

## Question Pattern for

### 4-year B.A./B.Sc. Honours & Honours with Research, with Mathematics Major

<b>MTHM-DSCC 1-TH</b>	<b>Calculus, Geometry &amp; Vector Analysis</b>
<b>Group A : Calculus</b> (Marks : 20)	(a) Short answer type questions: 2 questions are to be attempted out of 3 questions each carrying 2 marks. (b) Long answer type questions: 4 questions are to be attempted out of 6 questions each carrying 4 marks. Each question may have multiple parts.
<b>Group B : Geometry</b> (Marks : 35)	5 questions are to be attempted out of 8 questions each carrying 7 marks. Each question may have multiple parts.
<b>Group C : Vector Analysis</b> (Marks : 20)	(a) Short answer type questions: 2 questions are to be attempted out of 3 questions each carrying 2 marks. (b) Long answer type questions: 4 questions are to be attempted out of 6 questions each carrying 4 marks. Each question may have multiple parts.
<b>MTHM-SEC 1-TH</b>	<b>C Language with Mathematical Applications</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 7 questions each carrying 3 marks (b) Long answer type questions: 5 questions are to be attempted out of 7 questions each carrying 8 marks Each question may have multiple parts. (a) Longer answer type questions: 2 questions are to be attempted out of 3 questions each carrying 10 marks. Each question may have multiple parts.
<b>MTHM-DSCC 2-TH</b>	<b>Basic Algebra</b>
<b>Group A, B, C :</b> (Each group carries 25 marks)	5 questions are to be attempted out of 8 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-SEC 2.1-TH</b>	<b>Python Programming &amp; Introduction to Latex</b>
<b>Group A :</b> <b>Python programming</b> (Marks : 50)	(a) Short answer type questions: 5 questions are to be attempted out of 7 questions each carrying 3 marks. (b) Long answer type questions: 7 questions are to be attempted out of 10 questions each carrying 5 marks Each question may have multiple parts.
<b>Group B :</b> <b>Introduction to Latex</b> (Marks : 25)	(a) Short answer type questions: 5 questions are to be attempted out of 7 questions each carrying 2 marks (b) Long answer type questions: 3 questions are to be attempted out of 5 questions each carrying 5 marks. Each question may have multiple parts.

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<b>MTHM-DSCC 3-TH</b>	<b>Real Analysis</b>
<b>Group A :</b> (Marks : 30)	(a) Short answer type questions: 3 questions are to be attempted out of 5 questions each carrying 3 marks. (b) Long answer type questions: 3 questions are to be attempted out of 5 questions each carrying 7 marks. Each question may have multiple parts.
<b>Group B :</b> (Marks : 35)	(a) Short answer type questions: 4 questions are to be attempted out of 6 questions each carrying 2 marks. (b) Long answer type questions: (i) 3 questions are to be attempted out of 5 questions each carrying 4 marks. (ii) 3 questions are to be attempted out of 5 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group C :</b> (Marks : 10)	2 questions are to be attempted out of 4 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 4-TH</b>	<b>Ordinary Differential Equations-I and Group Theory-I</b>
<b>Group A : Ordinary Differential Equations-I</b> (Marks : 45)	9 questions are to be attempted out of 14 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B : Group Theory-I</b> (Marks : 30)	6 questions are to be attempted out of 9 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-SEC 3-TH</b>	<b>Linear Programming &amp; Rectangular Games</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. (b) Long answer type questions: (i) 5 questions are to be attempted out of 8 questions each carrying 6 marks. (questions are to be set from first three items, starting from LPP formulation to Two-phase method)] (ii) 5 questions are to be attempted out of 8 questions each carrying 6 marks. (questions are to be set from last three items, starting from Duality theory to Game problems)
<b>MTHM-DSCC 5-TH</b>	<b>Theory of Real Functions</b>
<b>Group A : Limit &amp; Continuity of functions</b> (Marks : 45)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. (b) Long answer type questions: 6 questions are to be attempted out of 9 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B : Differentiability of functions</b> (Marks : 30)	(a) Short answer type questions: 4 questions are to be attempted out of 6 questions each carrying 3 marks. (b) Long answer type questions: 3 questions are to be attempted out of 5 questions each carrying 6 marks. Each question may have multiple parts.

