Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2018/2019

COURSE NAME	:	QUANTITATIVE TECHNIQUE FOR REAL ESTATE
COURSE CODE	:	BPE 44303
PROGRAMME CODE	:	BPD
EXAMINATION DATE	:	JUNE / JULY 2019
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 A linear relationship is a statistical term used to describe a straight-line relationship between a variable and a constant. Linear relationships can be expressed either in a graphical format where the variable and the constant are connected via a straight line or in a mathematical format where the independent variable is multiplied by the slope coefficient, added by a constant, which determines the dependent variable. Common used linear relationship are covariance, correlation and linear regression.

(a) Identify the covariance, correlation and linear regression application theoretically.
(10 marks)

(b) Relate the linear relationship application to one real estate research case study.
(15 marks)

Q2 A Property Consultant investigates the most significant variables that influence the housing price in Johor Bahru, Malaysia. The variables which have been chosen to be examined for this study are population, construction cost, housing speculation, and inflation rate. Four hypotheses were set in this study.

H1: *There is a positive relationship between the populations and the housing price in Johor Bahru, Malaysia.*

H2: *There is a positive relationship between the construction costs and the housing price in Johor Bahru, Malaysia.*

H3: *There is a positive relationship between the housing speculation and the housing price in Johor Bahru, Malaysia.*

H4: *There is a positive relationship between the inflation rates and the housing price in Johor Bahru, Malaysia.*

The relationship between housing price and the four variables were analysed using correlation analysis in **Table Q2(a)** and **Table Q2(b)** below.

Table Q2(a): Correlation analysis

Correlations

		Housing price	Population	Construction cost	Housing speculation	Inflation rate
Housing price	Pearson Correlation	1	.491**	.468**	.400**	.099
	Sig. (2-tailed)		.000	.000	.000	.283
	N	120	120	120	120	120
Population	Pearson Correlation	.491**	1	.361**	.460**	.051
	Sig. (2-tailed)	.000		.000	.000	.582
	N	120	120	120	120	120
Construction cost	Pearson Correlation	.468**	.361**	1	.292**	.210*
	Sig. (2-tailed)	.000	.000		.001	.021
	N	120	120	120	120	120
Housing speculation	Pearson Correlation	.400**	.460**	.292**	1	.135
	Sig. (2-tailed)	.000	.000	.001		.141
	N	120	120	120	120	120
Inflation rate	Pearson Correlation	.099	.051	.210*	.135	1
	Sig. (2-tailed)	.283	.582	.021	.141	
	N	120	120	120	120	120

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table Q2(b): Literature review

No.	Author	Discussion
1	*Mulder et al(2013)*	*Population is the main key factor which affecting the housing price, people will move to the area houses are built or the area which more convenience or have more people living in.*
2	*Hassan (2016)*	*70% people live in city and it shows population is one of the factors that influencing living area, thus it will lead to effect of housing price.*
3	*Hou (2010)*	*Increase of the population leads to the expanding of urban area.*
4	*Kassim (2014)*	*Construction cost has direct influence on the housing price due to the raw material.*
5	*Haron (2015)*	*Construction cost will be included into the developers' account when they develop any housing projects.*
6	*Ibrahim et al (2017)*	*Construction cost is the production cost of housing development and it will increase the selling price of a house.*
7	*Mohammad (2010)*	*The more the speculation of the product, the market more active and attract more investor to invest on the product.*
8	*Towbin (2018)*	*There is a relationship between house price and speculation in financial market and speculation is injurious to public because it improves price fluctuations in the market.*
9	*Ong and Rom(2015)*	*Inflation will load real payment on the long-term fixed-rate mortgage, increasing of money supply lead to inflation and reduce in money value and lead to increasing of housing price.*
10	*Anari et al (2016)*	*Inflation rate has a relation between house price, rent, and also consumer price index.*

(a) State the hypothesis results from the analysis in **Table Q2(a)**.

(5 marks)

(b) Interpret the analysis from **Q2(a)**.

(10 arks)

(c) Conclude the findings from **Q2(b)** with the help of literature review in **Table Q2(b)**.

(10 marks)

Q3 Time series analysis is a statistical technique that deals with time series data, or trend analysis. Time series data means that data is in a series of particular time periods or intervals. The components, by which time series is composed of, are called component of time series data.

Interpret the time series component below with suitable sketch:

(i) Trend Component

(ii) Seasonal Component

(iii) Cyclical Component

(iv) Irregular Component

(v) Cyclical vs. Seasonal

(25 Marks)

Q4 (a) A property valuer is conducting a study of the factors that affect the value of housing market in Ainsdale City. All 14 factors have been identified to have influence on the market value of real estate in the area.

