UNIVERSITI TUNKU ABDUL RAHMAN

ACADEMIC YEAR 2019/2020

FINAL ASSESSMENT

UDPS2033 SAMPLE SURVEY AND SAMPLING TECHNIQUES

DATE & TIME OF DOWNLOAD: **9:00 AM, 13TH MAY 2020**

DATE & TIME OF SUBMISSION: **9:00 AM, 15TH MAY 2020**

DURATION: 48 HOUR(S) / 2 DAY (S)

BACHELOR OF SCIENCE (HONOURS) STATISTICAL COMPUTING AND
OPERATIONS RESEARCH

Instruction to Candidates:

1. This Final Assessment (FA) is an Individual, Open-Book assessment which consists of [FOUR (4)] questions. Each question carries marks as indicated beside them.

2. You are required to answer **[ALL]** questions by showing clear working steps, and submit the **ANSWER SCRIPT** by **9.00 am , 15th MAY 2020**.

3. **Statistical software** could be used to aid the analysis. However, please provide clear working steps for calculation.

4. Please use the answer booklet template provided in WBLE to answer the questions.

5. During the period of **[48 hours]** of this FA, the examiner(s) can be reached at
    (a) [Microsoft Teams] with Code/Password:[rfv5dc0] at 9.00-10.00 am, 3.00-4.00pm
    (b) Email:[kavithas@utar.edu.my] anytime

   You may use the above e-platform(s) to check with the examiner(s) if you need any clarification on this FA question paper.

6. You may refer to any books, lecture notes, published materials, online resources etc. when answering the questions. Proper referencing is necessary to avoid plagiarism. However, **Copy-and-Paste, Consultation, Discussion and Sharing of Answers** are **STRICTLY PROHIBITED** in this FA.

7. All answers will be checked for plagiarism via Turnitin.

UDPS2033 SAMPLE SURVEY AND SAMPLING TECHNIQUES

Q1. CardioGood Fitness is a company that sells treadmills ever since the year 2016. The company offers three types of treadmills, namely TM195, TM498 and TM798. The individuals who purchase the instruments for personal use are subjected to a short survey and the information obtained is recorded accordingly. The company wanted to analyse the customers' purchase records to carry out its sale promotion activities in three months to come. You have been hired to conduct the analysis for them. A sample of 180 buyers' records extracted from the total of 2053 buyers' records are available to you as the full data set containing client information is confidential. Refer to the Excel spreadsheet CardioGoodFitness. xls attached for details. The company claims that it has conducted a simple random sample to select those sample records. The ratio of females to males in the entire record is 35:65. Summarise the following information for the data analysis.

(i) Describe the distribution of age, gender and marital status of the buyers. You are encouraged to use statistical software to perform this analysis. (9 marks)

(ii) Estimate the mean fitness level of the buyers. Calculate the bound for the estimate. (Use α=0.05) (7 marks)

(iii) Estimate the mean income for the buyers. Calculate the bound for the estimate. (Use α=0.05) (7 marks)

(iv) Test whether there is a difference in the mean income between female and male buyers at 5% significance level. (7 marks)

(v) Recode the perceived fitness as follows: 4-5=satisfactory 1-3= not satisfactory. Test whether the proportions of females and males who rated their fitness level as satisfactory differ at 5% significance level. (7 marks)

(vi) Test whether there is a difference in proportion of participants who rate their health as satisfactory over non-satisfactory among the males at 5% significance level. (7 marks)

(vii) Based on the information from the analysis above and other additional analysis, explain who are the prospective buyers that the company should approach in its future promotional activities. (6 marks)

[Total: 50 marks]

Q2   A health district has 18 primary health clinics (12 in urban areas and 6 in rural areas) and all of them run a special clinic for elderly. One of the mandatory assessments conducted in the clinics was screening for mild cognitive impairment (MCI). Cognitive impairment is condition where a person's ability to remember, learn things, concentrate and make decisions decline to a level that is lower than what could be expected for their age group. It is the stage before dementia, a serious decline in cognitive function. The MCI can be identified using screening instruments. The health authorities wanted to determine the proportion of elderly with MCI by looking at the medical records. A preliminary study to was conducted by collecting information from all medical records in four randomly selected clinic as follows.

Clinic Reference Number	Type	Number of Elderly	Number with MCI based on screening
7	Urban	400	120
9	Urban	450	140
10	Urban	430	160
3	Rural	346	85

(i)   A proper study with adequate sample size is to be conducted using the sampling method explained above. Calculate sample size with 95% confidence level and bound on the error of estimate of 0.04.   (8 marks)

(ii)   Explain the strengths and limitations of the sampling method proposed above.
(8 marks)
[Total: 16 marks]

Q3.   A housing estate has 3375 houses which are in one of the four designs, A, B, C or D. The probability of finding house type A is 0.30, B is 0.2, C is 0.15 and D is 0.35. The past record shows that if a house is of type A, probability of it being robbed is 0.15, B is 0.20, C is 0.18 and D is 0.19. The local authority wanted to conduct a study on prevalence of robbery in the area. Estimate the appropriate sample size if bound on error of estimation of 0.01 and 95% confidence level are desired. The cost of sampling is RM1.50 per unit for design A and B and RM2.50 for design C and D. Allocate the samples based on cost of sampling criteria.   (14 marks)
[Total: 14 marks]

Q4.   Answer this question based on the research article entitled "Prevalence, comorbidity, disability and serve utilization" provided.

(i)   There are four perspectives of survey. Explain the perspectives that have been addressed in this research article. Comment if the perspectives have been well addressed.   (12 marks)

Q4. (Continued)

(ii)   Questionnaires are commonly used in population based health surveys as they enable mass information collection. Explain the important aspects that should have been considered while developing questionnaire for the above mentioned study.   (6 marks)

(iii)   State the sampling method used in this study and explain how the sampling and selection of participants are to be carried out in order to minimize non-response and ensure the sample selected resembles the population as closely as possible.   (10 marks)

(iv)   Create a 2-3 minutes video that explains the followings:

- The sampling method employed in this study,
- The strengths and the limitations of the sampling method used.
- Steps that could be taken to overcome the limitations of the sampling method used in future studies.

The points for the video presentation should also be included in the written assignment.   (10 marks)
[Total: 38 marks]

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