



EASTERN UNIVERSITY, SRI LANKA

SECOND EXAMINATION IN SCIENCE - 2005/2006

SECOND SEMESTER (Mar./ April., 2008)

MT 205 - DIFFERENTIAL GEOMETRY

Proper & Repeat

Answer all questions

Time : One hour

1. What is meant by saying that a curve is a helix?

[10 marks]

Prove, with the usual notations, that the necessary and sufficient condition for a curve to be a helix is that $\frac{\tau}{\kappa}$ is constant.

[40 marks]

Show that the curve $\underline{r}(\theta) = e^\theta(a \cos \theta, a \sin \theta, b)$ is a helix, where a and b are constants.

[50 marks]

2. Define the term "osculating sphere of a space curve" and find its radius and center.

[70 marks]

Show that the tangent, principal normal and binormal to the locus C_1 of the center of the osculating sphere of a given curve C are parallel to the binormal, principal normal and tangent to C respectively at the corresponding points.

[30 marks]