UNIVERSITI SAINS MALAYSIA

Final Examination
Semester I, Academic Session 1994/95

October/November 1994

AGW602 - RESEARCH METHODOLOGY

Time: [2 hours]

Instructions

Please make sure that this examination paper consists of EIGHT printed pages before you begin.

Answer **FIVE** questions. **TWO** from Section A and **THREE** from Section B.

SECTION A (Answer BOTH questions)

Q1. In the sampling process, discuss the major issues that can shape the choice of the appropriate sample design and the sample size to be used in the research.

[20 marks]

O R

Discuss the important issues that need to be addressed when determining the appropriate techniques of analysis.

[20 marks]

Q2. A survey was carried out to study job satisfaction among middle level executive in various organisations. The following are the SPSS output for a t-test for independent groups involving the variable SEX (Groups: 1 = Male, 2 = Female). The output also include a one-way analysis of variance involving different educational levels (Groups: 1 = Secondary School, 2 = being Diploma, 3 = Bachelors, 4 = Masters, and 5 = Ph.D).

...2/-

T - TEST / GROUPS SEX (1,2) / VARIABLES JOBSAT.

Independent samples of SEX — Respondent Gender

Group 1: SEX EQ 1 — Group 2: Sex EQ 2

T - TEST FOR: JOBSAT JOB SATISFACTION

	Number of cases	Mean	Standard Deviation	Standard Error
Group 1	179	13.7989	2.904	.217
Group 2	77	12.6104	3.591	.409

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.53	0.23	2.79	254	.006	2.57	120.67	0.12

(i) What is the hypothesis tested?

(ii) Please state the assumptions used in the t-test.

(iii) What conclusions can you draw from the data? State the appropriate figures you used in arriving at these conclusions.

ONEWAY/VARIABLES JOBSAT BY EDU (1,5) /RANGES DUNCAN/STATISTICS (1,2).

Variable JOBSAT — Job Satisfaction

By Variable EDU — Level of Education

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Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	353.1161	88.2790	10.0535	.0000
Within Groups	251	2204.0050	8.7809		
Total	255	2557.1211			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf	Int for Mean
Grp 1	44	14.2727	2.2861	.3446	13.5777	To 14.9678
Grp 2	24	11.9583	2.4402	.4981	10.9279	To 12.9888
Grp 3	152	12.8618	3.3692	.2733	12.3219	To 13.4018
Grp 4	13	15.2308	2.4884	.6902	13.7270	To 16.7345
Grp 5	23	16.2174	1.5654	.3264	15.5404	To 16.8943
Total	256	13.4414	3.1667	.1979	13.0516	To 13.8943
Fixed Effects Model			2.9633	.1852	13.0767	To 13.8062
Random Effects Model				.9315	10.8552	To 16.0276

Random Effects Model - Estimate of Between Component Variance 2.0755

Group	Minimum	Maximum
Grp 1	9.0000	18.0000
Grp 2	7.0000	17.0000
Grp 3	4.0000	18.0000
Grp 4	9.0000	18.0000
Grp 5	13.0000	18.0000
Total	4.0000	18.0000

Multiple Range Test
Duncan Procedure
Ranges for the .050 level -

2.79 2.93 3.02 3.10

...4/-

The ranges above are table ranges.
The value actually compared with Mean (J) - Mean (I) is..

2.0953 * Range * Sqrt (1/N [I] + 1/N [J])

(*) Denotes pairs of groups significantly different at the .050 level

Mean	Group	G G G G G r r r r r p p p p p 2 3 1 4 5
11.9583	Grp 2	
12.8618	Grp 3	
14.2727	Grp 1	* *
15.2308	Grp 4	* *
16.2174	Grp 5	* * *

Does job satisfaction vary significantly across the groups? If yes, which pairs of groups contribute to this significant difference?

[20 marks]

O R

A study was carried out to find the relationship between adjusted stock price against annual net dividend per share (cents), dividend payout during the year (%), annual growth in earnings (%), annual inflation rate (%), annual real GDP growth (%). Data was collected over three years, 1982, 1988 and 1993 for 30 companies listed on the KLSE. The REGRESSION procedure of SPSS produces the following output.

