

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc & BCA DEGREE EXAMINATION MAY 2017
(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
- 2 How to examine the system of equations are inconsistent?
- 3 Solve $(2D'' - 3D + 4)y = 0$.
- 4 Solve $\frac{d^2y}{dx^2} - \frac{dy}{dx} + 2 = 0$.
- 5 Write the names of iterative methods to solve the simultaneous linear algebraic equations.
- 6 What is Gauss - Jordan method?
- 7 Define difference table.
- 8 State Newton's backward interpolation formula.
- 9 Write the Newton's forward formula for derivatives.
- 10 State Simpson's - rule.

SECTION - B (25 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5x5 = 25)

11 a Find the rank of $\begin{vmatrix} 4 & -5 & 1 & 2 \\ 3 & 1 & -2 & 9 \\ 1 & 4 & 1 & 5 \end{vmatrix}$

OR

b Examine consistency and hence solve $x + y - 3z = -1$; $4x - 2y + 6z = 8$;
 $15x - 3y + 9z = 21$.

12 a Solve $(D^2 + 4D + 6)y = 5e^{2x}$.

OR

b Solve $p(1 + q^2) = q(z - 1)$.

13 a Solve by Gauss - elimination method.

$$2x + y + 4z = 12;$$

$$8x - 3y + 2z = 20;$$

$$4x + 11y - z = 33.$$

OR

b Solve by Gauss - Jordan method.

$$2x - 3y + z = -1$$

$$x + 4y + 5z = 25$$

$$3x - 4y + z = 2.$$

Cont...

14 a Using Newton's formula, find y when $x = 27$ from the following data.

x :	10	15	20	25	30
y :	35.4	32.2	29.1	26.0	23.1

OR

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

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

15 a From the following table of values of x and y find $\frac{dy}{dx}$ for $x = 1.05$,

x :	1.00	1.05	1.10	1.15	1.20	1.25	1.30
y :	1.00000	1.02470	1.04881	1.07238	1.09544	1.11803	1.14017*

OR

b Use Trapezoidal rule to compute $\int_0^1 \frac{1}{1+x^2} dx$ with $h = 0.125$.

SECTION - C (30 Marks)

Answer any THREE Questions

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

16 Find the eigen values and eigen vectors of the matrix $A =$

$$A = \begin{bmatrix} 8 & 6 & 2 \\ -6 & 7 & -4 \\ 2 & 4 & -3 \end{bmatrix}$$

17 Solve $(y^2 + z^2)p - xyq = -xz$.

18 Solve by Gauss - Jacobi method

$$\begin{aligned} 27x + 6y - z &= 85 \\ 6x + 15y + 2z &= 72 \\ x + y + 54z &= 110. \end{aligned}$$

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

$$\int_0^{\frac{\pi}{2}} \sin x \, dx \text{ by Simpson's rule.}$$

o

Z-Z-Z

END