

K J Somaiya Institute of Management Studies & Research

Business Research Methods PGDM-A&B, II Trimester

Time: 3 hours

Date : 29/12/2016

Marks : 50

Note:

- Attempt any 5 questions. All questions carry 10 marks each.
- Use of calculators is allowed
- Take assumptions wherever necessary and make a note of it.

Q1. Raymond ltd. is a well-established company in the textile and garment industry promoted by Vijaypath Singhania group. The company's business is divided into three major segments: textile, files and tools, and Air Charter Services. The textile business forms the core business with a contribution of 77% to the total sale during the year 2006-2007

Table 1 provides the Income, Ad Expenditure, Marketing Expense, Distribution Expense and Forex Earnings of Raymond Ltd from March 1990 (financial year 1989-1990) to March 2007 (financial year 2006- 2007).A Regression Model generated by taking income as dependent variable with the below generated output:

Table1 (Figures millions)

year	Income	Ad. Expense	Marketing Expense	Distribution expense	Forex Earnings
Mar-90	3854.6	52	82.6	316.3	174.5
Mar-91	4757.9	60.2	97.8	318	202.2
Mar-92	5973.5	63.7	132.8	366	331.6
Mar-93	6792.1	98.2	154.3	501.7	525.3
Mar-94	7643	134.3	192	502.8	735.3
Mar-95	9522.9	156	253.8	679	984.6
Mar-96	11670.9	267.4	292.6	755.8	1122.7
Mar-97	12716.9	283.6	326.7	898.7	1590.3
Mar-98	15728.5	246.9	383.8	1200.3	2235.7
Mar-99	16342.1	365.8	432.2	949.4	1804.4
Mar-00	17248.4	469	547.1	1262.7	2170.6
Mar-01	21413.9	455.7	473.9	1025.8	2220.1
Mar-02	10935.8	548.7	418.1	82.4	1704.9
Mar-03	11234.9	493.8	414.6	88.6	1760.9
Mar-04	12686.8	448.8	373.8	110.7	2141.5
Mar-05	12724.5	437.6	421.4	148.1	2653
Mar-06	14678.8	531.3	478.9	155.1	2688.4
Mar-07	15277.6	664.2	525.6	113	2261.1

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Model Summary Table1.1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.970 ^a	.942	.924	1298.362

a. Predictors: (Constant), Forex Earnings, Distribution expense, Ad Expense , Marketing Expense

ANOVA Table 1.2

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.543E8	4	8.859E7	52.550	.000 ^a
	Residual	2.191E7	13	1685743.162		
	Total	3.763E8	17			

a. Predictors: (Constant), Forex Earnings, Distribution expense, Ad. Expense , Marketing Expense

b. Dependent Variable: Income

Coefficients Table 1.3

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1803.251	938.666		1.921	.077
	Ad Expense	20.374	12.210	.843	1.669	.119
	Marketing Expense	-14.712	20.013	-.466	-.735	.475
	Distribution expense	7.591	2.229	.651	3.406	.005
	Forex Earnings	2.835	1.241	.510	2.285	.040

a. Dependent Variable: Income

On the basis of regression output answer the following question:

- a. Is suitable to run regression analysis? How will you decide?

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- b. What is the role of ANOVA in regression analysis?
- c. Develop an estimated regression equation that can be used to predict Income
- d. Comment on the variables contributing significantly
- e. Explain Adjusted R Square.

Q2. 12 students were given intensive coaching and 5 tests were conducted in a month. The scores of tests 1 and 5 are given below:

Table 2

No. of students	:	1	2	3	4	5	6	7	8	9	10	11	12
Marks in 1 st Test	:	50	42	51	26	35	42	60	41	70	55	62	38
Marks in 5 th test	:	62	40	61	35	30	52	68	51	84	63	72	50

- a) Frame Null and alternate hypothesis.
- b) Do the data indicate any improvement in the scores obtained in tests 1 and 5?
- c) What is the measurement scale used?
- d) Is paired t test is about measuring correlation also? Explain.
- e) What are the limitations of testing of hypothesis?

Paired Samples Statistics- Table 2.1

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Fifth test	55.67	12	15.790	4.558
First test	47.67	12	12.644	3.650

Paired Samples Test-Table 2.2

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Fifth test – first test	8.000	5.673	1.638	4.396	11.604	4.885	11	.000

Q3. You are summer trainee of Star car manufacturers, who wants to release a small car into the market. For this purpose they have asked you to survey 100 respondents about their perceptions and image attributes of small cars (Refer Table-3)

Table 3

Attributes(variables)	1 completely agree	2 agree	3 neutral	4 disagree	5 completely disagree
1. The price of the car should be reasonable.					
2. Fuel mileage of the car should be at least 17 km/hr.					
3. A small car should be easy to maintain and to be serviced .					
4. Seating should be comfortable for four adults.					
5. A small car should have adequate leg space and headroom .					
6. Brakes are the most critical part of a small car.					
7. Collapsible steering column should be standard equipment in all the new cars.					

