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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018**

**COURSE NAME : SUSTAINABLE CONSTRUCTION
MANAGEMENT**

COURSE CODE : BFC32703

PROGRAMME CODE : BFF

EXAMINATION DATE : JUNE/JULY 2018

DURATION : 3 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

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- Q1** The concept of sustainability in building and construction has initially focused on the issues of limited resources, especially energy, and on how to reduce impacts on the natural environment with emphasis on technical issues such as building materials, construction technologies and energy related design concepts.
- (a) Define the sustainability concept in construction industry. (5 marks)
 - (b) Explain in details the principal issue of environmentally friendly construction materials and construction waste management that affect the sustainability of construction activities. (10 marks)
 - (c) Discuss **FIVE (5)** sustainable strategies that could be implemented to the construction project. (10 marks)
- Q2**
- (a) Illustrate the paradigm shift from traditional to sustainable approach diagram which was introduced by Yang *et al.* in year 2005. (10 marks)
 - (b) Explain **FOUR (4)** basic concerns in sustainability as the construction goal from your illustrated diagram and knowledge. (10 marks)
 - (c) Describe in detail **TWO (2)** benefits of sustainable approach in construction industry. (5 marks)
- Q3**
- (a) Define the following terms:
 - (i) Total Quality Management (2 marks)
 - (ii) Quality Assurance (2 marks)
 - (iii) Quality Control (2 marks)
 - (b) You are appointed as construction manager to manage a construction of residential building in Muar, Johor. In order to reduce manpower due to budget constraint, the maximum allowable number of workers in your project is 10 workers.



- (i) Construct a network diagram using Precedence Diagram Method (PDM) to determine the project total duration. The list of activities involved is shown in **Table 1**.
(8 marks)
- (ii) Analyze all activities to determine the total float and state the critical activities in the project.
(3 marks)
- (iii) Construct a resource histogram to determine the resources distribution.
(3 marks)
- (iv) Produce a resource levelling with the maximum number of workers is 10.
(5 marks)

Q4 You are appointed as a planner to construct a school project in Batu Pahat, Johor. The list of activities involved is shown in **Table 2**. Based on that table,

- (a) Construct a precedence network diagram and compute the Early Start (ES), Early Finish (EF), Late Start (LS), Late Finish (LF), the link for 'lag or lead' and Total Float (TF) for each activity.
(12 marks)
- (b) State the critical path (s) of the network diagram.
(1 mark)
- (c) Referring to the developed PDM in **Q2(a)**, draw a bar chart of the project according to Early Start (ES) and show Total Float (TF). Assume the construction works operate for 7 days from 8.00 am to 5.00 pm.
(6 marks)
- (d) Construct a physical S-curve for the developed bar chart in **Q2(c)**. Change the 'cumulative duration' to 'progress percentage' before you plot the S-curve.
(6 marks)

– END OF QUESTIONS –

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TABLE 1

| Activity | Duration (days) | Predecessor | Relationship | Lag/Lead time | Workers/day |
|----------|-----------------|-------------|-----------------|---------------|-------------|
| A | 2 | - | Finish to Start | - | 4 |
| B | 4 | A | Finish to Start | - | 8 |
| C | 5 | A,B | Finish to Start | - | 4 |
| D | 3 | B | Finish to Start | - | 6 |
| E | 3 | B | Finish to Start | - | 6 |
| F | 3 | E | Finish to Start | - | 6 |
| G | 2 | F | Finish to Start | - | 4 |

TABLE 2

| Activity ID | Duration (days) | Predecessor (s) | Link type | Lead/ Lag time |
|-------------|-----------------|-----------------|-----------------|----------------|
| A | 2 | - | Finish to Start | - |
| B | 3 | - | Finish to Start | - |
| C | 3 | A, B | Finish to Start | - |
| D | 4 | B | Finish to Start | Lag 1 day |
| E | 5 | D | Start to Start | Lead 2 days |
| F | 2 | C | Finish to Start | - |
| G | 5 | E,F | Finish to Start | - |
| H | 3 | E | Start to Start | Lead 2 days |
| I | 2 | G | Finish to Start | - |
| J | 4 | F,G | Finish to Start | - |
| K | 4 | H,I | Finish to Start | - |
| L | 2 | J,K | Finish to Start | - |

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