

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 2
US02CMTH22(P)(MATHEMATICS PRACTICAL)
FOUR HOURS PER WEEK (2 CREDIT)
Effective from June 2018
Marks:-50(External)

PROBLEMS AND EXERCISES IN ALGEBRA

List of Practicals :

- (1) Complex Numbers, Polar Form of Complex Number. De Moivre's Theorem, n^{th} Roots of a Complex Number
- (2) Expansion of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ in powers of $\sin \theta$, $\cos \theta$, $\tan \theta$ respectively , Addition formulae for any number of angles , Expansion of $\sin^m \theta$, $\cos^m \theta$, $\sin^m \theta \cos^n \theta$ in a series of sines or cosines of multiples of θ ,
- (3) Complex Function : Exponential function , Hyperbolic Functions , Inverse Hyperbolic Functions, Real and Imaginary part of Circular and Hyperbolic Functions , Logarithmic Function.
- (4) Equivalence Relations , Functions , Composition of Functions , Invertible Functions , One to One Correspondence and Cardinality of a set , Well-ordering Property of Positive Integers , Division Algorithm , Divisibility and Euclidean Algorithm, Congruence Relation between Integers , Statement of Fundamental Theorem of Arithmetic .
- (5) Matrices , Some Special Types of Matrices , Sub-Matrices, Determinant and Minors of a Matrix , Algebra of Matrices , Reversal Law for Transpose of a Product, Associative Law, Distributive Law, Zero Divisor, Adjoint and Inverse of a Square Matrix
- (6) Rank of a Matrix, Elementary Transformation on a Matrix, Invariance of Rank Under Elementary Transformation, Reduction to Normal Form , Elementary Matrices
- (7) Method for Computing the Inverse of a Nonsingular Matrix by Elementary Operations, Equivalence Matrices
- (8) Solution of System of linear homogeneous algebraic equations , Solution of System of linear non homogeneous algebraic equations.
- (9) Characteristic Roots and Vectors of a Square Matrix, Nature of the Characteristic Roots and Some Special Types of Matrices , Construction of Orthogonal and Unitary Matrices
- (10) Characteristic Matrix and Characteristic equation of a matrix, Cayley-Hamilton Theorem.

NOTE :

- (1) Problem solving skill in mathematics is an important aspect in the teaching of mathematics.
- (2) There would be a batch of problem solving session will be of four hours per week and they will be conducted in batches of students of size 20 to 25 per batch.

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- (3) The candidate shall have to produce at the time practical Examination the record of their prescribed Laboratory work, certified by the Head of the Department.

Recommended Texts :

- (1) Shanti Narayan and P.K.Mittal , Analytical Solid Geometry,11th Edition , S.Chand and Co.Ltd., New Delhi, 2002
- (2) Dr.B.S.Grewal ,Higher Engineering Mathematics , 36th edition, Khanna publ.
- (3) Seymour Lipschutz, Marc Lars Lipson,Discrete Mathematics,McGraw-Hill International Ed.(Schaum's Series,)
- (4) Titu Andreescu and Dorin Andrica , Complex Numbers from A to Z , Birkhauser,2006
- (5) Edgar G.Goodaire and Michael M.Parmenter, Discrete Mathematics with Graph Theory,3rd Ed.,Pearson Education(Singapore) P.Ltd.,Indian Reprint,2005
- (6) David C.Lay, Linear Algebra and its Applications,3rd Ed.,Pearson Education Asia,Indian Reprint,2007
- (7) S.K.Patel,B.P.Patel,H.R.Kataria,B.L.Ghodadra,Calculus and Matrix Algebra. University Granthnirman Board,Ahmedabad-6