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Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2019/2020**

COURSE NAME : BUILDING MAINTENANCE  
COURSE CODE : BFB40903  
PROGRAMME CODE : BFF  
EXAMINATION DATE : DECEMBER 2019 / JANUARY 2020  
DURATION : 3 HOURS  
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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**Q1** Heritage buildings are facing gradual degradation and decay over time. Maintenance is one of the primary principles for conservation of heritage buildings. Proper maintenance will improve the status and value of the heritage buildings.

(a) Identify **THREE (3)** approaches that always been applied in conservation of heritage buildings.

(10 marks)

(b) Differentiate **TWO (2)** types of maintenance works for heritage building conservation project. Give an example of activities for each type of maintenance work.

(10 marks)

**Q2** (a) As a building maintenance engineer, your duty is to advise the top management regarding the building maintenance strategies. One of the duties is to help the top management to do a decision making in selecting the most efficient maintenance approach. Produce a maintenance decision making flow chart to decide which maintenance approach is suitable based on the certain criteria made by the organization.

(5 marks)

(b) The approach used for estimating the total life cycle cost of equipment procurement is known as life cycle costing (LCC). Based on the data provided in **Table 1**, calculate the life cycle cost (LCC) for each equipment. The interest rate is assumed to be 6% and expected lifespan is 10 years. Then, evaluate which type of equipment is economical to be used.

(15 marks)

**Q3** (a) Building defect is one of the major building problems that significantly needed attention. In general, defects refer to the deterioration of building features and services to unsatisfactory quality levels of requirement of the users. Categorise the types of building defects that usually occur to old building. Provide example of defects for each category.

(10 marks)

(b) Cracks in building wall, particularly, are common occurrences. Identification of the crack is normally carried out through visual inspection. Construct a table that explain the classification of visible damage to wall crack that can be used as a guideline during visual defect inspection.

(10 marks)

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**Q4** As a senior building maintenance engineer at Municipal Council, your duty is to ensure all the maintenance procedure and process was executed according to the standard working procedure. In order to achieve this, you are responsible to give a talk on the maintenance procedure that being practiced in your organization during the induction course for new staffs. Prepare notes to explain the work procedure on the maintenance works which relate to customer complaint, periodic inspection and memo from customer service. Your notes of explanation should include relevant flow chart diagrams to facilitate understanding among the course participants.

(20 marks)

**Q5** (a) The purpose of conducting a visual building inspection is to provide information to the Client regarding the overall condition of the assets at the time of the inspection. The inspection is a visual assessment only to identify major defects and form an opinion regarding the condition of the facilities at the time of inspection. Specify **FIVE (5)** defects that commonly identify during visual inspection of the building using the Guideline of Inspection and Condition Assessment, JKR 21602.

(15 marks)

(b) Calculate the payable amount to the contractor for maintenance works based on **Table 2**. The building is 21.6 km from the office of the PWD Batu Pahat District, Johor. The scope of works is as the following:

- (i) Changes of 6 nos damages flush door with new solid doors.
- (ii) Removing of 85 nos damages of roof tiles with new standard roofing tiles.
- (iii) Repairing and patching of old wall both sides

(5 marks)

– END OF QUESTIONS –

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**TABLE 1**

| <b>Description</b>    | <b>Equipment A<br/>(RM)</b> | <b>Equipment B<br/>(RM)</b> | <b>Equipment C<br/>(RM)</b> | <b>Equipment D<br/>(RM)</b> |
|-----------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Procurement cost      | 300,000                     | 270,000                     | 290,000                     | 350,000                     |
| Expected lifespan     | 10                          | 10                          | 10                          | 10                          |
| Annual failure rate   | 0.08                        | 0.07                        | 0.06                        | 0.04                        |
| Cost of a failure     | 2,000                       | 2,500                       | 3,000                       | 1,000                       |
| Interest rate         | 6%                          | 6%                          | 6%                          | 6%                          |
| Annual operating cost | 6,000                       | 7,000                       | 6,500                       | 8,000                       |

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**TABLE 2**

| No | Description   | Rate          |
|----|---|---------------|
| 1  | Replace and remove any type and thickness of existing door including hinges and lockset | RM 8.00/ no   |
| 2  | Supply and install new solid door type including hinges and lockset                     | RM 285.00/ no |
| 3  | Opening and removing damaged roof tiles   | RM 10.00/ no  |
| 4  | Supply and install new standard roofing tiles   | RM 25.00/ no  |
| 5  | Repairing and patching old walls (10' x 10')  | RM 90.00/m    |
| 6  | Additional factor for location  |               |
|    | -less than 15km   | 10%           |
|    | -15 – 30km  | 17%           |
|    | -30 – 50km  | 20%           |
| 7  | Cost Overhead and Profit  | 15%           |

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