2024

COMMERCE

Paper : GE-404

[Business Research Methods (BRM)]

Full Marks : 40

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Module - I

Answer *any two* questions.

1. (a) Discuss briefly the ethics in business research.

   (b) Highlight the major elements in drafting the research proposal in business research. 4+6

2. (a) Mention the differences between 'structured' and 'unstructured' questions with examples.

   (b) Define 'Longitudinal design' with a suitable example.

   (c) Briefly explain the concept of 'Non-spurious' and 'Spurious' association with examples. 4+2+4

3. (a) Mr. A, B, C and D participated in a 100 meter race and completed successfully. The following table shows their details of performance in the race.

Name of the runners (1)	Number assigned to the runners (2)	Time to finish in seconds (3)	Rank order of the runners (4)	Performance rating on a 0 to 10 scale (5)
A	6	14.2	Third place	8.6
B	11	12.8	First place	9.6
C	10	13.6	Second place	9.2
D	5	15.1	Fourth place	8.1

Classify the data in column 2, 3, 4 and 5 in above table into different scales and justify your classification.

   (b) Write a short note on 'Cronbach's alpha'.

   (c) Briefly explain the concept of 'double-barreled question' with a suitable example. 6+2+2

Please Turn Over

4. You are required to go through the following research problem statement in the context of business research and accordingly suggest the appropriate type of data collection technique that should be adopted. Briefly explain and provide reasons in support of your answer. 2×5

   (a) Trend of average revenue per user (ARPU) and the growth of customer base of a recently merged telecommunication company during the last 3 financial years.

   (b) Customer satisfaction level about the service encounter experiences at Automated Teller Machines (ATMs) of a certain nationalised bank across urban areas of Kolkata city.

   (c) Safety concerns of women riders and customer support being provided using a popular app-based bike rides for late night commuting in the National Capital Region of Delhi.

   (d) Average time taken to settle Mediclaim reimbursements against health insurance policies of insured persons by a certain insurance company.

   (e) On-time flight movement status including rescheduling and cancellation of scheduled flights by a private airline company operating across the domestic regions of India.

Module - II

Answer *any two* questions.

5. (a) What do you understand by inferential statistics?

   (b) Draw a positively skewed box plot and label it.

   (c) From the data set given below, containing the marks (with a provision for negative marking) of 59 students, identify mild outliers and extreme outliers using the rule relating to interquartile range. 3+2+5

− 5	12	15	23	25	26.5	28.5	29.5	34	44.5
− 4	12.5	20	23	25	27	28.5	29.5	35	50
0	13	22	24	25.5	27.5	28.75	30	36	56
9	13.5	22.5	24	25.5	27.5	29	31	40	57
11	13.5	22.5	24.5	25.5	27.5	29.25	32	40.5	60
11.5	14	23	24.5	26	28	29.5	33	44	

6. A health researcher wants to predict "VO$_2$max", an indicator of fitness and health. Normally, performing this procedure requires expensive laboratory equipment and necessitates that an individual exercise to their maximum, which at times may be difficult. For these reasons, it has been decided to find a way of predicting an individual's VO$_2$max based on attributes that can be measured more easily and cheaply. To this end, a researcher recruited 100 participants to perform a maximum VO$_2$max test, but also recorded their "age", "weight", "heart rate" and "gender" along with the VO$_2$max test score.

The researcher's goal is to be able to predict VO_2max based on these four attributes : age, weight, heart rate and gender. The researcher conducted a multiple regression analysis. The regression output is given below :

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.760	0.577	0.559	5.69097
a. Predictors : (Constant), gender, age, heart_rate, weight				

Coefficients					
Model		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	87.830	6.385	13.756	0.000
	age	− 0.165	0.063	− 2.619	0.010
	weight	− 0.385	0.043	− 8.953	0.000
	heart_rate	− 0.118	0.032	− 3.6875	0.000
	gender	13.208	1.344	9.827	0.000

You are required to :

(i) Interpret the model summary.

(ii) Conduct the test of overall significance of the model clearly stating the null and alternative hypothesis of the test. Interpret the test results. [Critical value of F with (4, 95) d.f. at 5% and 1% level of significance are 2.4675 and 3.5232]

(iii) Interpret the coefficient table. 2+4+4

7. (a) State the differences between Principal Component Analysis and Common Factor Analysis.

(b) Explain the terms: Eigenvalue and Factor Matrix.

(c) The output tables obtained from the Principal Component Analysis of a study of twelve (12) variables are given below : You are requested to interpret the results.

Table 1: KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.658
Bartlett's Test of Sphericity	Approx. Chi-Square	497.605
	df	66
	Significance	0.000

Please Turn Over

Table 2: Rotated Factor Matrix				
Factor				
	1	2	3	4
V1	0.001	−0.147	0.972	−0.109
V2	0.195	0.253	−0.002	0.711
V3	0.084	0.970	−0.146	0.074
V4	−0.042	−0.137	0.987	−0.035
V5	0.006	0.456	−0.430	0.600
V6	0.953	0.053	−0.004	0.078
V7	0.939	0.161	−0.162	0.086
V8	0.117	−0.008	−0.040	0.603
V9	0.936	0.068	0.164	0.186
V10	0.210	0.899	−0.101	0.103
V11	0.943	0.078	−0.059	0.158
V12	0.022	0.909	−0.110	0.206
Extraction Method: Principal Component Analysis.				

2+3+(2+3)

8. (a) Discuss briefly the different time series components.

(b) With a view to analyzing the short-run causality using Granger causality in VAR (Wald test) in Covid-19 global crisis period (October 24, 2019 to October 23, 2020) among the stock markets of three countries, namely Russia, India and China, their largest stock exchanges based on judgement sampling technique have been identified. They are: (a) MOEX Index (Russia); (b) BSE Sensex 30 (SENSEX) (India); and (c) SSE Composite Index (SSEC1) (China), Since the stock markets are not cointegrated in the long-run, short-run relationship among them can be estimated using

unrestricted VAR model. The data is transformed into stationary by taking their first difference. Results of Granger causality in VAR (Covid-19 global crisis period) are as follows :

Results of VAR Granger Causality Test (Pre-Covid-19 Global Crisis Period)

Dependent Variable	Independent Variables	Chi-Square	Prob.
DLNMOEX	DLNSENSEX	14.55776	0.0001
	DLNSSECI	0.417013	0.5184
	All	22.40219	0.0002
DLNSENSEX	DLNMOEX	11.92890	0.0006
	DLNSSECI	0.472450	0.4919
	All	37.45999	0.0000
DLNSSECI	DLNMOEX	3.147204	0.0761
	DLNSENSEX	6.680623	0.0097
	All	10.12600	0.0384

You are asked to elaborate the inferences based on the results of VAR Granger Causality Test (Pre-Covid-19 Global Crisis Period) at 5 per cent level of significance. 5+5