The Kelkar Education Trust's

Vinayak Ganesh Vaze College of Arts, Science & Commerce

(AUTONOMOUS)

College with Potential for Excellence

Mithaghar Road, Mulund East, Mumbai-400081, India

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Syllabus for F. Y. B. Sc. Programme:

Mathematics

Syllabus as per **Choice Based Credit System**

(June 2020 Onwards)

Submitted by

Department of Mathematics

Vinayak Ganesh Vaze College of Arts, Science and Commerce

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❖ Syllabus as per Choice Based Credit System

1. Name of the Programme	**F. Y. B. Sc. Mathematics: CBCS**	
The Mathematics course in F.Y.B.Sc is a one Year Full Time Course consisting of two semesters, to be known as Semester I and Semester II. Each semester consists of TWO core courses and practicals.		
2. Course Code	SEMESTER-I CODES	SEMESTER-II CODES
	SMAT101	SMAT201
	SMAT102	SMAT202
	SMATP101	SMATP201
3. Course Title	MATHEMATICS	
4. Semester wise Course Contents	Copy of the detailed syllabus enclosed	
5. References and additional references	Enclosed in the Syllabus	
6. No. of Credits per Semester	06	
7. No. of lectures per Unit	15	
8. No. of lectures per week	06	
9. No. of Practicals per week	For SMAT101 and SMAT102	01 (One Practical = 2 Lectures)
10. Scheme of Examination	Semester End Exam:**60 marks** (3 Questions of 20 marks each)	
	Internal Assessment :**40 marks**	
	Class Test :15 marks	
	Project/ Assignment :15 marks	
	Class Participation:10 marks	
11. Special notes, if any	No	
12. Eligibility, if any	As laid down in the College Admission brochure / website	
13. Fee Structure	As per College Fee Structure specifications	
14. Special Ordinances / Resolutions, if any	No	

Programme Structure and Course Credit Scheme:

Programme: F. Y. B. Sc.	Semester: I	Credits	Semester: II	Credits
Course 1: Maths Paper-I	Course Code SMAT101	2	Course Code SMAT201	2
Course 2: Maths Paper-II	Course Code SMAT102	2	Course Code SMAT202	2
Course 3: Practicals based on Maths paper I & II	Course Code SMATP101	2	Course Code SMATP201	2

Semester-wise Details of Mathematics Course

SEMESTER-I

Paper 1: CALCULUS I				
Course Code	**Unit**	**Topics**	**Credits**	**L/Week**
SMAT101	I	Real Number System	2	3
	II	Sequences		
	III	Limits and Continuity		
Paper 2: ALGEBRA I				
SMAT102	I	Integers and Divisibility	2	3
	II	Functions and Equivalence Relation		
	III	Polynomials		
PRACTICALS				
SMATP101		Practicals based on SMAT101and SMAT102	2	2

SEMESTER-II

Paper 1: CALCULUS II				
Course Code	**Unit**	**Topics**	**Credits**	**L/Week**
SMAT201	I	Series	2	3
	II	Continuous Functions and Their Applications		
	III	Differentiability and Its Applications		
Paper 2: ALGEBRA II				
SMAT202	I	System of Linear equations and Matrices	2	3
	II	Vector Spaces		
	III	Basis and Dimension of Vector Space		
PRACTICALS				
SMATP201		Practicals based on SMAT201 and SMAT202	2	2

SEMESTER – I									
Teaching Scheme (Hrs/Week)				**Continuous Internal Assessment (CIA) 40 marks**			**End Semester Examination Marks**		**Total**
Course Code	**L**	**P**	**C**	**CIA-1**	**CIA-2**	**CIA-3**	**Theory**	**Practical**	
SMAT101	03	01 (1P=2L)	2	15	15	10	60	--	100
SMAT102	03	01 (1P=2L)	2	15	15	10	60	--	100
SMATP101	--	--	2	--	--	--	--	100	100
Total credits of the course = 02 + 02+ 02 = 06									
Max. Time, End Semester Exam (Theory) : 2 .00 Hrs.									

SEMESTER - II									
Teaching Scheme (Hrs/Week)				**Continuous Internal Assessment (CIA) 40 marks**			**End Semester Examination Marks**		**Total**
Course Code	**L**	**P**	**C**	**CIA-1**	**CIA-2**	**CIA-3**	**Theory**	**Practical**	
SMAT201	03	01 (1P=2L)	2	15	15	10	60	--	100
SMAT202	03	01 (1P=2L)	2	15	15	10	60	--	100
SMATP201	--	--	2	--	--	--	--	100	100
Total credits of the course = 02 + 02+ 02 = 06									
Max. Time, End Semester Exam (Theory) : 2 .00 Hrs.									

