UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022

COURSE NAME : SURVEY & SAMPLING METHODS

COURSE CODE : BWB 21103

PROGRAMME CODE : BWQ

EXAMINATION DATE : JANUARY / FEBRUARY 2022

DURATION : 2 HOURS

INSTRUCTION : 1. ANSWER **ALL** QUESTIONS.

2. THIS FINAL EXAMINATION IS AN **ONLINE** ASSESSMENT AND CONDUCTED VIA **OPEN BOOK**.

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THIS EXAMINATION PAPER CONSISTS OF **THREE** (3) PAGES

Q1   (a)   Explain the difference between the construction of stratified and cluster sampling.

(4 marks)

(b)   A consulting firm is hired to estimate the proportion of voters favoring candidate A, in a countrywide election. A cluster sampling is used, with the state as clusters. A simple random sample of 10 states is selected from the 100 states in the country. The consultation firm wants to make the estimation on election day but before final returns are tallied. Therefore, the staff is sent to the polls of each sample state to obtain the pertinent information directly from the voters as in **Table Q1(b)**.

Table Q1(b)

Number of voters, m	Number favoring A, a
1290	680
1893	1143
843	321
1170	631
1942	1187
1066	487
840	475
971	542
1171	596
1620	935

(i)   Estimate the proportion of voters favoring candidate A. Place a bound on the error of estimation.

(12 marks)

(ii)   A new study will be conducted in the same states to estimate the proportion p of voters favoring candidate A. Calculate the sample should be taken to estimate p with a bound of 0.02 on the error of estimation.

(8 marks)

Q2   A marketing company in Cyberjaya wants to determine how their advertising reflects the public. They have enough time and money to interview $n = 100$ households and decide to select random samples of size $n_1=40$ from zone A, $n_2=15$ from zone B, $n_3=30$ from zone C, and $n_4=15$ from zone D in Cyberjaya. The simple random samples are selected, and the interviews are conducted. The results of the survey are based on total hours of television viewing time in a week as in **Table Q3**. Based on the previous survey, the stratum variance is approximately 9, 16, 9, and 4 respectively.

Table Q3

Zone	N	n	Mean	Median	Standard deviation	Allocation fraction
A	250	40	18.3	17.5	3.2	0.30
B	196	15	15.4	14.6	4.4	0.40

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| C | 224 | 30 | 17.5 | 17 | 3.1 | 0.20 |
| D | 199 | 15 | 15.2 | 15.2 | 1.9 | 0.10 |

(i) Estimate the population mean and choose the sample size to obtain a bound on the error of estimation equal to 2 hours.

(12 marks)

(ii) Estimate the population total and choose the sample size to obtain a bound on the error of estimation equal to 70 hours. Choose the appropriate sample size if an equal number of observations is to be taken from each stratum.

(8 marks)

Q3 (a) Explain a situation where the nonprobability sampling design is more preferred to the probability sampling design.

(3 marks)

(b) (i) A new company wants to determine whether people prefer to buy their product or their competitors' product. They plan to ask people about their product in a mall. Shoppers in that mall will be their potential respondents. Suggest a suitable sampling method to select the respondents.

(3 marks)

(ii) A medical researcher wants to test the effects of a new drug on diabetic disease. He needs samples from diabetic patients. Suggest a suitable method to collect the new drug effects data.

(3 marks)

(c) Distinguish between judgment and quota samplings.

(2 marks)

(d) Your team is appointed to conduct a survey for a telecommunication company. The GiDi company asked you to find out their customer's opinion on the services provided by them. Their customers are all over Malaysia. Discuss what is the suitable nonprobability sampling method to select respondents or samples. Justify your answer.

(5 marks)

- END OF QUESTIONS -

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