

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

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 (10 x 2 = 20)

- 1 Find the rank of $A = \begin{bmatrix} 1 & -2 & -1 \\ 2 & -4 & -2 \\ -1 & 2 & 1 \end{bmatrix}$.
- 2 Find the eigen values for the matrix $A = \begin{bmatrix} 5 & 3 \\ 1 & 3 \end{bmatrix}$.
- 3 Solve $(D^2 + 2D + 1)y = 0$.
- 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 $\Delta^5 u_0 = 0$.
- 9 Write down the Newton's backward difference formula.
- 10 Write down the Simpson's one third rule.

SECTION - B (25 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 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.
$$A = \begin{bmatrix} 6 & 1 & 1 & 1 \\ 16 & 1 & -1 & 5 \\ 7 & 2 & 3 & 0 \end{bmatrix}$$
- 12 a Solve $q = xp + p^2$.
OR
b Solve $z^4 q^2 - z^2 p = 1$.
- 13 a Solve by Gauss – elimination method for the following equations
 $2x + y + 4z = 12$; $8x - 3y + 2z = 20$; $4x + 11y - z = 33$.
OR
b Using Gauss – Seidel method, solve the following system of equations
 $8x - y + z - 18 = 0$; $x + y - 3z + 6 = 0$; $2x + 5y - 2z - 3 = 0$.

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 $\sec 31^\circ$ using numerical differentiation.

$\theta :$	31	32	33	34
$\tan \theta :$	0.6008	0.6249	0.6494	0.6745

OR

- b Dividing the range into 10 equal parts, find the approximate value of $\int_0^\pi \sin x \, dx$ 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 $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 8 & 1 & 1 \end{bmatrix}$.
- 17 Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.
- 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 |
| Sin X : | 0.9916 | 0.9857 | 0.9781 | 0.9691 | 0.9584 |

Z-Z-Z

END