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Course Content -Semester-I

Paper 1: CALCULUS I				
Course Code	**Unit**	**Topics**	**Credits**	**L/Week**
SMAT101	I	Real Number System	2	3
	II	Sequences		
	III	Limits and Continuity		
Paper 2: ALGEBRA I				
SMAT102	I	Integers and Divisibility	2	3
	II	Functions and Equivalence Relation		
	III	Polynomials		
PRACTICALS				
SMATP101		Practicals based on SMAT101and SMAT102	2	2

F. Y. B. Sc. MATHEMATICS: Choice Based Credit System			
Semester I			
PAPER: I - CALCULUS I			
Course Name: Calculus I (45 lectures)		**Course Code SMAT101**	
Periods per week (1 period 48 minutes)		**03**	
Credits		**02**	
Evaluation System		**Hours**	**Marks**
	Theory Examination	2.0	60
	Theory Internal		40

Unit No.	Content	No. of lectures
Unit I	**Real Number System** Real number system $\mathbb{R}$ and order properties of $\mathbb{R}$, Absolute value and its properties, AM-GM inequality, Cauchy schwarz inequality, Intervals and neighbourhoods, Hausdroff property, Bounded sets, supremum, infimum and their properties, statement of L.U.B. axiom, Archimedean property and its applications, Density of rationals in $\mathbb{R}$, Existence of n^{th} root of positive real numbers.	**15**
Unit II	**Sequences** Definition of a sequence and examples, convergence and divergence of sequences, Boundedness of convergent sequence, Uniqueness of limit of a convergent sequence, Algebra of convergent sequences, Sandwich theorem, Monotone sequences, monotone convergence theorems and consequences. Convergence of standard sequences like $\left(\frac{1}{1+na}\right) \forall\, a > 0$, $(b^n) \quad \forall\, b \in (0,1)$, $\left(C^{\frac{1}{n}}\right) \forall\, C > 0$, $\left(n^{\frac{1}{n}}\right)$ and $\left(1+\frac{1}{n}\right)^n$. Subsequences, Cauchy sequence and examples. Every convergent sequence is a Cauchy sequence. Boundedness of a Cauchy sequence. Cauchy Completeness property, Recursive Sequences.	**15**
Unit III	**Limits and Continuity** Graphs of some standard functions such as $\lvert x\rvert, e^x$, $In\ x$, $\frac{1}{x}$, $\sin x$, $\cos x$, $\tan x$, $\sin\left(\frac{1}{x}\right)$, $x\sin\left(\frac{1}{x}\right)$, $x^2\sin\left(\frac{1}{x}\right)$, ax^2+bx+c over suitable intervals in $\mathbb{R}$, conic sections. limit of a function, $(\varepsilon-\delta)$ definition of limit of a function, Evaluation of limit of simple functions using $(\varepsilon-\delta)$ definition, uniqueness of limit when it exists, Algebra of limits, Sandwich theorem for limits, one sided limits, non-existence of limits, limit at infinity and infinite limits. Continuous functions: Continuity of a real valued function on a set in terms of limits, examples, Continuity of a real valued function at end points of domain, Sequential continuity, Algebra of continuous functions, discontinuous functions, examples of removable and essential discontinuity.	**15**

List of suggested practicals based on SMAT 101:
1. Order properties, absolute value, AM-GM inequality, Hausdorff property.
2. Bounded sets, supremum and infimum, Archimedian property.
3. Convergent sequences, divergent sequences, sandwich theorem.
4. Monotone sequences, Cauchy sequences, Subsequences.
5. Drawing graphs of functions.
6. Limits of functions, sandwich theorem, non-existence of limits
7. Miscellaneous theoretical questions based on three units.

Learning Outcomes:

After learning this course, the learner will be able to

- Understand many properties of the real line $\mathbb{R}$ and learn to define sequence in terms of functions from $\mathbb{R}$ to a subset of $\mathbb{R}$.
- Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
- Calculate the limit and examine the continuity of a function at a point.
- Sketch curves in Cartesian and polar coordinate systems.

