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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2018/2019**

COURSE NAME : BUILDING MAINTENANCE
COURSE CODE : BFB40903
PROGRAMME CODE : BFF
EXAMINATION DATE : JUNE / JULY 2019
DURATION : 3 HOURS
INSTRUCTION : ANSWER FOUR (4) QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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- Q1** The historical buildings are facing the degree of degradation and decay gradually from time to time. Maintenance is one of the primary principles for conservation of historical buildings. Proper maintenance will upgrade the status and value of the historical buildings.
- (a) Based on The Guidelines for Conservation of Heritage Building, point out with suitable example the principle of conservation works for painting works of heritage building. (5 marks)
- (b) Conservation of heritage buildings can be harmful than beneficial to the heritage building, if its implementation is not in accordance with the principles and approaches to conservation. Interpret **FIVE (5)** important stages in conservation process that need to be done for any heritage building conservation project. (10 marks)
- Q2** (a) A developer has three structural design proposals for a small warehouse building. The financial data for the three plans is given in **Table Q2**. The discount rate is assumed to be 6.0%. As a building maintenance consultant, you need to advise your client on life cycle cost analysis of the proposals. Evaluate which structural design is more economic to be used. (15 marks)
- (b) One of the government building assets is worth of RM 2,000,000.00. The building is expected to have a life span of 30 years and will be demolished with salvage value of 10% of the original value. Calculate the Present Value (PV) for salvage revenue of the building, where the discount rate is at 5% annually. (5 marks)
- Q3** A developer has identified two types of alternative for the construction of shop building in their future project. The details information of the alternatives is presented in **Table Q3**. The discount rate is assumed to be 5.65 % and buildings lifespan is 60 years. As an engineer in the company, your duty is to advise the Company Director on life cycle cost analysis of that building. Based on the information given, evaluate life cycle cost for each option of the buildings. Suggest which building is more economic. (20 marks)

- Q4** (a) Construct a flowchart diagram to indicate a process being implemented by the Municipal Council for the maintenance works of their assets and facilities starts from receiving customer complaint.
(5 marks)
- (b) Periodic inspection for the internal water plumbing and sanitary system will not only help to ensure that the plumbing and sanitary systems performs as intended but also minimize the cost of repair work required to rectify the damage to the plumbing and sanitary system. Prepare the typical maintenance schedule for the internal plumbing and sanitary system in the Faculty of Civil and Environmental Engineering (FKAAS) Building.
(10 marks)
- Q5** The purpose of conducting a building inspection is to assess the building's condition. The inspection is a key means of identifying building defects. The condition survey protocol matrix is used for evaluating building condition during visual inspection of the building.
- (a) Discuss the protocol matrix used for visual inspection and assessment of building conditions using the Guideline of Inspection and Condition Assessment, JKR 21602.
(6 marks)
- (b) Generate with **THREE (3)** examples of defect commonly identified during visual inspection of the building using the Guideline of Inspection and Condition Assessment, JKR 21602.
(9 marks)
- Q6** (a) Building maintenance planning is the most cost-effective way to maintain the value of an asset. Neglect of maintenance will cause building defects which may result in extensive and unavoidable damage to the building fabric or equipment and can also give rise to fire and safety hazards. Create with an example of **FOUR (4)** long term maintenance activities, and **FOUR (4)** short term maintenance activities of high-rise residential building that is being occupied more than 15 years.
(8 marks)
- (b) The specification is extremely important document in any building maintenance project. Without a properly prepared specification, maintenance of building project cannot be carried out effectively and efficiently. Explain with an example **FIVE (5)** matters to be considered when drawing up specifications for maintenance projects.
(7 marks)

– END OF QUESTIONS –

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TABLE Q2

Cost Element	Timber (RM)	Concrete (RM)	Steel (RM)
Initial cost	50,000	65,000	70,000
Annual maintenance cost	6,000	5,000	0
Salvage value	8,000	0	5,000
Economic life span (years)	15	13	17

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TABLE Q3

Cost Element	Building A (RM)	Building B (RM)
Initial cost	110,000	55,000
Repair cost	1,000 every 10 years	2,500 every 5 years
Maintenance cost	500 per annum	1,500 per annum
Heating, lighting, etc	2,200 per annum	2,500 per annum
Major modification every 12 years	-	20,000
Demolition and disposal	5,000	6,500