THE HONG KONG POLYTECHNIC UNIVERSITY
HONG KONG COMMUNITY COLLEGE

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**Subject Title** : Applied Statistical Methods **Subject Code** : CCN2237

**Session** : Semester Two, 2013/14

**Numerical Answers**

**Question 1**

(a) $\hat{y} = -0.7957 + 0.1148x$ (or $\hat{y} = -0.7957 + 0.11475x$)

(b) 0.0538

(e) 0.4726 (or 0.47256)

**Question 2**

(a) $\hat{\beta}_0 \approx 11.5649$, $\hat{\beta}_1 \approx 9.4561$ and $\hat{\beta}_2 \approx -12.7029$

(c) (i) $\hat{\alpha}_0 \approx 15.0000$, $\hat{\alpha}_1 \approx 9.4561$ and $\hat{\alpha}_2 \approx -12.7029$
(ii) (2) 13.7014

**Question 3**

(a) $R_{\text{a}}^2(\Omega_1) \approx 0.8388$ and $R_{\text{a}}^2(\Omega_2) \approx 0.8340$

(c) $\boldsymbol{a}^T\hat{\boldsymbol{\beta}} \sim \text{N}\left(\boldsymbol{a}^T\boldsymbol{\beta},\ \sigma^2\boldsymbol{a}^T\left(X^TX\right)^{-1}\boldsymbol{a}\right)$, where $X$ is the design matrix of $\Omega_1$.

**Question 5**

(d) (i) $\sigma^2\chi_{21}^2$