacobi method for the following equations,
$27x + 6y - z = 85$; $6x + 15y + 2z = 72$; $x + y + 54z = 110$.

19 Using a polynomial of the third degree, complete the record given below of the export of a certain commodity during five years:

Year:	1917	1918	1919	1920	1921
Export (in tons) :	443	384	-	397	467

20 . Find the value of cos 1.74 using the values given in the table below:

X:	1.70	1.74	1.78	1.82	1.86
SinX:	0.9916	0.9857	0.9781	0.9691	0.9584

Z-Z-Z END