UNIVERSIDADE FEDERAL DE SANTA CATARINA
Departamento de Engenharia Elétrica e Eletrônica
Eletrônica Industrial (EEL7278)

Prova 01

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Semestre: 2015/2
Aluno: _____

Turma: 07202A
Matricula: _____

Prova referente aos assuntos:
Aula 01 – Retificador Monofásico de Onda Completa a Diodo
Aula 02 – Retificador Monofásico de Onda Completa a Tiristor
Aula 03 – Retificador Trifásico de Onda Completa a Diodo
Aula 04 – Retificador Trifásico com Ponto Médio a Diodo
Aula 05 – Retificador Trifásico de Onda Completa a Tiristor
Aula 06 – Retificador Trifásico com Ponto Médio a Tiristor

1. For a surface $\vec{r} = \vec{r}(u\cos v, u\sin v, f(u))$. Write down the first fundamental form of the surface. Show that the parametric curves are orthogonal. [06]

2. For a surface $\vec{r} = \vec{r}(u\cos v, u\sin v, f(u))$. Write down the first fundamental form of the surface. Show that the parametric curves are orthogonal. [06]

3. Prove that necessary conditions for the curve $u = u(t), v = v(t)$ on a surface $\vec{(r)} = \vec{(r)}(u, v)$ to be geodesic is that

$$U\frac{\partial T}{\partial \dot{v}} - V\frac{\partial T}{\partial \dot{u}} \tag{1}$$

where

$$U = \frac{d}{dt}\left(\frac{\partial T}{\partial \dot{u}}\right) - \frac{\partial T}{\partial u} = \frac{1}{2T}\frac{dT}{dt}\frac{\partial T}{\partial \dot{u}}$$
$$V = \frac{d}{dt}\left(\frac{\partial T}{\partial \dot{v}}\right) - \frac{\partial T}{\partial v} = \frac{1}{2T}\frac{dT}{dt}\frac{\partial T}{\partial \dot{v}}$$

[10]

4. For the curve

$$x = a(3u - u^3), \qquad y = 3au^2, \qquad z = a(3u + u^3)$$

show that

$$\tau = k = \frac{1}{3a(1+u^2)^2}$$

[8]

5. A curve is uniquely determined except as the position in space, when its curvature and torsion are given functions of its arc length. [8]

6. Show that there exists an infinite family of involutes for a gives curve. [8]

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7. Give short answers of the following questions.

    1. Define Helicoids?
    2. Define spherical indicatrix?
    3. Define the intrinsic equation?
    4. Write the statement of existence theorem for space curve?
    5. The normal curvature k_n is equal to the what?
    6. Prove that $L = -n_1 \cdot r_1$ and $N = -n_2 \cdot r_2$?
    7. Define the geodesic?
    8. Write down the equation of tangent plane?
    9. If equation of the circle is $x^2 + y^2 = a^2$ then the parametric equations of circles are_____?
