

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc/BCA DEGREE EXAMINATION JUNE 2014
(First / Second Semester)

Common to Branches – COMPUTER SCIENCE &
COMPUTER APPLICATIONS

MATHEMATICS – I / 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 $\begin{bmatrix} 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$.
- 2 When does the inverse of a matrix exist?
- 3 Solve $(D^2 - 5D + 4)y = 0$.
- 4 Eliminate a and b from $z = (x + a)(y + b)$.
- 5 Give the names of any two iteration methods for solving algebraic equations.
- 6 Explain diagonal dominance.
- 7 When does Newton's forward interpolation formula is used?
- 8 Write down Lagrange's interpolation formula.
- 9 Write the first derivative formula of differences at any point from the Newton's backward difference formula.
- 10 State Trapezoidal rule to evaluate $\int_{x_0}^{x_n} f(x)dx$.

SECTION - B (25 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 25)

- 11 a Examine the consistency of the following system of equations
 $x + y + z = 4$; $x + 7y - 7z = 5$; $2x + 5y - 2z = 3$.
OR
b Find the inverse of $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$
- 12 a Solve $(D^2 + 5D + 6)y = e^x$.
OR
b Solve $p + q = x + y$.
- 13 a Solve the following equations using Gauss elimination method.
 $x + y + z = 9$; $2x - 3y + 4z = 13$; $3x + 4y + 5z = 40$.
OR
b Is the system of equations diagonally dominant. If not make it diagonally dominant?
 $3x + 9y - 2z = 10$; $4x + 2y + 13z = 19$; $4x - 2y + z = 3$.

Cont ...

- 14 a Construct Newton's forward interpolation polynomial for the following data.

X	4	6	8	10
Y	1	3	8	16

OR

- b Find the divided differences table for the function $f(x) = x^2 + 2x + 2$ whose arguments are 1, 2, 4, 7, 10.

- 15 a Find $y'(x)$ given

X	0	1	2	3	4
Y	1	1	15	40	85

OR

- b Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule with $h = 0.2$ hence determine the value of π .

SECTION - C (30 Marks)

Answer any **THREE** Questions

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

- 16 Find the eigen values and eigen vector of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & 0 & 2 \end{bmatrix}$.

- 17 Solve $(mz - ny)p + (nx - lz)q = ly - mx$.

- 18 Solve the following system by Gauss-Jacobi method

$$28x + 4y - z = 32; \quad x + 3y + 10z = 24; \quad 2x + 17y + 4z = 35.$$

- 19 Find the form of the function y for the following data. Hence find $y(3)$

X	0	1	2	5
Y	2	3	12	147

- 20 Evaluate $\int_0^1 \frac{dx}{1+x}$ using Simpson's one-third and three-eighth rules.

Z-Z-Z

END