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<b>MTHM-DSCC 6-TH</b>	<b>Mechanics-I</b>
(Marks : 75)	<p>(a) Short answer type questions: 6 questions are to be attempted out of 9 questions each carrying 2 marks.</p> <p>(b) Long answer type questions: (i) 7 questions are to be attempted out of 10 questions each carrying 6 marks. (2 questions from Statics, 4 questions from Law of gravitation portion, 2 questions from Work, Power, Energy portion and 2 questions from Impulse of a force portion are to be set.) (ii) 3 questions are to be attempted out of 5 questions each carrying 7 marks. (questions are to be set from Motion of a particle in a plane)</p>
<b>MTHM-DSCC 7-TH</b>	<b>Multivariate Calculus-I and Partial Differential Equations-I</b>
<b>Group A : Multivariate Calculus - I</b> (Marks : 60)	<p>(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 2 marks.</p> <p>(b) Long answer type questions: 5 questions are to be attempted out of 8 questions each carrying 10 marks. Each question may have multiple parts.</p>
<b>Group B : Partial Differential Equations - I</b> (Marks : 15)	3 questions are to be attempted out of 5 questions each carrying 5 marks.
<b>MTHM-DSCC 8-TH</b>	<b>Group Theory-II and Ring Theory-I</b>
<b>Group A : Group Theory - II</b> (Marks : 40)	8 questions are to be attempted out of 11 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B : Ring Theory - I</b> (Marks : 35)	7 questions are to be attempted out of 10 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 9-TH</b>	<b>Probability and Statistics</b>
<b>Group A : Probability</b> (Marks : 45)	<p>(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts.</p> <p>(b) Long answer type questions: 5 questions are to be attempted out of 8 questions each carrying 6 marks. Each question may have multiple parts.</p>
<b>Group B : Statistics</b> (Marks : 30)	<p>(a) Short answer type questions: 3 questions are to be attempted out of 5 questions each carrying 3 marks. Each question may have multiple parts.</p> <p>(b) Long answer type questions: 3 questions are to be attempted out of 5 questions each carrying 7 marks. Each question may have multiple parts.</p>

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<b>MTHM-DSCC 10-TH</b>	<b>Ring Theory-II &amp; Linear Algebra-I</b>
<b>Group A :</b> <b>Ring Theory - II</b> (Marks : 40)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 5 questions are to be attempted out of 8 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B :</b> <b>Linear Algebra - I</b> (Marks : 35)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 4 questions are to be attempted out of 7 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 11-TH</b>	<b>Riemann Integration &amp; Series of functions</b>
<b>Group A :</b> <b>Riemann Integration</b> (Marks : 50)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 7 questions are to be attempted out of 11 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B : Series of functions</b> (Marks : 25)	5 questions are to be attempted out of 8 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 12-TH</b>	<b>Mechanics-II</b>
<b>Statics-II</b> (Marks : 28)	4 questions are to be attempted out of 7 questions each carrying 7 marks. Each question may have multiple parts.
<b>Particle Dynamics-II</b> (Marks : 15)	1 question of Dynamics of a particle is to be attempted from 3 questions carrying 8 marks and 1 question of Dynamics of a system of particles is to be attempted from 3 questions carrying 7 marks. Each question may have multiple parts.
<b>Dynamics of a rigid body</b> (Marks : 32)	4 questions are to be attempted out of 7 questions each carrying 8 marks. Each question may have multiple parts.
<b>MTHM-DSCC 13-TH</b>	<b>Metric Space &amp; Complex Analysis-I</b>
<b>Group A :</b> <b>Metric Space</b> (Marks : 45)	(a) Short answer type questions: 5 questions are to be attempted out of 7 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 6 questions are to be attempted out of 8 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B :</b> <b>Complex Analysis - I</b> (Marks : 30)	6 questions are to be attempted out of 9 questions each carrying 5 marks. Each question may have multiple parts.

