

**PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)**

**BSc DEGREE EXAMINATION MAY 2026  
(Second Semester)**

**Branch- COMPUTER NETWORKING AND MOBILE APPLICATION**

**MATHEMATICS FOR COMPUTING – I**

Time: Three Hours

Maximum: 75 Marks

**SECTION-A (10 Marks)**

Answer ALL questions

ALL questions carry EQUAL marks (10 × 1 = 10)

| Module No. | Question No. | Question                                                                                                                                                                         | K Level | CO  |
|------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|
| 1          | 1            | The rank of the identity matrix In is<br>i) 0 (ii) 1 (iii) n (iv) n-1                                                                                                            | K1      | CO1 |
|            | 2            | The eigenvalues of a triangular matrix are Sum of<br>i) Sum of diagonal elements<br>ii) Product of diagonal elements<br>iii) The diagonal elements themselves<br>iv) Always zero | K2      | CO1 |
| 2          | 3            | Which of the following is a linear differential equation?<br>i) $y'' + y^2 = 0$ ii) $yy'' + y' = 0$<br>iii) $y'' + yy' = 0$ iv) $y'' + xy' + y = 0$                              | K1      | CO2 |
|            | 4            | The Laplace transform of $f(t) = e^{at}$ is<br>i) $\frac{1}{s-a}$ ii) $\frac{1}{s+a}$ iii) $s+a$ iv) $s-a$                                                                       | K2      | CO2 |
| 3          | 5            | Which of the following matrices is obtained after Gauss elimination?<br>i) Identity matrix ii) Diagonal matrix<br>iii) Upper triangular matrix iv) Lower triangular matrix       | K1      | CO3 |
|            | 6            | Which method eliminates the need for back substitution?<br>i) Gauss elimination ii) Gauss-Jordan<br>iii) Gauss-Seidel iv) Jacobi                                                 | K2      | CO3 |
| 4          | 7            | Newton's backward difference formula is used when<br>i) Data is near the beginning ii) Data is near the end<br>iii) Data is symmetric iv) Data is continuous                     | K1      | CO4 |
|            | 8            | Simpson's 1/3 rule requires number of intervals to be<br>i) Odd ii) Even ii) Prime iv) Zero                                                                                      | K2      | CO4 |
| 5          | 9            | The improved Euler method uses<br>i) Only initial slope<br>ii) Only final slope<br>iii) Average of initial and predicted slopes<br>iv) No slopes                                 | K1      | CO5 |
|            | 10           | The most commonly used Runge-Kutta method is<br>i) First-order ii) Second-order<br>iii) Fourth-order (RK4) iv) Fifth-order                                                       | K2      | CO5 |

Cont...

**SECTION - B (35 Marks)**

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

| ALL questions carry EQUAL Marks (5 x 7 = 35) |              |                                                                                                                                                           |         |     |
|----------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|
| Module No.                                   | Question No. | Question                                                                                                                                                  | K Level | CO  |
| 1                                            | 11.a.        | Compute the rank of a matrix<br>$A = \begin{pmatrix} 1 & 0 & 2 & 1 \\ 2 & 1 & 5 & 3 \\ 3 & 1 & 7 & 4 \\ 1 & -1 & -2 & 0 \end{pmatrix}$                    | k2      | CO1 |
|                                              | (OR)         |                                                                                                                                                           |         |     |
|                                              | 11.b.        | Give the characteristic equation and compute inverse of A<br>$\begin{pmatrix} 2 & 1 & 0 \\ 0 & 3 & 1 \\ 1 & 0 & 2 \end{pmatrix}$                          |         |     |
| 2                                            | 12.a.        | Solve $\frac{dy}{dx} = xy$ , $y(0)=1$ .                                                                                                                   | K3      | CO2 |
|                                              | (OR)         |                                                                                                                                                           |         |     |
|                                              | 12.b.        | Find $L\{5\sin(4t)+2\cos(3t)\}$                                                                                                                           |         |     |
| 3                                            | 13.a.        | Solve the system by Gauss-Elimination method<br>$2x+y-z=1 : -3x-y+2z=-4 : x+2y+z=5$                                                                       | K3      | CO3 |
|                                              | (OR)         |                                                                                                                                                           |         |     |
|                                              | 13.b.        | Solve by Gauss seidal method $4x-y+z=7 ; x+3y-2z=4 ; 2x-y+5z=5$ .                                                                                         |         |     |
| 4                                            | 14.a.        | Using the following data, find $\frac{dy}{dx}$ for $x=2.05$<br>X 2.00 2.05 2.10 2.15 2.20 2.25 2.30<br>Y 4.0000 4.1025 4.2100 4.3225 4.4400 4.5625 4.6900 | K3      | C04 |
|                                              | (OR)         |                                                                                                                                                           |         |     |
|                                              | 14.b.        | Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's rule by dividing the range into equal parts.                                                         |         |     |
| 5                                            | 15.a.        | Use Euler's method with step size $h = 0.2$ to approximate $y(0.4)$ , given<br>$\frac{dy}{dx} = y - x^2, y(0) = 1$                                        | K2      | CO5 |
|                                              | (OR)         |                                                                                                                                                           |         |     |
|                                              | 15.b.        | Approximate $y(0.4)$ using RK2 with $h = 0.2$ , given<br>$\frac{dy}{dx} = x^2 + y, y(0) = 1$                                                              |         |     |

