



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER I
SESSION 2020/2021**

COURSE NAME : SURVEY & SAMPLING METHODS
COURSE CODE : BWB 21103
PROGRAMME CODE : BWQ
EXAMINATION DATE : JANUARY / FEBRUARY 2021
DURATION : 4 HOURS
**INSTRUCTION : ANSWER ALL QUESTIONS.
OPEN BOOK EXAMINATION**

THIS EXAMINATION PAPER CONSISTS OF SIX (6) PAGES

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- Q1** Your team is appointed to conduct a survey for a transportation company. The company, Syarikat Prasarana Negara Berhad asked you to find out the passengers' opinion on awareness, usage, and satisfaction on the light rapid transit (LRT) services in Kuala Lumpur. There are 37 LRT stations from Gombak to Putra Heights.
- (a) Discuss what is the suitable sampling method to select respondents or samples, among the LRT passengers. Justify your method according to the station's location involved and the number of respondents or samples.
(6 marks)
 - (b) The company wants 5000 respondents and the time allocation for the survey completed is within six months. Explain to the company whether the time allocation given is relevant or not.
(2 marks)
 - (c) Discuss on strategies that you used for selection and training of field workers, the organization of field works, and the organization of data management.
(6 marks)
 - (d) As a team leader, do you consider applying the non probability sampling in this survey? Justify your answer.
(2 marks)
 - (e) In your opinion, what are the suitable non-probability methods that can be applied in this survey? Explain why these methods are chosen.
(4 marks)
- Q2**
- (a) Identify whether the following sampling methods produce a simple random sample of students from a class of 50 students.
 - (i) Select the first five students from the class attendance lists.
 - (ii) The class consists of 25 boys and 25 girls. Assign the boys with the numbers from 1 to 25, and the girls from 26 to 50. Use a random table to select 10 numbers from 1 to 25 and 10 numbers from 26 to 50. Then, select the students assigned those numbers in your sample.
 - (iii) Choose randomly a letter from the 'English' word and select for the sample who those students' last names begin with that letter. If no last name begins with that letter, randomly choose another letter from that word.
 - (iv) Put the students' names in a jar and randomly pick for samples and do not put back the name into the jar.
 - (v) Select the samples based on those students who wear spectacles.
(5 marks)

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- (b) A community in Taman Pagoh Jaya consists of 30 families with their weekly medical expenses (RM) data is shown in Table Q2(b).

Table Q2(b)

Family Number	Family Size	Weekly Medical Expenses (RM)	Family Number	Family Size	Weekly Medical Expenses (RM)
1	2	28.60	16	5	72.00
2	3	41.60	17	3	21.20
3	3	45.40	18	4	55.40
4	5	61.00	19	2	51.90
5	4	82.40	20	4	46.60
6	7	56.40	21	2	79.60
7	2	48.40	22	5	33.60
8	4	88.80	23	3	75.60
9	2	26.80	24	4	69.60
10	5	39.60	25	7	57.40
11	3	58.80	26	3	126.00
12	6	54.20	27	3	39.10
13	4	44.20	28	6	43.20
14	4	75.40	29	2	36.40
15	2	45.20	30	2	40.20

- (i) Salina wishes to estimate the total weekly medical expenses by taking 10 families as a sample using a simple random sampling technique. She chooses family numbers 1, 4, 6, 10, 12, 14, 18, 21, 25, and 30 randomly to be the sample. Compute the value of estimated total weekly medical expenses and estimated standard error from the sample. (5 marks)
- (ii) Meanwhile, Aliah wishes to do the same survey as Salina but she takes more size samples which are 20 families. The sample contains family number 1, 2, 3, 5, 8, 10, 11, 13, 14, 16, 17, 19, 20, 21, 23, 24, 26, 27, 28 and 29. Compute the value of estimated total weekly medical expenses and estimated standard error from the sample. (5 marks)
- (iii) Compare the results obtained in Q2(b)(i) and Q2(b)(ii). Which samples do you think is more reliable? Give your reasons. (2 marks)
- (iv) Based on data samples taken by Salina and Aliah, which samples have a larger proportion of family size 3 or more? (3 marks)

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- Q3** (a) A school is concerned about improving its relations with a neighboring community. A 1-in-150 systematic sample of the $N = 4500$ students listed in the directory is taken to estimate the mean amount of money spent on clothing during one quarter of the school year. The results of the sample are listed in **Table Q3**.

