

Analysis of AIEEE 2005 Paper in Mathematics

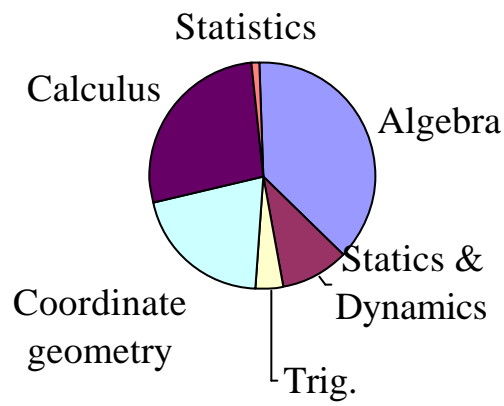
Question No.	Topic	Concept
1	Differential Equations	Eliminate the constant to get order and degree.
2	Derivatives	Application of calculus to maxima and minima.
3	Definite Integral	Integral as a limit of sum.
4	Complex Numbers	Roots of an equation.
5	Matrices	If a matrix satisfies a polynomial equation, the inverse can be obtained by multiplying by A^{-1}
6	Relations	Basic definitions of symmetric, reflexive, transitive.
7	Statistics	Relation between mean, mode and median.
8	Parabola, Locus	Equation of a chord whose midpoint is given
9	Vectors	Section formula.
10	Statics	Lami's theorem.
11	Quadratic Equations and Trigonometry	$\tan A + \tan B$
12	Bionomial Theorem	Standard theory when 3 consecutive terms are in A.P.
13	Functions	Range
14	Binomial expansion	General term
15	Complex numbers, locus	Geometrical interpretation of distance.
16	Determinants	Column operations
17	Complex numbers	Triangle inequality and knowledge of when equality holds.
18	Quadratic equations	Completing the square
19	Quadratic equations	$(\text{Difference of roots})^2 = D/A^2$
20	System of Equations	Condition for no solution of $\mathbf{AX} = \mathbf{B}$
21	Bionomial coefficients	Pascal's triangle
22	Matrices	If A and B commute then bionomial theorem is applicable and nil potent matrix.

Question No.	Topic	Concept
23	Permutation & combinations	Standard shortcut for lexical (dictionary) order.
24	Geometric progressions	Sum of a infinite geometric series
25	Bionomial Theorem for non-integral exponent	Approximations
26	Trigonometry	Inverse trigonometric identities
27	Properties of a triangle	Area of a triangle
28	Properties of a triangle	r, R for a right angled triangle
29	Derivatives	Monotonicity
30	Quadratic equations and limits	Factor theorem and $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} = \frac{1}{2}$
31	Derivatives	Application to tangents and normals
32	Derivatives	Lagrange's mean value theorem
33	Derivatives	If the derivative of a function is zero on an interval, then the function is constant
34	Derivatives	Definition
35	Indefinite Integral	$\int e^x [f(x) + f'(x)] dx = e^x f(x) + C$
36	Derivatives	Related rates
37	Definite Integrals	Areas and graphs
38	Calculus	Limits, Leibniz' theorem
39	Definite integrals	Areas and graphs
40	Definite integrals	Areas and graphs
41	Inequalities	Simple observation that $2^{x^2} > 2^{x^3}$ if $0 < x < 1$
42	Straight lines	Family of straight lines
43	Differential equations	Homogeneous differential equations
44	Coordinates	Section formula
45	Circles	Equation of common chord $S_1 - S_2 = 0$

