Code No: C3701
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations, March 2011
ADVANCED ENGINEERING MATHEMATICS
(CONTROL ENGINEERING)

Time: 3hours   Max. Marks: 60
Answer any five questions
All questions carry equal marks
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1.   Define
       (a) Vector Space
       (b) Linear Independence and Dependence
       (c) Basis of a vector space.
       Show that every linear transformation on a finite dimensional vector space is
       bounded.   [12]

2.   State and prove the Parseval's Identity.   [12]

3.   Let V Be the inner product space of all real valued continuous functions defined

       on the interval -1<t<1 with inner product $\langle f, g \rangle = \int\limits_{-1}^{1} f(t) g(t) \, dt$. Let W be the

       set of all odd functions in V. Find the orthogonal complement of W.   [12]

4.   Find   the   orthogonal   Basis   by   applying   Gram-Schmidt   process   to
       $\{(1,0,1),(1,0,-1),(0,3,4)\}$
                                                                                      [12]

5.   Solve   the   following   equations   by   iteration
       $27x + 6y - z = 85 : 6x + 15y + 2z = 72 : x + y + 54z = 110$.   [12]

6.   If W is a linear sub space of a finite dimensional vector space V then show that
       $\text{Dim}\left(\dfrac{V}{W}\right) = \text{DimV-DimW}$.   [12]

7.   Let U and V be vector spaces over the same field F. Show that the set L (U, V) of
       all linear transformations of U into V is a vector space over F. If Dim (U) = m and
       Dim (V) = n then find the Dim (L (U, V)).   [12]

8.   Let 1<p<∞ .Then Show that l_p^n all n tuples x = $(x_1, x_2, \ldots x_n)$ of scalars with

       norm $x_p = \left(\sum\limits_{i=1}^{n} |x_i|^p\right)^{1/p}$ is a banach space. [12]

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