Table Q3(a)

Student	Amount spent (RM)	Student	Amount spent (RM)	Student	Amount spent (RM)
1	30	11	29	21	9
2	22	12	21	22	15
3	10	13	13	23	6
4	62	14	15	24	93
5	28	15	23	25	21
6	31	16	32	26	20
7	40	17	14	27	13
8	29	18	29	28	12
9	17	19	48	29	29
10	51	20	50	30	38

- (i) Identify what type of populations based on the data given in **Table Q3**. You can plot a graph to ease the identification process. (4 marks)
- (ii) Based on **Q3(a)(i)**, what can you conclude on the amount of money spent on clothing during one quarter of the school year by the students? (2 marks)
- (iii) Determine the sample size required to estimate the mean population, which represents the average amount of money spent on clothing during one quarter of the school year by the students. (7 marks)
- (iv) Explain why the sample size is too small in **Q3(a)(iii)**. (1 mark)
- (b) Lisa is an auditor in a private firm. She is confronted with a long list of accounts receivable for her firm. She must verify the amounts on 10% of these accounts and estimate the average difference between the audited and book values.
- (i) The accounts are arranged chronologically, with the older accounts tending to have smaller values. Should she choose a systematic or a simple random sampling design to select the sample? Justify your answer. (2 marks)

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(ii) The accounts are arranged randomly. Should she choose a systematic or a simple random sampling design to select the sample? Justify your answer.

(2 marks)

(iii) Suppose the accounts are grouped by department and then listed chronologically within departments. The older accounts again tend to have smaller values. Should she choose a systematic or a simple random sampling design to select the sample? Justify your answer.

(2 marks)

Q4 (a) “Cluster sampling is less costly than simple or stratified random sampling”. By using your own word, discuss when this situation occurs?

(2 marks)

(b) Rahul is an experimenter working in an urban area. He decided to estimate the average value of a variable that highly correlated with race. He plans to use cluster sampling in his experiment. He uses city blocks as clusters and adults within blocks as elements. Identify and give justification why he would or would not use cluster sampling in the following situations.

(i) Most of the adults in certain blocks are Malay and most in other blocks are non-Malay.

(ii) The proportion of non-Malay is the same in every block and is not close to 0 or 1.

(iii) The proportion of non-Malay differs from block to block.

(6 marks)

(c) A consultation firm is hired to estimate the proportion of voters favoring candidate A, in a countrywide election. A cluster sampling is used, with 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 staffs are sent to the polls of each sample state to obtain the pertinent information directly from the voters as in **Table Q4(c)**.

Table Q4(c)

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

- (i) Construct 95% confidence intervals for the proportion of voters favoring candidate A. (7 marks)
- (ii) Construct 90% confidence intervals for the proportion of voters favoring candidate A. (3 marks)
- (iii) Discuss the difference between both results in **Q4(c)(i)** and **Q4(c)(ii)**. (2 marks)

Q5 (a) The marketing firm in Putrajaya finds that the costs doing a survey is higher in the rural areas compare to the town areas. The cost is increasing because of the traveling from house to house in rural areas. The cost can be referred in **Table Q5**.

Table Q5(a)

Stratum	Location	Costs (RM)	Population	Standard deviation
1	Rural	25	250	32
2	Town	9	624	22

Calculate the overall sample size n and the stratum sample sizes, n_1 and n_2 that allow the firm to estimate at the minimum cost, the average cost doing a survey with a bound on the error of estimation equal to RM1.20.

(10 marks)

- (b) Discuss by using your own word, investigates why stratified sampling is better than simple random sampling. (6 marks)
- (c) An analyst from a cosmetics company wants to estimate the proportion of customers who favor his products over a similar product from his competitors' company. The test areas for his research is at Kuala Lumpur. He interests to separate estimates of this proportions for those between the ages of 20 to 30 and for those over age 30. Organizes the possible sampling designs for his survey. (4 marks)

- END OF QUESTIONS -

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