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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER II
SESSION 2019/2020**

COURSE NAME : CONSTRUCTION PLANNING AND SCHEDULING
COURSE CODE : BFP40103
PROGRAMME CODE : BFF
EXAMINATION DATE : JULY 2020
DURATION : 6 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

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TERBUKA

- Q1**
- (a) Explain the phases of development for work program in construction projects. (8 marks)
 - (b) Compare the responsibilities of main contractor and consultant in project planning and scheduling. (6 marks)
 - (c) Your company is awarded to construct a school project in Kluang, Johor. The project consists of 2-storey administration building, 4-storey building for classes and a canteen. As a project manager, you are required to identify strategies that can be adopted in planning the project effectively. Justify the strategies that you suggest to be adopted. (6 marks)
 - (d) List **FIVE** (5) characteristics in defining activity for work program. (5 marks)
- Q2**
- (a) Differentiate Program Evaluation Review Technique (PERT) and Arrow Diagram Method (ADM)? (5 marks)
 - (b) PERT uses a probabilistic approach, which requires a duration frequency distribution for each activity. According to **TABLE Q2(b)**, calculate the expected duration (T_E) and the standard deviation (σ_E) for path ABCDEF. Develop a table that consist of the expected duration (T_e), standard deviation (σ_e) and variance (σ_e^2) for each activity. (8 marks)
 - (c) You are assigned to develop a PDM diagram for a school project located in Petrajaya, Sarawak. The list of activities for the project is shown in **TABLE Q2(c)**. Using Precedence Diagram Method (PDM), determine the total duration to complete the project and identify the critical path. (12 marks)
- Q3**
- (a) You are compiling a monthly summary for your Project Management Office (PMO) reports. There are 4 projects reporting the following data: Project A has an EV of RM500 and an AC of RM505; Project B has an EV of RM400 and an AC of RM500, Project C has an EV of RM455 and an AC of RM450; and Project D has an EV of RM200 and an AC of RM300. Which project is the most cost efficient? Provide justification to support your decision. (5 marks)

- (b) A contractor is required to complete a project with the activities as shown in **TABLE Q3(b)**. The contractor is only able to allocate six (6) labours per day for this project. By using an Arrow Diagram Method (ADM), level the resources manually by satisfying the preceding activity to complying with the maximum number of resources provided by the contractor. (10 marks)
- (c) Construct a schedule for a road-construction project using Linear Scheduling Method (LSM) for activities given in **TABLE Q3(c)** and determine the total duration to complete the project. (10 marks)

Q4 As a planning engineer, you are required to propose the most appropriate network diagram for a project illustrate in **FIGURE Q4**. There are several activities involved 'lead' and 'lag' in the network diagram. Moreover, at least two activities need to be started together in the network diagram. The project is still in the initiation process, and you can make assumptions to prepare the network diagram. The bearing capacity of the soil is good and pad footing is suggested to be used for the project.

- (i) Name the method that you suggest to be used in developing the network diagram. (2 marks)
- (ii) Develop a Work Breakdown Structure (WBS) for the propose project using the graphical method (up to level 4). The minimum number for the task is 3 for each main activity. (5 marks)
- (iii) Identify 6 major activities for the structural works in the project. The type of relationship for all activities is 'Finish to Start'. The six activities are located in the critical path, which is the only critical path in the project. Estimate the normal duration and normal cost for each activity according to **FIGURE Q4**. (3 marks)
- (iv) Determine the crash cost and crash duration for each activity determined in (c). The increment of crash duration and crash cost is shown in **TABLE Q4**. (3 marks)
- (v) Develop a network diagram for **Q4(c)** to determine the total duration required to complete the project. Calculate the Early Start (ES), Early Finish (EF), Late Start (LS), Late Finish (LF) and Total Float (TF) for all activities. (3 marks)
- (vi) Execute a schedule compression for the project and determine All Crash Point (ACP) and Project Crash Point (PCP). You need to show the Early Start (ES), Early Finish

(EF), Late Start (LS), Late Finish (LF) and Total Float (TF) for all activities during the process.