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<b>MTHM-DSCC 14-TH</b>	<b>Multivariate Calculus &amp; Application of Calculus</b>
<b>Group A : Multivariate Calculus</b> (Marks : 50)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 5 questions are to be attempted out of 8 questions each carrying 7 marks. Each question may have multiple parts.
<b>Group B: Application of Calculus</b> (Marks : 25)	5 questions are to be attempted out of 8 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 15-TH</b>	<b>Numerical Analysis</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: (i) 6 questions are to be attempted out of 9 questions each carrying 5 marks. These questions will be set from the topics Representation of numbers and errors in Numerical Analysis, Approximation, Interpolation, Numerical Differentiation and Numerical Integration. Each question may have multiple parts. (ii) 6 questions are to be attempted out of 9 questions each carrying 5 marks. These questions will be set from the topics Numerical solution of linear and nonlinear equations, matrix inversion, algebraic Eigen value problem and Numerical solution of initial value problems for ordinary differential equations. Each question may have multiple parts.
<b>MTHM-DSCC 16-TH</b>	<b>Group Theory-III &amp; Linear Algebra - II</b>
<b>Group A : Group Theory-III</b> (Marks : 35)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 2 marks. (b) Long answer type questions: 5 questions are to be attempted out of 8 questions each carrying 5 marks Each question may have multiple parts.
<b>Group B : Linear Algebra-II</b> (Marks : 40)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 2 marks. (b) Long answer type questions: 6 questions are to be attempted out of 10 questions each carrying 5 marks. Each question may have multiple parts.

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<b>MTHM-DSCC 17-TH</b>	<b>Complex Analysis-II and Measure Theory-I</b>
<b>Group A :</b> <b>Complex Analysis-II</b> (Marks : 40)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 2 marks. (b) Long answer type questions: 6 questions are to be attempted out of 10 questions each carrying 5 marks Each question may have multiple parts.
<b>Group B :</b> <b>Measure Theory-I</b> (Marks : 35)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 2 marks. (b) Long answer type questions: 5 questions are to be attempted out of 8 questions each carrying 5 marks Each question may have multiple parts.
<b>MTHM-DSCC 18-TH</b>	<b>Generalized Functions, Integral Transforms &amp; Integral Equations</b>
<b>Group A :</b> <b>Generalized Functions</b> (Marks : 15)	3 questions are to be attempted out of 6 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B :</b> <b>Integral Transforms</b> (Marks : 35)	7 questions are to be attempted out of 11 questions each carrying 5 marks. Each question may have multiple parts. From each of the integral transforms at least five questions should be set.
<b>Group C :</b> <b>Integral Equations</b> (Marks : 25)	5 questions are to be attempted out of 8 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 19-TH</b>	<b>Topology-I</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 10 questions are to be attempted out of 15 questions each carrying 6 marks Each question may have multiple parts.
<b>MTHM-DSCC 20-TH</b>	<b>Functional Analysis-I</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 10 questions are to be attempted out of 15 questions each carrying 6 marks Each question may have multiple parts.

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<b>MTHM-DSCC 21-TH</b>	<b>Ordinary Differential Equations-II &amp; Partial Differential Equations-II</b>
<b>Group A: Ordinary Differential Equations-II</b> (Marks: 45)	(a) 5 questions are to be attempted out of 8 questions each carrying 5 marks. These questions will be set from the topics Qualitative Analysis of One-dimensional Continuous Systems, One-dimensional Bifurcations and Systems of Differential Equations. Each question may have multiple parts. (b) 2 questions are to be attempted out of 4 questions each carrying 10 marks. These questions will be set from the topics Series Solution and Special Functions and Sturm–Liouville Problems and Eigen function Expansions. Each question may have multiple parts.
<b>Group-B : Partial Differential Equations-II</b> (Marks : 30)	5 questions are to be attempted out of 8 questions each carrying 6 marks. Each question may have multiple parts.
<b>MTHM-DSCC 22-TH</b>	<b>Graph Theory</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 10 questions are to be attempted out of 15 questions each carrying 6 marks. Each question may have multiple parts.
<b>MTHM-DSCC 23.1-TH</b>	<b>Mechanics-III</b>
<b>Group A: Classical Mechanics</b> (Marks : 60)	(a) 5 questions are to be attempted out of 8 questions each carrying 6 marks. These will be set from the topics mentioned in the syllabus starting from ‘Mechanics of a system of particles...’ to ‘...Statement of Noether’s theorem with some illustrations’. Each question may have multiple parts. (b) 5 questions are to be attempted out of 8 questions each carrying 6 marks. These will be set from the topics mentioned in the syllabus starting from ‘Hamiltonian and Hamiltonian equations...’ to ‘...Generating function; Jacobi-Poisson Equation’. Each question may have multiple parts.
<b>Group B: Continuum Mechanics</b> (Marks : 15)	3 questions are to be attempted out of 6 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 23.2-TH</b>	<b>Measure Theory-II</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 10 questions are to be attempted out of 15 questions each carrying 6 marks. Each question may have multiple parts.