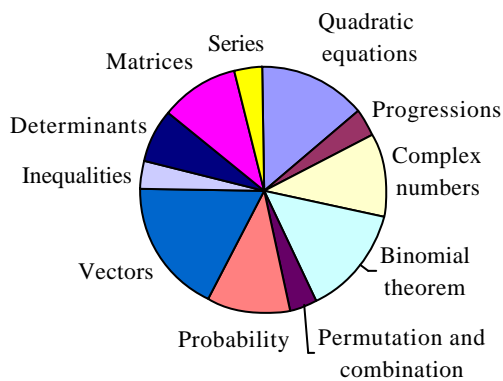
Question No.	Topic	Concept
46	Straight lines	Family of straight lines
47	Circle, locus	Orthogonality condition
48	Ellipse	Pythagoras theorem and $b^2 = a^2(1 - e^2)$
49	Circles	Condition for contact for two circles
50	3-D Straight lines	Dot product
51	3-D Line and Plane	Dot product
52	Hyperbola, locus	Condition for tangency $c^2 = a^2m^2 - b^2$
53	3-D Line and Plane	Distance between a line and a parallel plane
54	Vectors	$ \mathbf{a} ^2 = (\mathbf{a} \cdot \mathbf{i})^2 + (\mathbf{a} \cdot \mathbf{j})^2 + (\mathbf{a} \cdot \mathbf{k})^2$ and $(\mathbf{a} \times \mathbf{i})^2 = \mathbf{a} ^2 - (\mathbf{a} \cdot \mathbf{i})^2$
55	3-D, Spheres	Section formula
56	Vectors	Condition for coplanarity $[\mathbf{a} \ \mathbf{b} \ \mathbf{c}] = 0$
57	Vectors	Computation of $[\mathbf{a} \ \mathbf{b} \ \mathbf{c}]$
58	Vectors	Computation of $[\mathbf{a} \ \mathbf{b} \ \mathbf{c}]$
59	Classical probability	Elementary counting
60	Probability	Definition of a Poisson random variable
61	Probability	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
62	Kinematics	Distance-time graphs
63	Resolution of forces	Resultant of forces, Pythagoras theorem
64	Kinematics	Velocity-time graphs
65	Statics	Resultant of parallel forces and condition for equilibrium
66	Exponential series	$e = \sum_{n=0}^{\infty} \frac{x^n}{n!}$
67	Determinants, progressions	If a, b, c are +ve and in G.P. then $\log a, \log b, \log c$ are in A.P. If elements of each column are in A.P. then determinant is zero.

Question No.	Topic	Concept
68	Quadratic equations	Location of roots
69	Derivatives	Application of Rolle's theorem
70	Functions	Functional equations
71	3-D Geometry	Intersection of a plane and a sphere and Pythagoras theorem
72	Pair of straight lines	Angle between lines $\tan \theta = \frac{2\sqrt{h^2 - ab}}{a + b}$
73	Definite integral	$\int_a^b f(x) dx = \int_a^b f(a + b - x) dx$
74	Projectiles, kinematics	$\mathbf{v} = \mathbf{u} - \mathbf{g}t$ and dot product
75	Inequalities	Application of Cauchy-Schwarz inequality $\left \sum_{i=1}^n x_i \right \leq \sqrt{n} \left(\sum_{i=1}^n x_i^2 \right)^{\frac{1}{2}}$

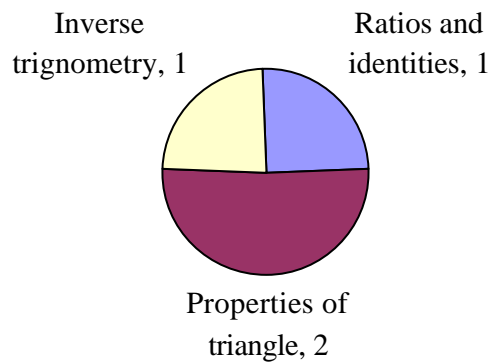
**Module wise breakup of Question
in
AIEEE-2005
by percentage**



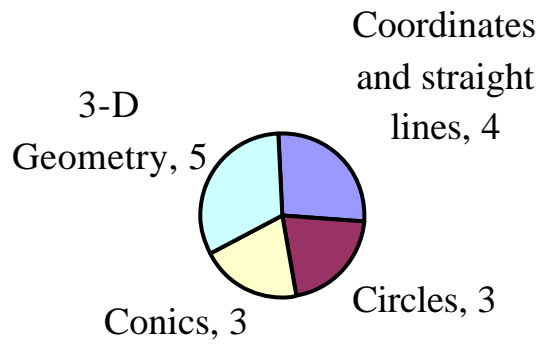
ALGEBRA



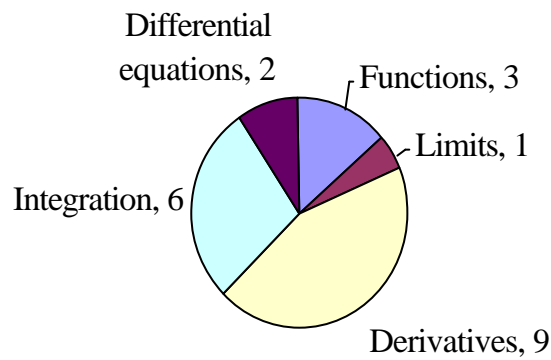
TRIGONOMETRY



COORDINATE GEOMETRY



CALCULUS



STATICS & DYNAMIC

