

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2018  
(First Semester)

Branch –SOFTWARE SYSTEMS  
(Five year integrated)

MATHEMATICS-I

Time: Three Hours

Maximum: 75 Marks

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 15 = 75)

- 1 a For what value of K is the matrix  $\begin{bmatrix} 6 & 3 & 5 & 9 \\ 5 & 2 & 3 & 6 \\ 0 & 1 & 2 & 3 \\ 2 & 1 & 1 & K \end{bmatrix}$ , using rank method. (5)
- b Show that the equations :  
 $2x - y + z = 7$ ;  $3x + y - 5z = 13$ ;  $x + y + z = 5$  are consistent and solve them. (10)
- OR
- c Find the eigen values and eigen vectors of the matrix  $\begin{bmatrix} 2 & 2 & 0 \\ 2 & 1 & 1 \\ -7 & 2 & -3 \end{bmatrix}$ . (10)
- d Calculate  $A^4$  when  $A = \begin{bmatrix} -1 & 3 \\ -1 & 4 \end{bmatrix}$ . (5)
- 2 a Solve  $p^2 + q^2 = npq$ . (5)
- b Solve  $(D^2 - 3D + 2)y = \sin 3x$ . (10)
- OR
- c Solve  $p + q = x + y$ . (3)
- d Find the equation of the cone satisfying the equation  $xp + yq = z$  and passing through the circle  $x^2 + y^2 + z^2 = 4$  and  $x + y + z = 2$ . (12)
- 3 a Solve by Gauss elimination method :  
 $3x + 4y + 5z = 18$ ;  $2x - y + 8z = 13$ ;  $5x - 2y + 7z = 20$  (8)
- b Explain the procedure for Gauss – Jacobi method. (7)
- OR
- c Solve the system by Gauss – Jordan method :  
 $x + 2y + z = 3$ ;  $2x + 3y + 3z = 10$ ;  $3x - y + 2z = 13$  (9)
- d Explain the step by step procedure for Gauss – Seidel method of iteration. (6)
- 4 a If  $f(0) = 3$ ;  $f(1) = 12$ ,  $f(2) = 81$ ,  $f(3) = 200$ ,  $f(4) = 100$ ,  $f(5) = 8$ , find  $\nabla^4 f(4)$ ,  $\nabla^5 f(0)$  and  $\nabla^2 f(2)$ . (7)

Cont...

4 Cont...

- b From the table, estimate the number of students who obtained marks between 40 & 45 : (8)

Marks :	30-40	40-50	50-60	60-70	70-80
No. of students :	31	42	51	35	31

OR

- c Compute the value of  $\sin 38^\circ$ . (10)

x :	0	10	20	30	40
y = sin x :	0	0.17365	0.34202	0.5	0.64279

- d Estimate the missing value :

x :	0	1	2	3	4
y :	1	2	4	-	16

Explain why it differ from  $2^3 = 8$ . (5)

- 5 a The population of a certain town is given below. Find the rate of growth of the population in 1931, 1941, 1961 and 1971 : (15)

Year (x) :	1931	1941	1951	1961	1971
Population in '000 (y) :	40.62	60.80	79.95	103.56	132.65

OR

- b Evaluate  $I = \int_0^{\infty} \frac{1}{1+x} dx$  using

(i) Trapezoidal rule (ii) Simpson's rule (both)  
check up by direct integration. (15)

Z-Z-Z

END