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<b>MTHM-DSCC 24.1-TH</b>	<b>Operations Research &amp; Stochastic process</b>
<b>Group A : Operations Research</b> (Marks : 50)	(a) 5 questions are to be attempted out of 8 questions each carrying 7 marks. These will be set from the topics Integer Programming, Network Optimization and Queuing Theory. Each question may have multiple parts. (b) 3 questions are to be attempted out of 5 questions each carrying 5 marks. These will be set from the topics Monte Carlo simulation and Inventory Models. Each question may have multiple parts.
<b>Group B : Stochastic process</b> (Marks : 25)	5 questions are to be attempted out of 8 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 24.2-TH</b>	<b>Differential Geometry</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. Each question may have multiple parts. (b) Long answer type questions: 10 questions are to be attempted out of 15 questions each carrying 6 marks Each question may have multiple parts.
<b>MTHM-DSCC 25.1-TH</b>	<b>Fluid Mechanics &amp; Computational Mathematics</b>
<b>Group A : Fluid Mechanics</b> (Marks : 35)	5 questions are to be attempted out of 8 questions each carrying 7 marks. Each question may have multiple parts.
<b>Group B : Computational Mathe- matics</b> (Marks : 40)	8 questions are to be attempted out of 12 questions each carrying 5 marks. Each question may have multiple parts.
<b>MTHM-DSCC 25.2-TH</b>	<b>Functional Analysis - II and Topology - II</b>
<b>Group A : Functional Analysis-II</b> (Marks : 40)	5 questions are to be attempted out of 8 questions each carrying 8 marks. Each question may have multiple parts.
<b>Group B : Topology-II</b> (Marks : 35)	5 questions are to be attempted out of 8 questions each carrying 7 marks. Each question may have multiple parts.
<b>MTHM-DSCC-RM1-TH</b>	<b>Research Methodology - I</b>
<b>Group A :</b> (Marks : 30)	(a) 10 questions are to be attempted out of 12 questions each carrying 1 mark. (b) 10 questions are to be attempted out of 12 questions each carrying 2 marks.
<b>Group B :</b> (Marks : 45)	(a) 1 compulsory question carrying 3 marks. (b) 7 questions are to be attempted out of 10 questions each carrying 6 marks. Each question may have multiple parts.

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<b>MTHM-DSCC-RM2-TH</b>	<b>Research Methodology - II</b>
<b>Group A :</b> (Marks : 25)	(a) 5 questions are to be attempted out of 7 questions each carrying 1 mark. (b) 10 questions are to be attempted out of 12 questions each carrying 2 marks.
<b>Group B : Unit I</b> (Marks : 50)	(a) 3 questions are to be attempted out of 5 questions each carrying 5 marks. These questions will be set from Introduction to Graph Theory and Graph Algorithm. Each question may have multiple parts. (b) 5 questions are to be attempted out of 8 questions each carrying 7 marks. These questions will be set from Introduction to Machine learning to support vector machines. Each question may have multiple parts.
<b>Group B : Unit II</b> (Marks : 50)	(a) 2 questions are to be attempted out of 4 questions each carrying 4 marks. Each question may have multiple parts. (b) 7 questions are to be attempted out of 10 questions each carrying 6 marks. Each question may have multiple parts.

