JR-3533

M. A./M. Sc. (Second Semester) Examination, June 2022

MATHEMATICS

[Differential Geometry of Manifolds-II-V(iii)]

Time Allowed : Three hours

Maximum Marks : 40

Note : Attempt questions of all two sections as directed. Distribution of marks is given with sections.

Section-'A'

(Short Answer Type Questions)   5×3=15

Note : Attempt all five questions. Each question carries 3 marks.

1. Define vector bundle over a manifold.

Or

Define bundle homomarphism over manifold.

2. Explain Riemannian connection.

Or

Explain sectional curvature.

3. Define projective curvature tensor with example.

Or

Explain conformal curvature with example.

4. Derive Weingater equation of the subspace V_n.

Or

Describe submanifolds with example.

5. Define Nijenhuis tensor with example.

Or

Explain E-connection with example.

Section-'B'

(Long Answer Type Questions)   5×5=25

Note : Attempt all five questions. Each question carries 5 marks.

6. Explain associated fibre bundle with example.

Or

Describe in detail with example the induced bundle.

7. Describe in detail with example the Riemmannion manifolds.

Or

State and prove that Schur's theorem.

8. Prove that for a Riemannian symmetric space any C^{∞} curve is invariant under the symmetric about each of its points is a representation of a geodesic.

Or

Describe the geodesics in a Riemannian, manifold and given an example.

9. State and prove that Gauss's formulae.

Or

State and prove that generalised Gauss and Mainardi-Codazzi equation.

10. Describe almost complex manifolds and given an example.

Or

Prove that complex manifolds and almost complex manifolds are orientable.