Answer the following questions

Question 1 (30 marks)

(A) Define the following items:

(i) the metric space and its required conditions

(ii) the real axis and write its metric and check its conditions

(iii) the Hilbert sequences space L^2 and L^P space   (15 Marks)

(B) (i) Deduce each of Cauchy-Starter and Holders inequalities

(ii) Deduce the Menkovski inequality for summations using Holders inequality for summations

(iii) Define the Cauchy's sequence and prove that every convergent sequence in metric space is Cauchy sequence   (15 Marks)

Question 2 (30 marks)

(A) (i) Prove that the Euclidian space is a complete space

(ii) Define definite and indefinite dimensional vector space.

(iii) What is the difference between regular space and Banach space   (15 Marks)

(B) (i) Define the Norm and state its properties

(ii) Define the linear independence and linear dependence

(iii) Can metric in vector space produce metric?   (15 Marks)

Question 3 (35 marks)

(A) (i) Define the continuous application.

(ii) What are the types of groups in metric space and what is the relation between them.

(iii) When the sequence in metric space is converging sequence   (20 Marks)

(B) (i) Give some examples of norm in different spaces

(ii) Define the inner product space and Hilbert space.

(iii) Write some examples on a metric space.   (20 Marks)

This exam measures the following ILOs									
Question Number	Q1-a	Q2-a	Q3-b		Q2-b	Q3-b		Q1-b	Q3-a
Skills			b-ii			b-i			
	Knowledge &understanding skills				Intellectual Skills			Professional Skills	

With my best wishes
Associated Prof. Dr. Islam M. Eldesoky