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**Question Pattern for**  
**3-year Multidisciplinary Course with Mathematics**  
**and Mathematics as a Minor subject**

MMTH-MN1-TH MMTH-MDC-mn1-TH MMTH-MDC-CC1-TH	<b>Calculus, Geometry &amp; Vector Analysis</b>
<b>Group A : Calculus</b> (Marks : 20)	(a) Short answer type questions: 4 questions are to be attempted out of 7 questions each carrying 2 marks. (b) Long answer type questions: 3 questions are to be attempted out of 6 questions each carrying 4 marks. Each question may have multiple parts.
<b>Group B : Geometry</b> (Marks : 35)	5 questions are to be attempted out of 9 questions each carrying 7 marks. Each question may have multiple parts.
<b>Group C : Vector Analysis</b> (Marks : 20)	(a) Short answer type questions: 4 questions are to be attempted out of 7 questions each carrying 2 marks. (b) Long answer type questions: 3 questions are to be attempted out of 6 questions each carrying 4 marks. Each question may have multiple parts.
MMTH-MN2-TH MMTH-MDC-mn2-TH MMTH-MDC-CC2-TH	<b>Basic Algebra</b>
<b>Group A, B, C :</b> (Each group carries 25 marks)	5 questions are to be attempted out of 9 questions each carrying 5 marks. Each question may have multiple parts.
MMTH-SEC-TH	<b>C Language with Mathematical Applications</b>
(Marks : 75)	(a) Short answer type questions: 5 questions are to be attempted out of 8 questions each carrying 3 marks. (b) Long answer type questions: 5 questions are to be attempted out of 8 questions each carrying 8 marks. Each question may have multiple parts. (a) Longer answer type questions: 2 questions are to be attempted out of 4 questions each carrying 10 marks. Each question may have multiple parts.
MMTH-MN3-TH MMTH-MDC-mn3-TH MMTH-MDC-CC3-TH	<b>Ordinary Differential Equations &amp; Group Theory</b>
<b>Group A: Ordinary Differential Equations</b> (Marks : 45)	9 questions are to be attempted out of 16 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B : Group Theory</b> (Marks : 30)	6 questions are to be attempted out of 10 questions each carrying 5 marks. Each question may have multiple parts.

MMTH-MN4-TH MMTH-MDC-mn4-TH MMTH-MDC-CC4-TH	<b>Mechanics</b>
(Marks : 75)	(a) Short answer type questions: 6 questions are to be attempted out of 10 questions each carrying 2 marks. (b) Long answer type questions: (i) 7 questions are to be attempted out of 11 questions each carrying 6 marks. (2 questions from Statics, 4 questions from Law of gravitation portion, 3 questions from Work, Power, Energy portion and 2 questions from Impulse of a force portion are to be set.) (ii) 3 questions are to be attempted out of 6 questions each carrying 7 marks. (questions are to be set from Motion of a particle in a plane)
MMTH-MDC-CC5-TH MMTH-MDC-mn5-TH	<b>Advanced Calculus</b>
<b>Group A:</b> (Marks : 20)	4 questions are to be attempted out of 7 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B :</b> (Marks : 25)	5 questions are to be attempted out of 9 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group C :</b> (Marks : 30)	6 questions are to be attempted out of 10 questions each carrying 5 marks. Each question may have multiple parts.
MMTH-MDC-CC6-TH MMTH-MDC-mn6-TH	<b>Statistics &amp; Numerical Analysis</b>
<b>Group A: Statistics</b> (Marks : 50)	(a) 5 questions are to be attempted out of 9 questions each carrying 5 marks. These 9 questions must be set from Probability Theory, Probability Distribution and Mathematical Expectation. Each question may have multiple parts. (b) 5 questions are to be attempted out of 9 questions each carrying 5 marks. These 9 questions must be set from Elements of Statistical Methods, Statistical Inference, Sampling Theory. Each question may have multiple parts.
<b>Group B : Numerical Analysis</b> (Marks : 25)	5 questions are to be attempted out of 9 questions each carrying 5 marks. Each question may have multiple parts.
MMTH-MDC-CC7-TH	<b>Mathematical Methods</b>
<b>Group A:</b> <b>Sequencs and series of functions</b> (Marks : 25)	5 questions are to be attempted out of 9 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B :</b> <b>Application of differential calculus</b> (Marks : 35)	7 questions are to be attempted out of 11 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group C :</b> <b>Fourier series and Laplace Transform</b> (Marks : 15)	3 questions are to be attempted out of 7 questions each carrying 5 marks. Each question may have multiple parts.