Reference Books:

1. Robert G. Bartle, Donald R. Sherbert, Introduction to Real Analysis, third edition, John Wiley & Sons, Inc.
2. R. R. Goldberg, Methods of real analysis, Indian Edition, Oxford and IBH publishing, New Delhi.
3. Tom M. Apostol, Calculus Vol.1, Second edition, John Wiley & Sons.
4. Sudhir R. Ghorpade, Balmohan V. Limaye, A Course in Calculus and Real Analysis, International edition, Springer.
5. Russell A. Gordon, Real Analysis A First Course, Second edition, Addison Wesley.
6. S. C. Malik, Savita Arora, Mathematical Analysis, third edition, New Age International Publishers, India.
7. William Trench, Introduction to Real Analysis, Free hyperlinked edition.
8. D. Somasundaram, B. Choudhary, A First Course in Mathematical Analysis, corrected edition, Narosa Publishing House.
9. Ajit Kumar, S. Kumaresan, A Basic Course in Real Analysis, CRC Press.
10. Charles G. Denlinger, Elements of Real Analysis, student edition, Jones & Bartlett.
11. M. Thamban Nair, Calculus of One Variable, student edition, Ane Books Pvt. Ltd.

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F. Y. B. Sc. MATHEMATICS: Choice Based Credit System			
Semester I			
PAPER: II ALGEBRA I			
Course Name: Algebra I (45 lectures)		**Course Code SMAT102**	
Lectures per week (1 period 48 minutes)		**03**	
Credits		**02**	
Evaluation System		**Hours**	**Marks**
	Theory Examination	2.0	60
	Theory Internal		40

Unit No.	Content	No. of lectures
Unit I	**Integers & Divisibility** Statement of well-ordering property of non-negative integers, Principles of mathematical induction (first and second) as a consequence of well-ordering property. Divisibility in integers, division algorithm, greatest common divisor (g.c.d.) and least common multiple (l.c.m.) of two integers, basic properties of g.c.d. such as existence and uniqueness of g.c.d. of integers a & b and that the g.c.d. can be expressed as $ma + nb$ for some $m, n \in \mathbb{Z}$, Euclidean algorithm. Primes, Euclid's lemma, Fundamental theorem of arithmetic, the set of primes is infinite. Congruences, definition and elementary properties, Euler's ϕ function, statements of Euler's theorem, Fermat's theorem and Wilson's theorem and their applications.	**15**
Unit II	**Functions and Equivalence Relations** Definition of a function, domain, co-domain and range of a function, composite functions, examples, Direct image f(A) and inverse image $f^{-1}(B)$ for a function f, injective, surjective, bijective functions, Composite of injective, surjective, bijective functions when defined, invertible functions, bijective functions are invertible and conversely. Examples of functions including constant, identity, projection, inclusion. Binary operation, properties, examples. Equivalence relation, Equivalence classes, properties such as two equivalences classes are either identical or disjoint, Definition of partition, every partition gives an equivalence relation and vice versa. Congruence is an equivalence relation on $\mathbb{Z}$, Residue classes and partition of $\mathbb{Z}$, addition and multiplication modulo n in $\mathbb{Z}_n$.	**15**

Unit III	**Polynomials** Definition of polynomials over $\mathbb{Z}$, $\mathbb{Q}$, $\mathbb{R}$ *or* $\mathbb{C}$, Algebra of polynomials, degree of polynomial, basic properties. Division algorithm in F[x] (without proof), and g.c.d. of two polynomials and its basic properties (without proof), Euclidean algorithm (without proof), applications, Roots of a polynomial, relation between roots and coefficients, multiplicity of a root, Remainder theorem, Factor theorem. A polynomial of degree n has at most n roots, Complex roots of a polynomial in $\mathbb{R}$[x] occur in conjugate pairs, Statement of Fundamental Theorem of Algebra, A polynomial of degree in $\mathbb{C}$[x] has exactly n complex roots counted with multiplicity, Rational root theorem, simple consequences such as $\sqrt{p}$ is a irrational number where p is a prime number, Eisenstein's Criterion for irreducibility of a polynomial with integer coefficient (without proof), roots of unity, sum of all the roots of unity.	**15**

List of suggested Practical for SMAT102:
1. Mathematical induction, Divisibility, GCD
2. Primes and their properties, Congruences
3. Functions
4. Binary operations and Equivalence relations
5. GCD of two polynomial, relation between roots and coefficients of polynomials, factorization.
6. Rational root theorem, Eisenstein's Criterion.
7. Miscellaneous Theoretical Questions based on three units.

