उत्तराखण्ड मुक्त विश्वविद्यालय,हल्द्वानी (नैनीताल)

M.A./M.Sc. Mathematics
ASSIGNMENT-FIRST YEAR

Last date of Submission: **15/05/2014** **(जमा करने की अन्तिम तिथि. 15/05/2014.)**

Course Title: Differential Geometry and Tensors **Course Code: - M.A./M.Sc . MAT 504**

Year: 2013-14 **Maximum Marks:** 40

Section 'A' contains 08 short answer type questions of 5 marks each. Learners are required to answers 4 questions only. Answers of short answer-type questions must be restricted to 250 words approximately.

भाग क में आठ लघु उत्तरीय प्रश्न दिये गये हैं इनमें से केवल चार प्रश्नों के उत्तर देने हैं । प्रत्येक प्रश्न के लिए पांच अंक निर्धारित हैं तथा प्रत्येक प्रश्न का उत्तर 250 शब्दों से अधिक नही होना चाहिए।

निम्न की संक्षेप में चर्चा कीजिए :

1- Write the condition for three point contact of a curve and a surface.

2- Find the radix of curvature and torsion of a helix

X = aws θ, y = asin θ, Z = a θ tanx

3- Preure that the distance between corresponding points of two curves is constant.

4- Find the envelope of the plane

lx + my + n z = 0 where al2 + b m2 + cn2 = 0

5- Compute the fundamental magnitudes for the surface.

r = (4cos $\underline{\vartheta}$, $\underline{\vartheta}$sin $\underline{\vartheta}$, f cw + $c\,\vartheta$

6- Define Conjugate directions at a given point (u, ϑ) on a surface r = r (u, ϑ)

7- Show than the contraction of the onter product of the tensors A^p and B_q is an invariant.

8- Show that $\frac{\partial A^r}{\partial x^s}$ is not a tensor even though A_p is a covariant tensor of rank one.

Section 'B' contains 04 long answer-type questions of 10 marks each. Learners are required to answers 02 questions only.

भाग ख में चार दीर्घ उत्तरीय प्रश्न दिये गये हैं इनमें से केवल दो प्रश्नों के उत्तर देने हैं। प्रत्येक प्रश्न के लिए दस अंक निर्धारित हैं ।

1- Show than the gloat circles on a sphere are geodesic.

2- Show that the number of independent componants of the covariant curvature tensor in a space of N – dimension is $\frac{N2}{12}$

3- Prure that every point on a lone or cylinder is a parabolic point

4- Prure that

$$H\,N_1 = Mr_1 - Lr_2$$