PG ODD SEMESTER EXAMINATION, 2022

MATHEMATICS

1st Semester

Course No. : MAT - 505 (Practical)

(Basic Mathematical Software)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

(Answer any two)

[2 x 20 = 40 + (P.N.B - 15) (Viva - 15)]

1. Write and execute the LaTex code to generate the following expressions : 10x2=20

(i) $1^2 + 2^2 + 3^2 = 14$

(ii) $\sqrt[6]{729} = 3$

(iii) $e^{x+iy} = e^x(\cos y + i \sin y)$

(iv) $A \cup B = \{ x \in A \text{ or } y \in B \}$

(v) $\frac{a}{b} \geq \frac{c}{d}$

(vi) $\sum_{i=1}^{n} \frac{n(n+1)}{2}$

(Turn Over)

(vii) $\int_0^\infty f(x)\,dx$

(viii) $\lim_{x \to c} f(x) = L$

(ix) $\begin{bmatrix} 1 & 2 & 3 \\ 7 & 8 & 9 \end{bmatrix}$

(x) (without equation number)

$2x + 3y = 7$

$3y = 7 - 2y$

$y = \dfrac{7 - 2y}{3}$

2. (a) Define a Matrix of size p x q, in the possible ways in Scilab. Also, list out functions that generate matrices. 5

(b) Write the Scilab code to solve the system 5

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

$6x - 8y + 7z = -3$

$-2x + 6y - z = 3$

(c) Using the matrices 10

$$A = \begin{bmatrix} 5 & 5 & -2 \\ 1 & -2 & 0 \\ 4 & -1 & -2 \end{bmatrix}, \quad B = \begin{bmatrix} -5 & 4 & -\pi \\ -1 & 1 & 10 \\ 0 & 4 & -2 \end{bmatrix}, \quad C = \begin{bmatrix} 2 & 5 \\ 1 & -3 \\ 4 & 2 \end{bmatrix}$$

perform the operations A + B, A - B, B - A, B - C, A. (B. C)

3. (a) Determine the result of the following calculations using Scilab, if $a = 1.3$, $b = 2.3$, $c = \pi/2$, $x = 2/\pi$ and $y = \sqrt{3}$ 5

(i) $a^2 + bc + x$

(ii) $\sin(c) + (y/c)$

(iii) $(a + c) / (x + y)$

(iv) $\dfrac{1}{(cos\ (c) + \log(x))}$

(v) $(a + c)^{3/b}$

(b) Explain the 'break' and 'continue' statements in Scilab and write the Scilab syntax to compute the sum of the numbers from 1 to 15. 5

(c) Plot the following in Scilab graphics window : 10

(i) $z = 2x^2 + y^2$

(ii) $f(x) = (x^2 + 2x)\, e^{-x}$, $g(x) = \sin\left(\dfrac{x}{2}\right)$

over [-2, 5]

4. Practical Note book. 15

5. Viva-voce 15

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