DRAVIDIAN   UNIVERSITY

Directorate of Distance Education (DDE)

KUPPAM – 517 426:: A.P.

Course: II year MSC (Maths)

Paper – I Topology and Functional Analysis

Question Paper for Assignment

Answer any **THREE** of the following **FIVE** Questions.

3x10=30

1. State and prove Lebesgue covering Lemma?

2. Stat and prove Uryshon's Lemma?

3. a) State and Prove Schwaz Inequality?

   b) Prove that a closed convex subset C of a Hilbert Space H contains a unique

      Vector of smallest norm?

4. a) let M be a closed linear subspace of a Hilbert space H, x be a vector not in M

      and d be the distance from x to M then prove that there exists a unique vector

      yo in M such that $\| x - yo \|$

   b) State and prove Bessel Inequality?

5. a) Prove that an operator T on H is self adjoint hand only if (Tx, x) is real for all x

   b) If T is an operator and if $(Tx, x) = 0 \forall x \in H$ Then $T = 0$

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Paper – II Probality and Statistics

Question Paper for Assignment

Answer any <u>THREE</u> of the following <u>FIVE</u> Questions.

3x10=30

1. (a) Define a Equivalence relation. Axiom of choice, Zorm'slex?

    (b) Define a Borel set and prove that for a set of real numbers E. its closure $\overleftrightarrow{E}$ is closed set that contains E in the sense that if F is closed and E $\leq$ F. Then $\overleftrightarrow{E} \leq$ F?

2. (a) Define a outer measure. Prove that every outer measure is its length?

    (b) State and prove countable subadditivity?

3. (a) Prove that f is measure function and $F = g$ a.e then g is measurable?

    (b) State and prove Egoroff's theorem ?

4. (a) State and prove Bounded Convergence theorem ?

    (b) Let f be a bounded function defined on [a,b] if f is primann Integrable on [a,b]. Then it is measurable and R $\int_a^b f\, dx = \int_a^b f\, dx$?

5. (a) State and prove Fatou's lemma?

    (b) State and prove monotenic Convergence theorem?

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Paper – III Analytic Number Theory (or) Discreate Mathematics

Question Paper for Assignment

Answer any <u>THREE</u> of the following <u>FIVE</u> Questions.

3x10=30

1. (a) Define a Euler's Constant?

   (b) State and Prove Euler's Summation formula?

2. (a) For All $x \geq 1$ Prove that
   $$\sum d(n) + x\, logx + (2c - 1)x + 0(\sqrt{x})\ n \leq x$$

   (b) State and Prove Legendre's Identity?

3. Prove that for every Integer $n \geq 2$, we have $\dfrac{1}{6}\ \dfrac{n}{logn} < \pi(n) < 6\,\dfrac{n}{Log\, n}$

4. State and Prove Selberg's Asymptotic Formula?

5. State and Prove Shapiro's Tauberian Theorem?

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Paper – IV Computer Algorithm and Problems Solving

Question Paper for Assignment

Answer any <u>THREE</u> of the following <u>FIVE</u> Questions.

3x10=30

1. Define the constructor of loops and Termination of loops?

2. Write an algorithm that accepts a positive integer and reverses the order of its digits?

3. Write an algorithm to a given randomly ordered array of n elements?

4. Draw a flowchart of Fibonacci sequence?

5. Write an algorithm of Fibonacci sequence?

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Paper – V

C and Data Structures

Question Paper for Assignment

Answer any <u>THREE</u> of the following <u>FIVE</u> Questions.

3x10=30

1. (a) What are the benefits of Points to the C Programmers?

   (b) Write a program using pointers to complete the sum of all elements stored in an array?

2. (a) Write the Syntax of loop operations provide in the C languages?

   (b) Write a Program using while loop to reverse the digits of the given number?

3. (a) Write down the differences between library functions and user – defined functions?

   (b) Write a program using a single – subscripted variable to evaluate the following Expressions:

   $$\text{Total} = \sum_{i=1}^{10} x_i^2$$

   The values of $X_1 X_2$ ----------, X_{10} are read from the terminal.

4. (a) Explain about Storage Classes?

   (b) About in a Multi- Dimensional array? Give Syntax of Multi Dimensional array?

5. (a) Explain about 'C' language character set ?

   (b) Give an explanation about increment and Decrement Operators?