* * * * M U L T I P L E R E G R E S S I O N * * * *

Listwise Deletion of Missing Data

Equation Number 1 Dependent Variable.. PRICE Stock average price during c

Block Number 1. Method: Enter
ANNDIV ANNGRE DIVPOUT GDP INFLAT YEAR

...5/-

Variable(s) Entered on Step Number

1..	YEAR	Year
2..	ANNGRE	annual growth in earnings (%)
3..	DIVPOUT	dividend payout during year (%)
4..	ANNDIV	annual net dividend per share (sen)
5..	INFLAT	Annual inflation rate (%)

Multiple R	.74048
R Square	.54831
Adjusted R Square	.52143
Standard Error	2.56553

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	5	671.15085	134.23017
Residual	84	552.88160	6.58192

F = 20.39376 Signf F = .0000

Var-Covar Matrix of Regression Coefficients (B)
Below Diagonal: Covariance Above: Correlation

	YEAR	ANNGRE	DIVPOUT	ANNDIV	INFLAT
YEAR	.00903	.09243	.05532	-.34850	.65657
ANNGRE	3.997E-05	2.070E-05	.26833	.18770	.26422
DIVPOUT	1.041E-05	2.418E-06	3.923E-06	.09651	.01589
ANNDIV	-.00152	3.925E-05	8.786E-06	.00211	-.11355
INFLAT	.01715	3.304E-04	8.650E-06	-.00143	.07553

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
ANNDIV	.294033	.045962	.519479	6.397	.0000
ANNGRE	.001733	.004550	.030843	.381	.7043
DIVPOUT	- .001400	.001981	-.054312	-.707	.4816
INFLAT	.605145	.274834	.225123	2.202	.0304
YEAR	.418261	.095034	.463016	4.401	.0000
(Constant)	-832.477465	189.548496		-4.392	.0000

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Variables not in the Equation

Variable	Beta In	Partial	Min Tole	T	Sig T
GDP	.	.	.000000	.	.

End Block Number 1 Tolerance = 1.00E-04 Limits reached.

Residuals Statistics:

	Min	Max	Mean	Std Dev	N
*PRED	-1.0319	15.7606	3.5817	2.7461	90
*RESID	-3.0362	18.3707	.0000	2.4924	90
*ZPRED	-1.6800	4.4350	.0000	1.0000	90
*ZRESID	-1.1834	7.1606	.0000	.9715	90

Total Cases = 90

Durbin-Watson Test = 2.00293

i. Discuss the validity of the output in terms of the basic assumptions of the regression procedure.

ii. Discuss the goodness of the model.

iii. What are the major factors affecting adjusted stock price?

iv. How would you test for multicollinearity among the independent variables? Suggest ways to overcome problems of multicollinearity.

[20 marks]

SECTION B (Answer any **THREE** questions)

Q3. Explain fully how you would demonstrate to and convince machine operators that thorough knowledge of the operating policies and procedures (by reading the Manual) will virtually eliminate all on-the-job accidents.

[20 marks]

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Q4. "The Solomon Four Group Design is the answer to all our research questions pertaining to cause-effect relations because it guards against all the threats to internal validity." Discuss.

[20 marks]

Q5. What data collection methods would be most appropriately used for the following and why?

(a) A study to assess the impact of sequential changes contemplated to be made in an organization with respect to employee benefits -- both tangible and intangible -- on the experienced satisfactions of the employees.

(b) A study of the reactions of university professors to the interruptions from students during their non-office hours, especially their willingness or irritability in solving students' problems.

(c) A study of audience reactions to a political speaker.

(d) A study to understand why some college students rebel against their parents.

(e) A study of students' reactions to how the University is run.

(f) A study of the parking problem in downtown Penang.

[20 marks]

Q6. Below are two scenarios. For each, indicate how the researcher should proceed with the following, giving reasons:

(a) The purpose of the study
(b) The type of investigation
(c) The extent of researcher interference
(d) The study setting
(e) The time horizon for the study
(f) The unit of analysis.

Scenario A

Mr. Silva, the owner of a jewellery shop, has invited a research consultant to tell him how his shop is different from similar jewellery shops located in Penang, in regard to his usage of the computer technology, his sales volume, his profit margin, and the way he trains his staff.

...8/-

Scenario B

Mr. Santokh Singh, the owner of several restaurants in Penang is concerned about the wide differences in the profit margins of the various restaurants. He would like to try some incentive plans for increasing the efficiency levels of these restaurants that are lagging behind. But, before he introduces this, he would like to be sure that the idea will work. He asks a research firm to help him with this issue.

[20 marks]

Q7. Here are eight variables:

1) Understanding Student Needs (by teacher);
2) Developing appropriate teaching strategies (by teacher);
3) In-class examples and exercises;
4) Student entry level skills;
5) Student understanding;
6) Student examination performance;
7) Difficulty of examination;
8) Stress.

(a) With these eight variables, develop a Theoretical Framework, treating variable #4 as a moderater, and variable #5 as an intervening variable.

(b) Develop four hypotheses.

[20 marks]

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