**SECTION - C (30 Marks)**

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

ALL questions carry EQUAL Marks (5 × 16 = 80)

| Module No. | Question No. | Question                                                                                                                                                                                                                                                                                                                                                                                                                            | K Level | CO     |        |        |    |    |    |  |   |        |        |        |        |        |        |    |    |     |
|------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|--------|--------|----|----|----|--|---|--------|--------|--------|--------|--------|--------|----|----|-----|
| 1          | 16           | Examine the consistency of the following system of equations, and if it is consistent, solve it: $x+2y-z=4$ ; $2x-y+3z=1$ ; $3x+y+2z=7$ .                                                                                                                                                                                                                                                                                           | K4      | CO1    |        |        |    |    |    |  |   |        |        |        |        |        |        |    |    |     |
| 2          | 17           | Solve $y'' - 2y' + 2y = e^x$ , $y(0)=0$ , $y'(0)=1$ .                                                                                                                                                                                                                                                                                                                                                                               | K3      | CO2    |        |        |    |    |    |  |   |        |        |        |        |        |        |    |    |     |
| 3          | 18           | Solve by Gauss Jordan method $x+y+z=6$ ; $2x-y+3z=14$ ; $x+4y-z=2$                                                                                                                                                                                                                                                                                                                                                                  | K3      | CO3    |        |        |    |    |    |  |   |        |        |        |        |        |        |    |    |     |
| 4          | 19           | <div>           Compute the first two derivatives of <math>(x)^{1/3}</math> at <math>x=50</math> and <math>x=56</math> gives the table below           <table border="1"> <tr> <td>X</td> <td>50</td> <td>51</td> <td>52</td> <td>53</td> <td>54</td> <td>55</td> <td></td> </tr> <tr> <td>Y</td> <td>3.6840</td> <td>3.7084</td> <td>3.7325</td> <td>3.7563</td> <td>3.7798</td> <td>3.8230</td> <td>3.</td> </tr> </table> </div> | X       | 50     | 51     | 52     | 53 | 54 | 55 |  | Y | 3.6840 | 3.7084 | 3.7325 | 3.7563 | 3.7798 | 3.8230 | 3. | K2 | CO4 |
| X          | 50           | 51                                                                                                                                                                                                                                                                                                                                                                                                                                  | 52      | 53     | 54     | 55     |    |    |    |  |   |        |        |        |        |        |        |    |    |     |
| Y          | 3.6840       | 3.7084                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.7325  | 3.7563 | 3.7798 | 3.8230 | 3. |    |    |  |   |        |        |        |        |        |        |    |    |     |
| 5          | 20           | Use Modified Euler method ,find $y(0.2)$ for<br>$\frac{dy}{dx} = x^2 + y^2$ , $y(0) = 1$                                                                                                                                                                                                                                                                                                                                            | K2      | CO5    |        |        |    |    |    |  |   |        |        |        |        |        |        |    |    |     |

Z-Z-Z END