

*New College*

# VECTOR CALCULUS

**B.A./B.Sc.-I**  
**SECOND SEMESTER**

**JEEVANSONS PUBLICATIONS**

# SYLLABUS

Kurukshetra University, Kurukshetra

B.A. / B. Sc. 1st Year

SECOND SEMESTER

VECTOR CALCULUS : (BM - 123)

Maximum Marks : B.Sc. - 40  
B.A. - 26

Time Allowed : 3 Hours

**Note.** The examiner is requested to set **nine questions** in all, selecting two questions from each section and **one compulsory question** consisting of five parts distributed over all the four sections. Candidates are required to attempt five questions, selecting at least one question from each section and the compulsory question.

## Section - I

Scalar and Vector product of three vectors, Product of four vectors. Reciprocal vectors. Vector differentiation, Scalar valued point functions, Vector valued point functions, derivative along a curve, directional derivatives.

## Section - II

Gradient of a scalar point function, geometrical interpretation of  $\text{grad } \phi$ , character of gradient as a point function. Divergence and curl of vector point function, characters of  $\text{div } \vec{f}$  and  $\text{curl } \vec{f}$  as point function, examples. Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator.

## Section - III

Orthogonal curvilinear co-ordinates. Conditions for orthogonality. Fundamental triad of mutually orthogonal unit vectors. Gradient, divergence, curl and laplacian operators in terms of orthogonal curvilinear co-ordinates, cylindrical co-ordinates, spherical co-ordinates.

## Section - IV

Vector integration, line integral, surface integral, volume integral  
Theorem of Gauss, Green, Stokes and problems based on these.

# SYLLABUS

Maharishi Dayanand University, Rohtak

B.A. / B. Sc. 1st Year

SECOND SEMESTER

VECTOR CALCULUS : (BM - 123)

Maximum Marks : B.Sc. – 40  
B.A. – 26

Time Allowed : 3 Hours

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**Note.** The question paper will consist of **five** sections. Each of the first four sections will contain two questions and the students shall be asked to attempt **one** question from each section. **Section – V** will contain **six** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.

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## Section - I

Scalar and Vector product of three vectors, Product of four vectors. Reciprocal vectors. Vector differentiation, Scalar valued point functions, Vector valued point functions, derivative along a curve, directional derivatives.

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Gradient of a scalar point function, geometrical interpretation of  $\text{grad } \phi$ , character of gradient as a point function. Divergence and curl of vector point function, characters of  $\text{div } \vec{f}$  and  $\text{curl } \vec{f}$  as point function, examples. Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator.

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Theorem of Gauss, Green, Stokes and problems based on these.

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