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Pre Ph. D. Course work Examination 2019-20

MATHEMATICS

PAPER II: CW – 02 (TOOLS AND TECHNIQUES)

Model question paper

[Set – IV]

Duration - 3.00 Hrs **Max. Marks - 80**

Note: Section - A is Compulsory. Answer one question from each unit of Section - 'B' carrying equal marks

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Section - A

1. Answer the following questions in brief. **2 X 10 = 20**

(I) What is verbatim?

(II) Write syntax for following matrix.

$$\begin{bmatrix} 2 & -3 & 0 \\ 1 & 4 & 7 \\ -5 & 6 & 3 \end{bmatrix}$$

(III) Write 5 binary relation symbols for LaTex.

(IV) Define $\propto_A$ for A$\in \mathcal{F}(x)$.

(V) If A, B$\in \mathcal{F}(x)$, then define standard t-norms and standard t-conorms for A and B.

(VI) Give an example of a fuzzy complement that is continuous but not involutive.

(VII) Write Brown Fixed point theorem.

(VIII) What is the most important application of fixed point theory?

(IX) Write Dini's test.

(X) Define summation of series by arithmetic mean.

Section - B

12 X 5 = 60

UNIT - I

2. Write about page layout in LaTex.

3. How do we insert footnotes in our documents by LaTex Command?

UNIT - II

4. Let A and B be fuzzy sets defined on universal set X. Prove that
$|A| + |B| = |A \cup B| + |A \cap B|$.

5. Calculate the scalar cardinality of the fuzzy set D on X, where
X = {0, 1, 2, 3 ... ... 10} and $D(x) = 1 - \frac{x}{10}$ **.**

UNIT - III

6. Prove that any contraction mapping is uniformly continuous.

7. Let T: X → X, where X is complete metric space. Suppose that T satisfies the condition
f(Tx, Ty) ≤ f(x, y) where x,y ∈ $\bar{s}$(x$_0$,r). Assume that
$\rho(x_0, Tx_0) < (1 - \alpha)r$ **prove that iterative sequence.**
Starting from x$_0$, converges to x∈ $\bar{s}$, which is unique fixed point of T in $\bar{s}$.

UNIT - IV

8. Show that Euler method is regular.

9. State and prove the necessary and sufficient condition for the regularity of the (N,p$_n$) method.

UNIT - V

10. Derive formula for partial sums of Fourier series and its conjugate series.

11. State and prove Dini's test.

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