The data consists of the actual transaction prices of residential buildings having market period of two years, covering 2017 to 2018. A total of 53 valuation reports on residential buildings have been collected from practicing government valuers.

Using multiple regression analysis, the results are as below.

Table Q4(a): Regression Statistics

Regression Statistics	
Multiple R	0.998
R Square	0.997
Adjusted R Square	0.995
Standard Error	2.269
Observations	53.000

Table Q4(b): ANOVA

	df	SS	MS	F	Significance F
Regression	14	58824.08	4201.71984	816.0478	1.34728E-42
Residual	38	195.6569	5.148864588		
Total	52	59019.73			

Table Q4(c): Coefficient

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	72.80	4.07	17.88	0.00	64.56	81.04
Built up area in Sq.ft	0.02	0.00	60.18	0.00	0.02	0.02
Plot shape	-9.08	2.08	-4.37	0.00	-13.29	-4.87
Location	-7.39	0.73	-10.18	0.00	-8.85	-5.92
Zoning	6.17	0.49	12.58	0.00	5.18	7.16
Age of building /property as on the date of valuation	0.08	0.03	2.50	0.02	0.01	0.14
Number of storey in building	-4.16	0.31	-13.55	0.00	-4.78	-3.54
Condition of property	-7.32	0.61	-12.10	0.00	-8.55	-6.10
Type of construction	-13.96	1.08	-12.89	0.00	-16.16	-11.77
View from property	-5.00	0.33	-14.99	0.00	-5.68	-4.33
Access road width	8.41	0.35	24.38	0.00	7.72	9.11
Parking facilities	-3.74	0.17	-22.00	0.00	-4.09	-3.40
Nearness to amenities	-3.55	0.29	-12.18	0.00	-4.15	-2.96
Nearness to facilities	-8.42	0.43	-19.59	0.00	-9.30	-7.55
Internal transport facilities	15.15	0.52	28.96	0.00	14.10	16.21

Based on the output in **Table Q4(a)**, **Table Q4(b)** and **Table Q4(c)**, answer the following questions:

(i) Identify the regression equation.

(2 marks)

(ii) Interpret the value of the coefficient for the independent factors.

(8 marks)

(iii) Determine the variability in price as explained by the model.

(3 marks)

(iv) Determine the significance of the overall regression model.

(2 marks)

(b) A researcher aim to measure the relationship between macroeconomic variables and the housing price. This research examines empirically whether the increasing trend in the Malaysian housing price is related to changes in the gross domestic product (GDP), population, inflation rate, costs of construction, interest rate and real property gains tax (RPGT). The empirical data were collected from Valuation and Property Services Department of the Ministry of Finance Malaysia from 2001 to 2018.

Table Q4(d): Coefficient

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	-24.191	3.757		-6.438	.000		
ln(GDP)	.172	.040	.446	4.274	**.000**	**.107**	**2.358**
ln(Cost of Construction)	-.004	.005	-.019	-.675	.505	.134	5.459
ln(Population)	1.937	.256	.752	7.569	**.000**	**.151**	**3.610**
Inflation Rate	-.004	.003	-.046	-1.593	.121	.092	4.868
Interest Rate	.002	.003	.020	.653	.518	.087	8.780
RPGT(%)	.002	.000	.219	3.895	**.000**	.167	6.125

Dependent variable: Housing price

$R^2 = 0.981$; F statistic = 287.093

Hypothesis developed:

H1: *The population in Malaysia has a significant impact on the housing price.*

H2: *The gross domestic product (GDP) has a significant impact on the housing price in Malaysia.*

H3: *The interest rate has a significant impact on the housing price in Malaysia.*

H4: *The labour force has a significant impact on the housing price in Malaysia.*

H5: *Inflation has a significant impact on the housing price in Malaysia.*

H6: *The RPGT has a significant impact on the housing price in Malaysia.*

Table Q4(e): Literature review

No.	Author (Year)	Discussion
1	Qing (2011)	*Housing investment is part of GDP*
2	Chioma (2012)	*There is a causal relationship between the gross domestic product, which can be measured as economic growth, and the consumption expenditure, which grows as a result of the increase in consumption expenditure*
3	Agus (2015)	*When the demand is greater than the supply, it will cause the housing price to increase*
4	(Monk, 2017; Asiah, 2017)	*The constructors might face restrictions on the supply of land in the area, finding a strategy location to build the houses and the type, density and timing of the development*

Based on **Table Q4(d)** and **Table Q4(e)**, discuss whether the findings are useful for speculators, investors and buyers in determining the factors to account for in housing investment decision.

(10 Marks)

- END OF QUESTIONS -