Question Bank for PG Course

অঙ্ক (Mathematics)

দশম (খ ১) পত্র (Paper - XB(i))

Advanced Functional Analysis : PGMT-XB(i)

1. Which of the followings is/are true in a vector space?
   1. Intersection of finite number of convex sets is convex
   2. Intersection of any number of convex sets is convex
   3. Union of finite number of convex sets is convex
2. $A\ balanced\ set\ is\ always\ symmetri$-is the statement true or false?
3. If a vector space X is isomorphic to the vector space R^n over the real field, then what is the dimension of X?
4. Let A be any subset in TVS X and G be an open set in TVS X. Then which of the followings is/are true for $A + G$?
   1. Open
   2. Closed
   3. Neither open nor closed
5. Let B be a bounded set in TVS X. Is the closure $\bar{B}$, bounded in X?
6. Every compact subset of a topological vector space is bounded-is this statement true or false?
7. A linear operator $T: X \to W$ is continuous if it is continuous at the zero (0_X) of X- is this statement true or false?
8. What is the sufficient condition of normality for a TVS X in Kolmogorov theorem?
9. Consider the NLS $\wp$ of all real polynomials $P = a_0 + ax + \cdots + ax^n, \forall a_i \in R\ and\ \forall n \in Z^+ \cup \{0\}$ with the norm $||P|| = \max_i |a_i|$. Is this space a Banach space?
10. Let X and Y be two NLS with same scalar field and $T \in Bd\mathcal{L}(X, Y)$. If $\{x_n\}$converges weakly to x_0 in X, then what is the weak limit of $\{T(x_n)\}$?
11. Is every Hilbert space, H, strictly convex?
12. What is the resolvant set of a linear operator T on a NLS X?
13. What is the sufficient condition that the sum of two projection operators $P_{Y_1}\ and\ P_{Y_2}$ is also a projection operator in a Hilbert space?
14. Let T be a linear operator on finite dimensional Hilbert space and λ be an eigen value of T. Find a eigen value of T^*.
15. Is every Cauchy sequence bounded in NLS X?