Learning Outcomes:

After learning this course, the learner will be able to

- Know the properties of prime numbers.
- Understand mathematical induction as a proof technique
- Understand basics of functions.
- Understand Congruence in $\mathbb{Z}_n$, equivalence relation
- Find the GCD of two polynomials and roots of polynomials

Reference Books :

1. David M. Burton, Elementary Number Theory, Seventh Edition, McGraw Hill Education (India) Private Ltd.
2. Norman L. Biggs, Discrete Mathematics, Revised Edition, Clarendon Press, Oxford

Additional Reference Books :

1. I. Niven and S. Zuckerman, Introduction to the theory of numbers, Third Edition, Wiley Eastern, New Delhi
2. Ajit kumar S. Kumaresan & B.K. Sarma, A Foundation Course in Mathematics, Narosa publishing House
3. G. Birkhoff and S. Maclane, A Survey of Modern Algebra, Third Edition, MacMillan
4. N. S. Gopalkrishnan, University Algebra, New Age International Ltd
5. I.N. Herstein, Topics in Algebra, John Wiley
6. P. B. Bhattacharya, S. K. Jain and S. R. Nagpaul, Basic Abstract Algebra, New Age International
7. Kenneth Rosen, Discrete Mathematics and its applications, Mc-Graw Hill International Edition, Mathematics Series.
8. L. N. Childs, Concrete introduction to higher algebra, Third Edition, Springer.

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Course Content -Semester-II

Paper 1: CALCULUS II				
Course Code	**Unit**	**Topics**	**Credits**	**L/Week**
SMAT201	I	Series	2	3
	II	Continuous Functions and Their Applications		
	III	Differentiability and Its Applications		
Paper 2: ALGEBRA II				
SMAT202	I	System of Linear equations and Matrices	2	3
	II	Vector Spaces		
	III	Basis and Dimension of Vector Space		
PRACTICALS				
SMATP201		Practicals based on SMAT201 and SMAT202	2	2

F. Y. B. Sc. MATHEMATICS: Choice Based Credit System			
Semester II			
PAPER : I CALCULUS II			
Course Name: Calculus (45 lectures)		**Course Code SMAT201**	
Periods per week (1 period 48 minutes)		**03**	
Credits		**02**	
Evaluation System		**Hours**	**Marks**
	Theory Examination	2.0	60
	Theory Internal		40

Unit No.	Content	No. of lectures
Unit I	**Series** Infinite series of real numbers, convergent series, divergent series. Necessary condition for convergence of series. Algebra of convergent series, Cauchy's criterion, harmonic series, p-harmonic series, Comparison test, Limit comparison test, ratio test (without proof), root test (without proof) and examples, alternating series, Leibnitz test for alternating series, absolute convergence, conditional convergence.	**15**
Unit II	**Continuity and Its Applications** Continuity of real valued functions with domain as intervals in $\mathbb{R}$, examples, continuity of functions at end points of interval, Sequential continuity, Algebra of continuous functions, continuity of composite functions. Discontinuous functions, examples of removable and essential discontinuities. Sign preserving property of continuous function. Intermediate value theorem and its applications. Bolzano Weierstrass Theorem	**15**
Unit III	**Differentiability and Its Applications** Notion of differentiability with geometrical and physical interpretation, non-differentiable functions, necessary condition for differentiability of real valued function, algebra of differentiable functions, derivative of inverse functions, chain rule. Higher order derivatives, Leibnitz rule, implicit differentiation, Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, increasing and decreasing functions, extreme values, stationary points, first derivative test, second derivative test, point of inflection, convex and concave functions, L-Hospital rule (statement only), Taylor's theorem with Lagrange's form of remainder (statement only).	**15**

List of Practicals based on SMAT201
1. Learning series of real numbers and its behavior using sequence of partial sums and some tests for convergence. 2. Alternating series. 3. Continuous functions ϵ -δ definition, sequential continuity. 4. Applications of continuous functions. 5. Leibnitz theorem, extreme values, convex and concave functions. 6. Mean value theorems, Taylor's theorem. 7. Miscellaneous theoretical questions based on three units.

