BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
SECOND SEMESTER 2020-2021
ECON F241 ECONOMETRIC METHODS
QUIZ 2 – 6 April 2021 OPEN BOOK

TOTAL MARKS: 10 Name: ID:

Q1. Consider the following model.

$$GRADE_i = \beta_1 + \beta_2 STUDYTIME_i + \beta_3 ATTENDANCE_i + u_i$$

If we remove the *ATTENDANCE* variable, what kind of problems and bias will we face? What will this bias depend on? Which measures regarding the regression equation will be affected? Explain. **(2)**

Q2. Two models are fit to the same data set. The results are given below. Study the results carefully and answer the questions.

Model 1 – Simple linear regression $y=\beta_0+x\beta_1+u$

	Estimate	Std. Error	t value	Pr(>|t|)
Intercept	0.03818	0.20675	0.185	0.854
x	0.61672	0.12623	4.886	<0.001

R-Squared: 0.3521; Adjusted R-squared: 0.3182
F-statistic: 23.87 on 1 and 48 DF, p-value: < 0.001

Model 2 – Quadratic regression $y=\beta_0+x\beta_1+x^2\beta_2+u$

	Estimate	Std. Error	t value	Pr(>|t|)
Intercept	-0.008506	0.208413	-0.041	0.968
x	0.360560	0.233740	1.543	0.130
x^2	0.130633	0.100613	1.298	0.200

R-Squared: 0.3553; Adjusted R-squared: 0.3278
F-statistic: 12.95 on 2 and 47 DF, p-value: < 0.001

a) Which model would you select, Model 1 or 2? Why? **(1)**
b) Is there evidence of collinearity in Model 2? Explain. **(1)**

Q3. Consider the following models being run on the same data.

Model 1: $\text{STOCK}_t = \alpha_1 + \alpha_2 \text{OIL}_{2t} + \alpha_3 \text{GOLD}_{3t} + u_{1t}$

Model 2: $(STOCK_t - GOLD_{3t}) = \beta_1 + \beta_2 \text{OIL}_{2t} + \beta_3 \text{GOLD}_{3t} + u_{2t}$

a) Will OLS estimates of α_1 and β_1 be the same? Why? Will OLS estimates of α_3 and β_3 be the same? Why? **(1)**
b) What is the relationship between α_2 and β_2? Can you compare the R^2 terms of the two models? Why or why not? **(1)**
c) In model 1, $STOCK_t$ refers to the price of 1 share of Reliance **in Rs.**, OIL_{2t} refers to the oil price per barrel **in '000 Rs.** and GOLD_{3t} refers to the price of 10g of gold **in '000 Rs.** If α_2=1.3 and α_3 = -1.7, interpret α_2 and α_3. **(2)**

Q4. Consider the following model.

$$\ln Y_t = 6.183 - 0.521 \ln PT_t + 0.061 X_t$$

where Y is number of oranges bought in Pilani Market per week, PT is the price of tangerines in **Rs. per bag**, X is per capita income in **'000 Rs.** How would you interpret the two slope coefficients in the above model? **(2)**