Saving dataset95\_5\_top30.csv to dataset95\_5\_top30.csv

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

Proportion

Legitimate 0.949999

Phishing 0.050001

**1202/1202** ━━━━━━━━━━━━━━━━━━━━ **3s** 2ms/step

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

Proportion

Legitimate 0.5

Phishing 0.5

=== Model Ranking on Train Set ===

Ranking by Accuracy:

Model

Random Forest 0.942105

Stacking Ensemble 0.940411

CatBoost 0.940288

XGBoost 0.939795

Logistic Regression 0.905412

Name: Accuracy, dtype: float64

Ranking by Precision:

Model

Stacking Ensemble 0.908136

Random Forest 0.907797

CatBoost 0.906260

XGBoost 0.906082

Logistic Regression 0.852741

Name: Precision, dtype: float64

Ranking by Recall:

Model

Random Forest 0.984171

CatBoost 0.982170

XGBoost 0.981308

Logistic Regression 0.980076

Stacking Ensemble 0.979953

Name: Recall, dtype: float64

Ranking by F1 Score:

Model

Random Forest 0.944443

CatBoost 0.942689

Stacking Ensemble 0.942679

XGBoost 0.942196

Logistic Regression 0.911985

Name: F1 Score, dtype: float64

Ranking by ROC-AUC:

Model

Random Forest 0.942104

Stacking Ensemble 0.940411

CatBoost 0.940287

XGBoost 0.939795

Logistic Regression 0.905411

Name: ROC-AUC, dtype: float64

=== Model Ranking on Test Set ===

Ranking by Accuracy:

Model

CatBoost 0.875328

XGBoost 0.874290

Stacking Ensemble 0.873962

Random Forest 0.873253

Logistic Regression 0.815749

Name: Accuracy, dtype: float64

Ranking by Precision:

Model

CatBoost 0.224284

XGBoost 0.219433

Random Forest 0.215932

Stacking Ensemble 0.210000

Logistic Regression 0.161805

Name: Precision, dtype: float64

Ranking by Recall:

Model

Logistic Regression 0.641921

CatBoost 0.606987

XGBoost 0.591703

Random Forest 0.582969

Stacking Ensemble 0.550218

Name: Recall, dtype: float64

Ranking by F1 Score:

Model

CatBoost 0.327541

XGBoost 0.320142

Random Forest 0.315137

Stacking Ensemble 0.303981

Logistic Regression 0.258462

Name: F1 Score, dtype: float64

Ranking by ROC-AUC:

Model

CatBoost 0.748222

XGBoost 0.740436

Random Forest 0.735754

Logistic Regression 0.733412

Stacking Ensemble 0.720614

Name: ROC-AUC, dtype: float64

=== Cross-Validation Scores ===

Accuracy F1 Score ROC-AUC

Logistic Regression 0.904979 0.911601 0.990098

Random Forest 0.936414 0.938986 0.985976

XGBoost 0.936858 0.939443 0.986834

CatBoost 0.937030 0.939544 0.968017

Stacking Ensemble 0.937314 0.939705 0.994942