Learning Outcomes:

On studying the syllabi the learner will be able to understand

- Convergence and divergence of Series
- Absolute & conditional convergence.
- Continuity & Sequential continuity
- Intermediate value theorem and Bolzano Weierstrass Theorem
- Differentiability with geometrical and physical interpretation
- Mean value theorem & its applications

Reference Books :

1. Robert G. Bartle, Donald R. Sherbert, Introduction to Real Analysis, third edition, John Wiley & Sons, Inc.
2. R. R. Goldberg, Methods of real analysis, Indian Edition, Oxford and IBH publishing, New Delhi.
3. Tom M. Apostol, Calculus Vol.1, Second edition, John Wiley & Sons
4. Sudhir R. Ghorpade, Balmohan V. Limaye, A Course in Calculus and Real Analysis, International edition, Springer
5. Russell A. Gordon, Real Analysis A First Course, Second edition, AddisonWesley
6. S. C. Malik, Savita Arora, Mathematical Analysis, third edition, New Age International Publishers, India.
7. William Trench, Introduction to Real Analysis, Free hyperlinked edition.
8. D. Somasundaram, B. Choudhary, A First Course in Mathematical Analysis, corrected edition, Narosa Publishing House.
9. Ajit Kumar, S. Kumaresan, A Basic Course in Real Analysis, CRC Press.
10. Charles G. Denlinger, Elements of Real Analysis, student edition, Jones & Bartlett Publishers.
11. M. Thamban Nair, Calculus of One Variable, student edition, Ane Books Pvt. Ltd.

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F. Y. B. Sc. MATHEMATICS: Choice Based Credit System			
Semester II			
PAPER: II ALGEBRA II			
Course Name: Algebra II (45 lectures)		**Course Code SMAT202**	
Periods per week (1 period 48 minutes)		**03**	
Credits		**02**	
Evaluation System		**Hours**	**Marks**
	Theory Examination	2.0	60
	Theory Internal		40

Unit No.	Content	No. of lectures
Unit I	**System of Linear Equations and Matrices** Definition of *n-tuples* of real numbers, sum of two *n-tuples* and scalar multiple of *n-tuples*. Parametric equation of lines and planes. System of homogeneous and non-homogeneous linear equations, the solution of system of m homogeneous linear equations in n unknowns by elimination and their geometrical interpretation for $(m, n) = (1,2), (1,3), (2, 2), (2, 3), (3, 3)$. Matrix units, elementary row operations, elementary matrices, invertible matrices, elementary matrices are invertible and an invertible matrix is a product of elementary matrices. Row echelon form of matrices, rank of a matrix. System of linear equations in matrix form, Gaussian elimination method, System of m homogeneous linear equations in n unknowns has a non-trivial solution if $m < n$.	**15**
Unit II	**Vector Spaces** Definition of a real vector space, Examples such as $\mathbb{R}^n, \mathbb{R}[x]$, $\mathcal{M}_{mxn}(\mathbb{R})$ space of all real valued functions on a non-empty set. Definition of a subspace of a vector space and examples such as: lines, planes passing through origin as sub-spaces of respectively; upper triangular matrices, diagonal matrices, symmetric matrices, skew-symmetric matrices as subspaces of $M_n(\mathbb{R})(\, n = 2,3)$; $P_n[x] = \{\, a_0 + a_1 x + \cdots a_n x^n \;/\; a_i \in \mathbb{R} \,\forall\, 0 \le i \le n \,\}$ as a subspace of $\mathbb{R}[X]$, the space of all solutions of the system of homogeneous linear equations in n unknowns as a subspace of $\mathbb{R}$ Properties of a subspace such as necessary and sufficient condition for a non empty subset to be a subspace of a vector space, arbitrary intersection of subspaces of a vector space is a subspace, union of two subspaces is a subspace if and only if one is a subset of the other. Finite linear combinations of vectors in a vector space; the linear span L(S) of a non-empty subset S of a vector space, S is a generating set for L(S); L(S) is a vector subspace of V.	**15**