<b>MMTH-MDC-CC8-TH</b>	<b>Discrete Mathematics</b>
<b>Group A :</b> (Marks : 30)	6 questions are to be attempted out of 10 questions each carrying 5 marks. Each question may have multiple parts.
<b>Group B :</b> (Marks : 35)	(a) 7 questions are to be attempted out of 12 questions each carrying 5 marks. These 12 questions will be set from Application of Congruences, Combinatorics, Recurrence Relations and Generating functions. Each question may have multiple parts. (b) 2 questions are to be attempted out of 4 questions each carrying 5 marks. These 4 questions will be set from Boolean Algebra. Each question may have multiple parts.

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## Question Pattern for Interdisciplinary Course (IDC) in Mathematics

MTHD-IDC	Mathematics in Daily Life
<b>Group A :</b> <b>Basics of set theory</b> (Marks : 4)	1 question is to be attempted out of 2 questions each carrying 4 marks.
<b>Group B :</b> <b>Understanding integers</b> (Marks : 20)	5 questions are to be attempted out of 8 questions each carrying 4 marks.
<b>Group C :</b> <b>Mathematical Logic</b> (Marks : 7)	1 question is to be attempted out of 3 questions each carrying 7 marks. Each questions may have multiple parts.
<b>Group D : Basics of Operations Research</b> (Marks : 9)	1 question is to be attempted out of 3 questions each carrying 9 marks. Each questions may have multiple parts.
<b>Group E : Financial Mathematics</b> (Marks : 10)	2 questions are to be attempted out of 4 questions each carrying 5 marks.

### Evaluation of Tutorial (TU : 1 credit, 25 marks)

- (a) An Internal examination of 15 marks will be conducted by the Colleges. Questions of 3 marks / 5 marks / 6 marks covering the whole syllabus should be prepared for the purpose of internal examination.
- (b) Total Marks for Viva-Voce examination conducted by the Mathematics department of the concerned College is 10.
- (c) For MTHM-SEC3-TH (Linear Programming & Rectangular Games) 10 marks will be awarded by evaluation of internal assignments instead of viva-voce.

### Evaluation of Practical papers (P : 1 credit, 25 marks)

- (a) 15 marks for a Practical Examination of 2 hours duration.  
1 question is to be attempted out of 3 questions each carrying 8 marks and 1 question is to be attempted out of 3 questions each carrying 7 marks.
- (b) 5 marks for Viva-Voce examination.
- (c) 5 marks for Practical Notebook.

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## Guidelines for Summer Internship in Mathematics

1. Two or three neighbouring Colleges may interchange their students for an internship program and the students may be offered a course related to their curriculum by the mentor in the neighbouring College. The content of the program will depend on the respective mentor. It may be a theoretical course on Mathematical Analysis / Numerical Analysis / Applied Mathematics / Financial Mathematics / Mathematical Logic / Industrial Mathematics or it may be any hands on training with the help of programming technique. After completion of the course the respective mentor / supervisor should give a completion certificate to the candidate.
2. A student can select a mentor/supervisor in some Industry for doing summer internship. At the end of the course candidate should collect a completion certificate from the mentor / supervisor.
3. A student can do internship under the supervision of a teacher in his / her College in allied subjects (i.e., a student with Mathematics major can do internship on Chemistry, Statistics, Physics, Economics, Computer Science) and at the end of the course the mentor / supervisor should give a completion certificate to the candidate.
4. Interns may be engaged in Practice Teaching, in their previous schools or schools to be identified and arranged by the respective College, in topics to be decided by the concerned school authority. After completion of the Practice Teaching interns should collect the completion certificate from the respective School Authority.
5. Interns may be engaged in advanced learning in topics beyond their course curriculum under the guidance of the respective mentor.
6. Interns may be required to write codes for problems assigned to them in C / Python / any other programming language and run those in the computer laboratory under the guidance of respective mentor.
7. Interns may be asked to prepare study materials in MS-Power Point / LaTeX on topics to be assigned to them by the respective mentor.
8. Interns may arrange to learn / to work as a quantitative researcher in a financial establishment like bank / insurance company / financial consulting firm. After completion of internship students should collect completion certificate from the concerned authority.
9. Interns may visit Research Institute / Research Laboratory / University / College and may do some research related work with a researcher / scientist. After completion of internship students should collect completion certificate from the concerned authority.

