R09

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 $\langle f, g \rangle = \int_{-1}^{1} f(t)\, g(t)\, dt$. 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 Dim$\left(\frac{V}{W}\right)$ = 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 = ($x_1, x_2, ...x_n$) of scalars with norm $x_p = \left(\sum_{i=1}^{n} |x_i|^p\right)^{1/p}$ is a banach space. [12]

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