

PAPER-I: TOPOLOGY AND FUNCTIONAL ANALYSIS

Answer any three questions

3x10=30

- 1). Prove that any closed subspace of a compact space is compact.
- 2). State and prove Urysohn's lemma and Teiz Extension theorem.
- 3). a) Prove that the product of any non-empty class of connected space is connected.
b) Prove that any continuous image of a connected space is connected.
- 4). State and prove Open Mapping theorem.
- 5). a) If N_1, N_2 are normal operators on H with the properties that either commutes with the adjoint of others. Then show that
i) N_1+N_2 , ii) N_1N_2 are normal.
b) An operator on N in H is normal iff $\|N^*x\| = \|Nx\| \forall x \in H$.

Paper – II
Probability and statistics

1. a) State and prove Bayes theorem
b) Box I contains 2000 Companies of which 5% are defective. Box II contains 500 Components of which 40% are defective two other boxes i.e., Box III & IV contains 1000 components one of the above boxes and remove from it at random at single component. What is the probability that this component is defective?
2. a) State and prove chebyscheris theorem
b) if x is a Poisson variate such that $p(x=0)=p(x=2)+3p(x=4)$ find (i) Means of x
(ii) $P(X \leq Z)$
3. write in brief different types of samplings
4. a) if a binomial distribution to the following data and test for goodness of fit

X	0	1	2	3	4
F	28	62	46	10	4

b) Two independent samples of 8 and 7 items respectively had the following

Sample I	9	11	13	11	16	10	12	14
Sample II	11	13	11	14	10	8	10	-

5. a) Explain the method of fitting a second degree parabola by using the principle of least squares

b) fit a straight to the following data

X	1	2	3	4	6	8
F	2.4	3	3.6	4	5	6

Paper – III

Discrete Mathematics

1. Explain “Connectives” with suitable examples and truth tables
2. a) If $f: X \rightarrow Y$ and $g: Y \rightarrow Z$ and both f and g are on to show that $g \circ f$ is also onto. Is $g \circ f$ one to one if both g and f are to one? Justify
 b) At $f(x) = X^2 - 3x + 2$ find (i) $f(X^2)$ (ii) $f(y-x)$ (iii) $f(x+3)$
3. a) state and prove binomial theorem
 b) Obtain coefficient of X^5 in $(a+bx+cx^2)$
4. a) prove that the isomorphism of a simple graph is an equivalence relation
 b) Explain isomorphism of the graphs with suitable example
5. Prove that a connected graph is Eulerian if and if the degree of each of its vertices is even

PAPER-IV: COMPUTER ALGORITHM AND PROBLEM SOLVING

Answer any three questions

3x10=30

1. (a) Explain algorithms representations through flow charts
 (b) What is the algorithm for finding cross sales and discount.
2. What is the Concept of Flow – charts and their algorithms for manipulation of arrays to transfer contents of one memory array to another
3. Describe drafting entries in the decision tables for the same.
4. Explain about the concept of variables and loop.
5. Explain Subroutine and structured problem solving.

PAPER-V: PROGRAMMING IN C

Answer any three questions

3x10=30

- 1). Explain operators in 'C' programming.
- 2). What is an array? Explain two dimensional and multi dimensional arrays.
- 3). What is string? Explain different string functions with an example.
- 4). What is a stack? Write the applications of a stack.
- 5). What is a list? Explain various operations on a list.