BM-123

(Semester-II)

Vector Calculus

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: **Paper setter will set nine questions in all, selecting two questions from each section and one**

Compulsory question consisting of five parts distributed over all 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 grad F , character of gradient as a point function. Divergence and curl of vector point function, characters of Div f and Curl f as point function, examples. Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator.

Section-III

Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors. Gradient, Divergence, Curl and Laplacian operators in terms of orthogonal curvilinear coordinates, Cylindrical co-ordinates and Spherical coordinates

Section-IV

Vector integration; Line integral, Surface integral, Volume integral Theorems of Gauss, Green & Stokes and problems based on these theorems.

REFERENCES

- Murrary R. Spiegal : Theory and Problems of Advanced Calculus, Schaum Publishing Company, New York.

- Murrary R. Spiegal : Vector Analysis, Schaum Publisghing Company, New York.

- N. Saran and S.N. NIgam. Introduction to Vector Analysis, Pothishala Pvt. Ltd., Allahabad.

- Shanti Narayna : A Text Book of Vector Calculus. S. Chand & Co., New Delhi.