**Note : For the modalities of the summer internship one may refer to CSR/132/2024, dt. 14.11.2024.**

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# Guidelines for Research Internship in Mathematics for

## Semester VIII (Honours with Research)

1. Every Undergraduate student enrolled in Four year B.Sc. in Mathematics Honours with Research (under CCF) must complete one Research Internship carrying 4 credits in Semester VIII. This internship is a mandatory academic requirement for the completion of the programme.
2. The duration of the internship shall be 6–8 weeks. The internship must be completed before the End-Semester Examination, at least 30 days prior to the commencement of the semester-end examination.
3. The internship should involve academic or research-oriented work in Mathematics. The following types of activities may be considered appropriate:
  - A mini research project in mathematics.
  - Mathematical modelling or computational work.
  - A study project under the supervision of a college faculty member.
  - Internship at research institutes or recognized academic organizations.
4. The internship may include activities such as:
  - Reading and understanding mathematical research papers or books.
  - Learning and using mathematical or computational software.
  - Solving mathematical problems or preparing a survey/study report.
  - Maintaining and submitting a project notebook documenting the work.
5. At the completion of the internship, each student must submit a Project Notebook / Internship Report and appear for a Viva-Voce Examination. The total marks (100) has the following distribution :
  - Project Notebook / Internship Report - 60
  - Viva-Voce Examination - 40

Students must obtain a minimum of 40% of the total marks (i.e., 40 out of 100) to successfully complete the internship.
6. The evaluation of the Research Internship will be conducted by the Mathematics Department of the College (the student's mother institution). The evaluation committee will consist of the Head of the Department of the concerned college, the Supervisor(s), and an External Expert. The name of the External Expert will be proposed by the college and approved by the University.

The committee will assess the Project Notebook / Internship Report submitted by the student as well as the knowledge and understanding acquired during the internship, through the viva-voce examination.
7. The Internship Report should be prepared following the [structure](#) provided below.

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# Guidelines for Dissertation/Project in Mathematics for

## Semester VIII (Honours with Research)

1. The Dissertation course is intended to introduce students to independent learning, mathematical investigation, and academic writing. It provides an opportunity for students to explore in depth a specific topic in mathematics under the guidance of a supervisor.
2. The Head of the department of Mathematics of the student's own college will assign a supervisor from the faculty members of his/her department. The supervisor will help the student in selecting a topic, identifying appropriate references, understanding mathematical concepts and structuring the dissertation. This process may be initiated at the beginning of Semester VII, so that students have sufficient time for topic selection and preliminary study before formally undertaking the Dissertation course in semester VIII.
3. The Dissertation will be evaluated by a Committee consisting of the Head of the department, the Supervisor(s) and an External Expert. The name of the External Expert will be proposed by the college and approved by the University.  
The evaluation will include assessment of the written dissertation, oral presentation of his/her work and a viva-voce examination to judge the student's understanding of the work.
4. The total marks (200) will be distributed as follows:
  - Dissertation - 100
  - Oral Presentation - 50
  - Viva-Voce Examination - 50.

Students must obtain a minimum 40% of the total marks (i.e., 80 out of 200) for successful completion of this 8 credit course.

5. Dissertation should be prepared following the [structure](#) provided below.

[4-yr Credit Distribution](#)

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# Structure of Project Notebook /Internship Report and Dissertation in Mathematics

1. The title Page should include the following items:
  - Title of the Project
  - Name of the student
  - University Roll number and Registration number
  - Course : 4 Year B. Sc. Honours with Research with Mathematics Major
  - Semester VIII
  - College Name, University name
  - Name of Supervisor(s)
  - Year of submission
2. Certificate from the supervisor confirming that the work is done under his/her guidance and that the work is free from plagiarism.
3. Acknowledgement
4. Abstract (i.e., A summary of the work in 150-250 words.)
5. A brief introduction which will include the objective and the background of the topic under consideration.
6. Literature Review.
7. Main part : Definitions, Results/Theorems/Computations, examples, etc.
8. Outcome of the entire work and Conclusion.
9. References (List should not exceed 2 pages)

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