

Question Bank for PG Course

অঙ্ক (Mathematics)

নবম (খ ১) পত্র (Paper - IXB(i))

Topological Group : PGMT-IXB(i)
(OLD SYLLABUS)

- Let P be an open set in topological group G and A be any subset of G . Then which of the followings is/are true?
 - uP, Pu are open set in G for any member $u \in G$
 - AP and PA are open sets in G
 - $P - A$ is a closed set in G
- Which of the followings is/are true?
 - The circle group is homeomorphic with the unite circle in \mathbb{C} .
 - If G be a locally compact Hausdorff abelian topological group, then its dual group G^* is also a similar topological group
 - Let G be a topological group then G^* be a topological group.
- Let F be a closed set and C be a compact set in a topological group. Which of the followings is/are true?
 - FC is a closed set
 - CF is a closed set
 - CF or FC may not closed.
- Fill in the blank.

A topological group that is Hausdorff is

 - completely regular
 - regular
 - T_1
- Which of the followings is/are true?
 - Let H be a sub-group of a topological group G , then its closure \bar{H} is so.
 - A sub-group H of a topological group G is open iff its interior $int(H) \neq \emptyset$.
 - A sub-group H of a topological group G is open iff its interior $int(H) = \emptyset$.
- Fill in the blank.

The centre of a Hausdorff topological group is a Normal sub-group.

 - open
 - closed
 - may not be closed
- Which of the followings is/are true?
 - $M_n(\mathbb{R})$ is Hausdorff topological group that is compact
 - $M_n(\mathbb{R})$ is Hausdorff topological group that is not compact
 - $M_n(\mathbb{R})$ is Hausdorff topological group that is locally compact
 - $M_n(\mathbb{R})$ is Hausdorff topological group that is not locally compact
- Which of the followings is/are true?
 - $G_n(\mathbb{R})$ is an open set in topological group $M_n(\mathbb{R})$.
 - $G_n(\mathbb{R})$ is an closed set in topological group $M_n(\mathbb{R})$.
 - $O_n(\mathbb{R})$ is a compact topological sub group of $G_n(\mathbb{R})$.

9. Let $\{x_n\}$ and $\{y_n\}$ be two Cauchy sequences in a Banach Algebra X . Is the sequence $\{x_n y_n\}$ Cauchy?
10. Let f be a complex homomorphism on a Banach Algebra X and $x \in X$ with $\|x\| \neq 1$. Then find $f(x)$.
11. Let X be a Banach Algebra with identity. Is the set of all invertible elements of X open or closed?
12. Is multiplication operator in a Banach Algebra continuous?
13. Let M be a maximal ideal in a commutative Banach Algebra X with identity e . Find the value of $e(M)$.
14. Let M be a maximal ideal in a commutative Banach Algebra X with identity. Is X/M a Banach Algebra?
15. Which of the following statement is always true about an ideal I of the commutative Banach Algebra X
 1. For any $x \in X$, x belongs to I
 2. Identity e of X belongs to I
 3. For any $x \in X$ and $y \in I$, then $xy \in I$