Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(ONLINE)
SEMESTER II
SESSION 2019/2020

COURSE NAME	:	BUILDING MAINTENANCE
COURSE CODE	:	BFB40903
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JULY 2020
DURATION	:	6 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 Conservation historic buildings are undoubtedly important to our country especially in a way to show their architectural and historical characteristics for the next generation. The significance of these buildings presents in the forms of their aesthetical characteristics, historical value, social value, spiritual value and symbolical value.

(a) List **TWO (2)** historical buildings that need maintenance to protect their function, asset's value and appearance.

(2 marks)

(b) Maintenance is one of the primary principles for conservation of historic buildings. Using an example, discuss the importance of conducting building maintenance for historical buildings.

(4 marks)

Q2 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 in decision making to select the most effective maintenance approach. Produce a diagram that differentiates between planned and unplanned maintenance and it associates. From this diagram, explain with example of maintenance activities that can clearly differentiate between both approaches.

(14 marks)

Q3 The maintenance section is part of the XYZ Company's organization structure. As a senior maintenance engineer, you are given a task by the Company Director to propose a new organization structure that shows maintenance section chart. The new organization chart for maintenance section is needed due to changes in existing organization structure resulted from the expansion of the scope of work and staffing. The new maintenance section chart should have civil engineering members, mechanical and electrical members, and architecture/landscape members. Based on your understanding, propose the new organization chart of maintenance section and explain the main duties of each member.

(14 marks)

Q4 Your organization has been practicing Life Cycle Costing (LCC) in many buildings and infrastructure assets for new and existing projects owned by the government. You have been assigned to manage a new asset which involves the application of LCC. **TABLE Q4** shows the activities involved in the LCC of the assets. The expected life of assets is 50 years and the discount rate to be used is 6.59%. Based on the data provided, calculate the Net Present Value (NPV) of the assets.

(14 marks)

Q5 Megoh Sentiasa Hotel is considering to replace its heating equipment system. System A relies on the standard scheme whereas system B relies on the additional insulation for the system. The hotel owner has appointed you to consult them in selecting the best system to be used. The useful life for both systems is assumed to be 60 years and the discount rate to be used is 5.59%. Evaluate each system and propose the most economic one, using the data provided in **TABLE Q5.**

(14 marks)

Q6 Building inspection is one of the key components of building maintenance. The primary purpose of performing a building inspection is to evaluate the building's condition. The inspection through visual assessment is only to identify major defects and form an opinion regarding the condition of the facilities at the time of inspection. Prepare **THREE (3)** example of defects commonly identified in an educational building of more than 25 years during visual inspection works using protocol in the Guideline of Inspection and Condition Assessment, JKR 21602.

(14 marks)

Q7 Scheduled maintenance is a list of predetermined maintenance actions carried out at regular time intervals. As a senior building maintenance engineer, discuss a need of maintenance planning for the scheduled maintenance and proposed **THREE (3)** example of a maintenance works schedule of the ten (10) storey office building building that more 20 years usage. Moreover, as your organizations in the company do not have sufficient technical and operational personnels to carry out the scheduled maintenance work, recommend a workflow for the appointment of external qualified contractors up to supervision of maintenance works and managing contracts.

(24 marks)

– END OF QUESTIONS –

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TABLE Q4

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

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TABLE Q5

Item	Description	**System A (RM)**	**System B (RM)**
1	**Initial Cost**		
	• Boiler	170,000	180,000
	• Pipework and units	40,000	45,000
	• Insulation	15,000	43,500
2	**Recurring Cost**		
	• Repairs	3,5000 per annum	4,000 per annum
	• Replacement	40,000 every 20 years	45,000 every 30 years
	• Overhaul	18,000 every 5 years	25,000 every 10 years
	• Fuel	10,000 Per annum	8,500 Per anum
3	Salvage revenue	3,500	5,000