



**UTHM**

Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESI 2016/2017**

COURSE NAME : BUILDING MAINTENANCE  
COURSE CODE : BFB40903  
PROGRAMME CODE : BFF  
EXAMINATION DATE : JUNE 2017  
DURATION : 3 HOURS  
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

## CONFIDENTIAL

BFB40903

- Q1** Some of old public institution buildings have not seen any significant maintenance or show little signs of maintenance since they were constructed. This lack of maintenance by the authorities and occupants of these facilities often leads to reduced lifespan of these buildings.
- (a) Explain with an example on **FIVE (5)** factors of building principle that have an influence on lifespan of the building or structure. (10 marks)
- (b) Based on decision-based flow approach, discuss types of maintenance need to be executed to increase the lifespan of the old public institution buildings and to prevent serious building defects. (15 marks)
- Q2** Computer Maintenance Management System (CMMS) is computer software designed to simplify maintenance management. The application of CMMS as a means for obtaining, maintenance, managing and exploiting data in building maintenance management is crucial.
- Explain how CMMS has been used to improve performance in maintenance work operation. Support your discussion with two example of using CMMS software solution. (15 marks)
- Q3** The guideline has been provided for the regulation development in RKK (Special Area Plan) at Conservation Area of Melaka Historic City. The guideline provides a guide to all parties involved in carrying out the planning and development work at the Main Zone, Buffer Zone and Heritage Village.
- Based on the guideline, explain with an example of any chosen project on **FIVE (5)** major building components as a general guidelines which are suitable for conservation of heritage building in Melaka Historic City. (10 marks)
- Q4** Life cycle costing (LCC) is a process to determine the sum of all the costs associated with an asset or part including acquisition, installation, operation, maintenance, refurbishment and disposal cost. **Table 1** summarises the activity involved in the LCC for the building assets and infrastructures of the particular organization.
- Based on the data provided, calculate the Net Present Value (NPV) of the activities by completing the **Table 2**. (10 marks)

- Q5** A building owner of Lenaku Hotel is considering replacing its heating system. System A is the standard scheme whereas System B relies on additional insulation being provided. The expected life for building is assumed to be 60 years and the discount rate to be used is 7.5%.

Evaluate the alternatives of more economic proposition, using the data provided in **Table 3**.  
(15 marks)

- Q6** Defects occur in various forms and to different extents in all types of buildings or structure, irrespective of age. Most defects can, at their early stages, be discovered through visible or detectable symptoms. With an appropriate example and project, choose any **FIVE (5)** of the following building components and explain defect rectification.

- (a) Foundation
- (b) Ground Floor
- (c) Upper Floor
- (d) Roof
- (e) Wall
- (f) Internal Finishes
- (g) External Finishes
- (h) Doors
- (i) Windows
- (j) Electrical and Mechanical Fittings
- (k) Sanitary Fittings

(25 marks)

– END OF QUESTIONS –

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**TABLE 1**

No.	Activities	Duration	Cost (RM)
1	Replacement of carpet	Year 7	15 000
2	Replacement of ceiling	Year 10	250 000
3	Electrical and water bill and etc	Per Annum	100 000
4	Resurfacing road	Year 10	1 200 000
5	Replacing of lift motor	Year 15	15 000
6	Replacing water tank pump	Year 15	25 000
7	Maintenance of road shoulder	Per Annum	250 000
8	Replacement of Air Handling Unit (AHU)	Year 20	850 000
9	Replacement of roofing tiles	Year 30	1 500 000
10	Demolition and disposal	Year 50	500 000



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**TABLE 2 NPV Calculation Form**

Item	Activities	Cost (RM)	Duration	Factor P/F	Factor P/A	Present Value (RM)
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**TABLE 3**

No.	Description	System A (RM)	System B (RM)
<b>1.0</b>	<b>Initial Cost</b>		
1.1	Boiler	180 000	165 000
1.2	Pipework and Units	50 000	44 000
1.3	Insulation	15 000	38 500
<b>2.0</b>	<b>Recurring Cost</b>		
2.1	Repairs	3 500 (per annum)	2 680 (per annum)
2.2	Replacement	45 000 (every 20 years)	35 000 (every 30 years)
2.3	Overhaul	18 000 (every 5 years)	18 000 (every 10 years)
2.4	Fuel	14 900 (per annum)	10 550 (per annum)

FOR MATHEMATICS AND PHYSICS  
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