

B.C.A/P.G.D.C.S.A.

Bridge Course (Mathematics)

Semester I

Unit 1: Differential Calculus

Meaning of Limit, existence theorem for Limits, fundamental theorem on limits (statements only Continuity of a function at a point, over an open/ closed interval: sum, product and quotient of continuous function ; continuity of polynomial, exponential, logarithmic functions, derivative of a function, derivative of x^n $\sin x$, $\cos x$, $\tan x$, from first principles; the derivatives of the sum, difference , product & quotient of functions; derivative of trigonometric function.

Unit 2: Integral Calculus

Integration as the inverse of differentiation, indefinite integral or anti-derivative; properties of integrals. Fundamental integral involving algebraic, trigonometric, exponential and logarithmic functions, integration by substitution, integration by parts, Definite integral, definition as the limit of a sum.

Unit 3: Differential Equation

Definition : order and degree, general and particular solution, formation of a differential equation whose general solution is given, solution of differential equation by the method of separation of variables, homogeneous differential equation , linear differential equations.

Unit 4 : Matrices & Determinants

Matrices: Matrix as a rectangular arrangement of numbers, types of matrices, equality of matrices addition, scalar multiplication and multiplication of matrices, statement and verification of non-commutativity and associativity of matrix multiplications (no proof)

Determinants: Expansion rule, minors and cofactors of a determinant, determinant of a matrix, singular and non- singular matrices, application of determinants in the solution of equation and areas of triangle, Cramer's rule, adjoint, and inverse of matrices in solving simultaneous equation in two or three variables.

Unit 5: Probability and statistics

Bivariate frequency distribution, marginal and conditional frequency distribution ,relationship between two variables, scatter diagram, covariance, Karl Pearson's coefficient of correlation, its interpretation and limits, linear regression, relation between correlation and regression, least squares method of finding equation of lines of regression. Calculation of regression coefficients, angles between the lines of regression, point of intersection of lines of regression.



Probability theory : Random experimental and associated samples space ,events as subsets of sample space, occurrence of an event impossible event, sure events, combination of events through the operation “and” ,”or”, “not” and their set representation, meaning of equality likely outcomes, definition of probability of an the ratio of the number of favourable equally likely outcomes to the total number of outcomes, equally likely events.

Reference:

(1) Mathematics by R.D.Sharma



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Semester III

Unit 1:

Sets, relations and functions : set ,Cartesian product of sets; relation: functions : Binary operations.

Cartesian system of rectangular coordinates : Cartesian coordinate system –The number plane:
Distance formula: Area of triangle : section formula : slop of line :locus and equations.

Unit 2:

Straight line : find the equation of a straight lines parallel to an axis; the point-slop form ;two point form ; intercept form ; slop-intercept form; Normal form ; symmetric form ;General form; angle between two lines; distance of appoint from a line.Family of lines: equation of family of lines, pair of straight lines through origin ; angle between the pair of straight lines ;equation of the Bisectors of the angles.

Unit 3:

Circle and family of circle: Standard form of the equation of a circle ; General form of the equation of a circle ; equation of a curve in parametric form ; equation of a circle when the end points of a diameter are given point of intersection of a line and a circle with centre at origin, condition of tangency ; equation of a tangent to a circle an length of the tangent.

Unit 4 :

Complex number : The algebra of complex numbers ; the argand diagram and the polar form : polar representation ; powers and roots of complex numbers,

Quadratic equation: Solution of quadratic equation ; symmetric function os roots, graph of a quadratic polynomial ; application.

Unit 5:

Sequences and series : Sequences ;arithmetic progression (A.P); Examples of A.P. and arithmetic means ;Geometric progression (G.P) ; sum to infinity of a G.P., arithmetico – geometric sequence ;sum to n terms of special sequences.

Binomial Theorem : The binomial theorem ;some application of binomial theorem , binomial theorem for any index.

Reference:

(1) Mathematics by M.S. Rangachari