You have come out with the below given factor analysis results. On the basis of statistical tables generated, address the following Managerial issues:

- a. What is the role of factor analysis? Justify its application in your study.
- b. Is the sample size sufficient to run this analysis? If KMO value comes below 0.40, how would you address its implications?
- c. Which table explains individual variance of each and every variable and what do you deduce from you table?
- d. Extract the factors and summarize them (*highlight which component matrix is used*)
- e. Is it possible to extract desired no. of factors? If yes how and when we apply it?

KMO and Bartlett's Test- Table 3.1

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.630
Bartlett's Test of Sphericity	Approx. Chi-Square	1100.797
	df	45
	Sig.	.000

Communalities- Table 3.2

	Initial	Extraction
price	1.000	.941
mileage	1.000	.969
maintenance	1.000	.941
seating	1.000	.825
leg headspace	1.000	.871
brakes	1.000	.705
Collapsible steering	1.000	.617
Power steering	1.000	.569
Interior accessories	1.000	.818
luggage space	1.000	.960

Extraction Method: Principal Component Analysis.

Total Variance Explained- Table 3.3

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.935	39.353	39.353	3.935	39.353	39.353	3.901	39.014	39.014
2	2.687	26.867	66.219	2.687	26.867	66.219	2.496	24.960	63.974
3	1.593	15.934	82.154	1.593	15.934	82.154	1.818	18.179	82.154
4	.695	6.951	89.104						
5	.593	5.928	95.032						
6	.255	2.546	97.577						
7	.117	1.166	98.744						

8	.071	.707	99.451					
9	.039	.389	99.839					
10	.016	.161	100.000					

Extraction Method: Principal Component Analysis.

Component Matrix^a - Table 3.4

	Component		
	1	2	3
price	.958	-.142	-.060
mileage	.975	.111	-.072
maintenance	.943	-.225	-.040
seating	-.140	.821	-.363
leg headspace	.129	.741	-.552
brakes	.182	.426	.700
Collapsible searing	.191	.193	.737
Power steering	-.326	-.680	.031
interior accessories	-.089	.836	.333
luggage space	.979	-.003	-.044

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Rotated Component Matrix^a - Table 3.6

	Component		
	1	2	3
price	.969	-.054	.011
mileage	.961	.182	.106
maintenance	.960	-.137	-.007
seating	-.187	.889	-.007
leg headspace	.105	.911	-.176
brakes	.070	.101	.830
Collapsible steering	.100	-.125	.769
Power searing	-.257	-.645	-.295

interior accessories	-.205	.612	.633
luggage space	.974	.067	.085

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser normalization.

a. Rotation converged in 4 iterations.

Q4. A production manager wants to assess the reactions of blue collar workers in his department (including foremen) to the introduction of computer integrated manufacturing (CIM) systems. He is particularly interested to know how they perceive the effects of CIM on:

1. Their future jobs
2. Additional that they will have to receive
3. Future job advancement

Design a questionnaire for production manager.

Q5. The probability of cancer victims successfully recovering under the treatment was studied by a researcher in hospitals. She found three variables important for recovery:

- Early and correct diagnosis by the researcher.
- The nurses should carefully follow the instructions of the doctor.
- Peace & quiet in vicinity.

In quiet atmosphere, the patients rested well and recover sooner. Patients who were admitted in the advance stage of cancer did not respond to the treatment even though doctor's diagnosis was done immediately on arrival, nurses were there & there was peace and quiet.

1. Draw a theoretical framework of the above case let.
2. Identify all the variables under study and label them correctly.
3. Define different type of variables
4. What is the role of theoretical Framework in research?
5. Does Review of literature play any role in framing theoretical framework?

Q6.1 Suggest an appropriate sampling technique for the below mentioned situations with the appropriate reasoning:

- a) The Director of Human Resources of a manufacturing firm wants to offer stress management seminars to the personnel who experience high levels of stress. He conjectures that three groups are most prone to stress. The workmen who constantly handle dangerous chemicals, the foremen who are held responsible for production quotas, and the counselors, who day in day out, listen to the problems of the employees, initialize them and offer counsel, with no idea of how much they have really helped the clients.

To get a feel for the experienced level of stress, within each of the three groups and the rest of firm, the Director would classify the sample into four distinct categories.

1. The workmen handling the dangerous chemicals.
2. Foremen

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3. Counselors
 4. All the rest
- b) The human resource Director of a company with 120 people on its payroll has been asked by the Vice President to give a feedback on formulating an implementable flexi time policy. The Director feels that such a policy is necessary as everyone doesn't seem to be happy with 9 to 5 hrs. and people have complained. Formulating such a policy now, in the opinion of the Director will help different department people like sales etc. and with results, convince the V.P. that there is a need for flexitime.
- c) An administrator wants to access the reactions of employees to a new and improved health benefits scheme that requires a modest increase in the premiums to be paid by employees for their families. Explain the administrator an easy and quick sampling technique.

Q6.2. What are sampling and non-sampling errors? Explain with one example of each?

Q6.3. Name any 3 factors that help in determining sample size of a study?

PS.: Q6 comprises three subparts (Q6.1, Q6.2, and Q6.3).

*****All the best*****