Saving dataset90\_10\_top30.csv to dataset90\_10\_top30.csv

=== Class Ratio Before SMOTIFIED-GAN ===

Proportion

Legitimate 0.9

Phishing 0.1

**1128/1128** ━━━━━━━━━━━━━━━━━━━━ **3s** 3ms/step

=== Class Ratio After SMOTIFIED-GAN ===

Proportion

Phishing 0.5

Legitimate 0.5

=== Model Ranking on Train Set ===

Ranking by Accuracy:

Model

Random Forest 0.937834

Stacking Ensemble 0.935371

XGBoost 0.933662

CatBoost 0.933492

Logistic Regression 0.905812

Name: Accuracy, dtype: float64

Ranking by Precision:

Model

Random Forest 0.905197

Stacking Ensemble 0.904231

CatBoost 0.900746

XGBoost 0.900367

Logistic Regression 0.849084

Name: Precision, dtype: float64

Ranking by Recall:

Model

Logistic Regression 0.987068

Random Forest 0.978108

XGBoost 0.975245

CatBoost 0.974352

Stacking Ensemble 0.973890

Name: Recall, dtype: float64

Ranking by F1 Score:

Model

Random Forest 0.940242

Stacking Ensemble 0.937769

XGBoost 0.936311

CatBoost 0.936104

Logistic Regression 0.912891

Name: F1 Score, dtype: float64

Ranking by ROC-AUC:

Model

Random Forest 0.937833

Stacking Ensemble 0.935370

XGBoost 0.933661

CatBoost 0.933492

Logistic Regression 0.905810

Name: ROC-AUC, dtype: float64

=== Model Ranking on Test Set ===

Ranking by Accuracy:

Model

Random Forest 0.868146

Stacking Ensemble 0.868094

XGBoost 0.867784

CatBoost 0.867784

Logistic Regression 0.825316

Name: Accuracy, dtype: float64

Ranking by Precision:

Model

XGBoost 0.410049

Random Forest 0.409571

CatBoost 0.409474

Stacking Ensemble 0.407050

Logistic Regression 0.351928

Name: Precision, dtype: float64

Ranking by Recall:

Model

Logistic Regression 0.887739

XGBoost 0.734609

CatBoost 0.728919

Random Forest 0.721676

Stacking Ensemble 0.698914

Name: Recall, dtype: float64

Ranking by F1 Score:

Model

XGBoost 0.526316

CatBoost 0.524377

Random Forest 0.522570

Stacking Ensemble 0.514471

Logistic Regression 0.504039

Name: F1 Score, dtype: float64

Ranking by ROC-AUC:

Model

Logistic Regression 0.853060

XGBoost 0.808594

CatBoost 0.806065

Random Forest 0.803047

Stacking Ensemble 0.792902

Name: ROC-AUC, dtype: float64

=== Cross-Validation Scores ===

Accuracy F1 Score ROC-AUC

Logistic Regression 0.905326 0.912531 0.981707

Random Forest 0.928911 0.931723 0.955504

XGBoost 0.928874 0.931697 0.956597

CatBoost 0.929317 0.932131 0.956523

Stacking Ensemble 0.929317 0.931942 0.988490