

SEM-2355

M.A. / M. Sc. (Fourth Semester) Examination, June 2021

MATHEMATICS

Paper : First (Optional)

(Differential Structure on Manifolds-II)

Time Allowed : Three hours

Maximum Marks : 80

Note: Attempt all questions. Each question carries equal marks.

1. State and prove that “Bianchi identity”.
2. Show that the number of not necessarily vanishing independent components of curvature tensor does not exceed $\frac{1}{12}n^2(n^2 - 1)$.

3. Explain the following :

- (a) Nearly Kahler Manifolds
- (b) Holomorphic sectional curvature

4. Prove that :

$$L_\lambda(\alpha(\mu)) - L_\mu(\alpha(\lambda)) = (d_\alpha)(\lambda \wedge \mu) - \alpha([\lambda, \mu])$$

5. Prove that on an almost Grayan manifold :

- (a) $(D_x u)(y) = g(D_x \underline{1}, y)$
- (b) $g((D_x F)y, z) = (D_x F)(y, z)$