(7 marks)

(vii) Sketch a summary of the schedule compression in the 'cost vs time' graph.

(2 marks)

END OF QUESTIONS –

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TABLE Q2(b)

Activity ID	Predecessor	Duration (Days)		
		Optimistic	Most Likely	Pessimistic
A	-	2	4	6
B	A	4	6	10
C	B	2	4	6
D	C	4	6	8
E	D	1	4	6
F	E	1	2	4

TABLE Q2(c)

Activity ID	Duration (days)	Predecessor	Relationship	Lag / Lead
A	2	-	-	-
B	4	A	SS	+2
C	2	B	FS	+1
D	4	C	FF	-1
E	2	D	SF	0
F	8	E	FS	0
G	2	A	FS	0

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TABLE Q3(b)

Activity ID	Duration (days)	Predecessor	Labours
A	2	-	2
B	4	-	4
C	4	A	2
D	2	B	2
E	8	B	4
F	2	C	2
G	4	D,E	1

TABLE Q3(c)

Activity ID	Activity	Daily Production (Meter)
A	Excavation works	2,000
B	Reinforcement Bars Installation	4,000
C	Concreting works	800
D	Curing	1,200

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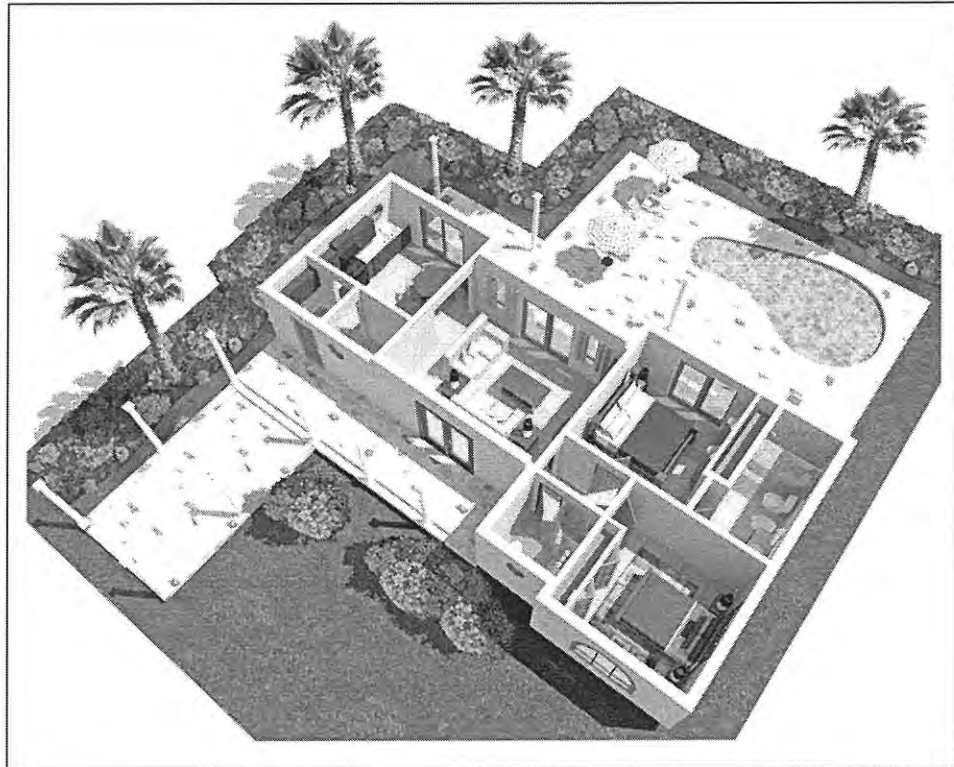


FIGURE Q4

TABLE Q4

Activity ID	Reduction percentage from the normal duration (Crash Duration)	Increament percentage from the normal cost (Crash Cost)
1	10%	15%
2	40%	30%
3	70%	60%
4	40%	40%
5	50%	20%
6	60%	40%