ATAL BIHARI VAJPAYEE VISHWAVIDYALAYA BILASPUR (C.G.)

Pre Ph. D. Course work Examination 2019-20

MATHEMATICS

PAPER II: CW – 02 (TOOLS AND TECHNIQUES)

Model question paper

[Set – V]

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

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

Section - A

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

((I) How can we write the following in LaTex? - (a) ∈Symbole (b) Binomial coefficient

(II) Write LaTex structure for - (a) Limit (b) Integration

(III) What is the meaning of following commands in LaTex? - (a) \neg (b) \cup

(IV) Define equilibrium of a fuzzy complement c.

(V) Define Dual triple.

(VI) State first characterization theorem of fuzzy complement.

(VII) Is there a function which does not satisfy the Banach contraction principle but has a fixed point?

(VIII) Define fixed point theorem for multi-function with an example.

(IX) What does Fejer-Lebesgue theorem state?

(X) What is integral modulus of continuity?

Section - B **12 X 5 = 60**

UNIT - I

2. Describe document classes and document sectioning in LaTex .

3. Discuss about creating documents in LaTex.

UNIT - II

4. Let f: X → Y be an arbitrary crisp function. Then for any A∈ $\mathcal{F}(x)$, Show that $\propto_{[f(A)]} \supseteq (f\propto_A)$, but conversaly.

5. Let the membership grade function of fuzzy sets A, B and C be defined as

$A(x) = \frac{x}{x+2}$, $B(x) = 2^x$, $C(x) = \frac{1}{[1+10(x-2)^2]}$

On the universal set X = {0, 1, 2, 3 ... ... } and let f(x) = x^2 for all x∈X. Then use the extension principle to derive f(A), f(B) and f(C).

UNIT -III

6. State and prove Banach fixed point theorem.

7. State and prove Schauder fixed point theorem.

UNIT-IV

8. Describe the following.

(a) $(E, 1)$ sum (b) $(C, 2)$ sum (c) (N, p_n) sum (d) Abel sum.

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

UNIT - V

10. What is summability of series? Describe summability Fourier series.

11. Describe the following

(a) Delta value Poussen's test (b) Integration of Fourier series.

===*===**