	Linearly independent/linearly dependent subsets of a vector space, a subset $\{v_1, v_2, \dots\dots\dots, v_k\}$ of a vector space is linearly dependent if and only if $\exists\, i \in \{1,2, \dots, k\}$ such that $v_i$is a linear combination of the other vectors $v_j's$.	
Unit III	**Basis and Dimension of Vector Space** Basis of a vector space, dimension of a vector space, maximal linearly independent subset of a vector space is a basis of a vector space, minimal generating set of a vector space is a basis of a vector space, any two basis of a vector space have the same number of elements, any set of n linearly independent vectors in an n dimensional vector space is a basis, any collection of n + 1 linearly independent vectors in an n-dimensional vector space is linearly dependent; extending any basis of a subspace W of a vector space V to a basis of the vector space V. If W_1, W_2 are two subspaces of a vector space V then $W_1 + W_2$ is a subspace of the vector space V of dimension $\dim(W_1 + W_2) = \dim(W_1) + \dim(W_2) - \dim(W_1 \cap W_2)$.	**15**

List of suggested practicals based on SMAT202:
1. Solving homogeneous system of m equations in n unknowns and their geometrical interpretation for $(m;\ n) = (1;\ 2);\ (1;\ 3);\ (2;\ 2);\ (2;\ 2);\ (3;\ 3)$, Row echelon form.
2. Solving any m by n linear system of equations, elementary matrices and invertible matrices.
3. Examples of vector spaces, Subspaces
4. Linearly dependent and Linearly Independent Set of a vector space
5. Basis and Dimension of Vector Space.
6. Row space, Column space, rank of a matrix
7. Miscellaneous Theoretical Questions based on three units.

Learning Outcomes:

On studying the syllabi, the learner will be able to

1. Solve Equation of lines and planes, System of linear equations
2. Understand Matrices & Gaussian elimination method
3. Understand real vector spaces, subspaces, basis, dimension and their properties.
4. Find the row space, column space and rank of a matrix.

Recommended Books.

1. Serge Lang, Introduction to Linear Algebra, Second Edition, Springer.
2. S. Kumaresan , Linear Algebra , Prentice Hall of India Pvt limited.
3. Gilbert Strang , Linear Algebra and its Applications, International Student Edition.
4. L. Smith, Linear Algebra, Springer Verlag.
5. A. Ramchandran Rao, P. Bhimashankaran; Linear Algebra Tata Mac GrawHill.

6. T. Banchoff and J. Wermer, Linear Algebra through Geometry, Springer Verlag, NewYork.
7. Sheldon Axler, Linear Algebra done right, Springer Verlag, New York.
8. Klaus Janich, Linear Algebra, Springer Verlag.
9. Otto Bretscher, Linear Algebra with Applications, Pearson Education.
10. Gareth Williams, Linear Algebra with Applications, Narosa Publication.
11. K.Hoffman and R. Kunze Linear Algebra, Tata MacGraw Hill, New Delhi.
12. H. Anton, Elementary Linear Algebra, Wiley publication.

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THEORY EXAMINATION PATTERN

Que.1 A)	Attempt Any One:	(8 Marks)
	i) Theory Question based on Unit-I	
	ii) Theory Question based on Unit-I	
B)	Attempt Any Two:	(12 Marks)
	i) Problems based on Unit-I	
	ii) Problems based on Unit-I	
	iii) Problems based on Unit-I	
Que.2 A)	Attempt Any One:	(8 Marks)
	i) Theory Question based on Unit-II	
	ii) Theory Question based on Unit-II	
B)	Attempt Any Two:	(12 Marks)
	i) Problems based on Unit-II	
	ii) Problems based on Unit-II	
	iii) Problems based on Unit-II	
Que.3 A)	Attempt Any One:	(8 Marks)
	i) Theory Question based on Unit-III	
	ii) Theory Question based on Unit-III	
B)	Attempt Any Two:	(12 Marks)
	i) Problems based on Unit-III	
	ii) Problems based on Unit-III	
	iii) Problems based on Unit-III	

Semester End Examinations Practicals:

At the end of the Semesters I & II Practical examinations of three hours duration and 100 marks shall be conducted for the courses SMATP101, SMATP102.

Marks for Journals and Viva:

For each course SMAT101, SMAT102 , SMAT201 and SMAT202:

1. Journals: 5 marks.

2. Viva: 5 marks.

Each Practical of every course of Semester I and II shall contain 10 (ten) problems out of which minimum 05 (five) have to be written in the journal. A student must have a certified journal before appearing for the practical examination.

PRATICAL EXAMINATION PATTERN

Que.1	Attempt any 8 objectives out of 12 from the following:	(8 x 3=24 Marks)
Que.2	Attempt any two from the following:	(8 x 2 =16 Marks)
	a) Based on unit-I	
	b) Based on unit-II	
	c) Based on unit-III	

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