

## UNIVERSITI TUN HUSSEIN ONN MALAYSIA

# FINAL EXAMINATION SEMESTER II **SESSION 2013/2014**

COURSE NAME

SUSTAINABLE CONSTRUCTION

MANAGEMENT

COURSE CODE

: BFC 32703

PROGRAMME

: 3 BFF / 4 BFF

EXAMINATION DATE : JUNE 2014

**DURATION** 

: 3 HOURS

INSTRUCTION

: A) ANSWERS ALL QUESTIONS

IN SECTION A AND B.

B) ANSWER **ONE** (1) QUESTION

IN SECTION C.

C) WRITE ALL ANSWERS IN

THE ANSWER SCRIPT.

D) ATTACH FIGURE Q2 AND Q3

IN YOU ANSWER BOOKLET.

THIS QUESTION PAPER CONSISTS OF TWELVE (12) PAGES

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#### SECTION A

| Q1 C | hoose | the | correct | answers. |
|------|-------|-----|---------|----------|
|------|-------|-----|---------|----------|

| 1. | The collection of project's critical components, i.e. cost, time, quality, sco | ре |
|----|--|----|
|    | and resources should be in equilibrium in order to achieve overall             |    |

A. project completion

B. sustainable project

C. project success

D. client's satisfaction

2. Choose the correct sequence of the following project phases.

I Decision to release for bid

II Advertise notice to bidders

III Notice to proceed

IV Bid package complete

V Bid period and receipt of proposals

A. I, II, V, III and IV

B. I, II, III, V and IV

C. IV. I, II, V and III

D. III, II, I, V and IV

3. \_\_\_\_ is responsible to third parties, main contractor, clerk of work and design team.

A. Project Manager

B. Site Manager

C. Construction Manager

D. Contract Manager

- 4. Which of the following are the key areas of concern to be addressed in order to enhance the level of productivity and quality of Malaysian construction industry?
  - I Inefficient and ineffective construction-related methods, practices and procedures
  - II Inability to attract and develop local workforce for the industry
  - III Difficulty in securing timely and adequate financing at various stage of construction
  - IV Difficulty in repatriating (bring back) profits or dividends from foreign projects
  - V Inability of construction companies to provide total integrated solutions (e.g. construction service that include financing package and equipment)

A. I, II and III

B. I, II, III and IV

C. I, II, III and V

D. All the above



| 5. | Which of the following are objective economic dimension?   | s of sustainable development from the   |
|----|--|---|
|    | <ul> <li>I Consider life-cycle cost</li> <li>II Internalise external costs</li> <li>III Consider alternative financing management</li> <li>IV Develop appropriate economic consumption</li> <li>V Consider the economic impact of</li> </ul> | instruments to promote sustainable  |
|    | A. I, II, IV and V<br>C. I, IV and V   | B. I, III, IV and V<br>D. All the above   |
| 6. | is one of the key criteria con rating system.  | sidered in Green Building Index (GBI)   |
|    | A. Building management efficiency  | B. Material and resources management  |
|    | C. Green product quality   | D. Procurement reliability  |
| 7. | advances and other changing needs, to  | accommodate future technological pease disassemble and to facilitate the als for reuse and recycling". This following strategy? |
|    | A. Reuse and recycling   | B. Industrialised Building System (IBS)   |
|    | C. Waste prevention  | D. Building adaptability  |
| 8. | The objective of is to ident materials as well as harmful and toxic  | tify environmentally friendly building materials that should be avoided.  |
|    | A. material selection C. building and material reuse   | B. procurement D. health and safety   |
| 9. | _  | fits of having goal to reduce the ruction and operation of the building,  |
|    | A. Lower general conditions costs C. Reduced air pollution   | <ul><li>B. Savings on utility bills</li><li>D. Healthier working environment</li></ul>  |



- 10. Listed below are the typical building components that suitable for reuse, **EXCEPT** 
  - A. Plumbing fixtures

B. Brick

C. Concrete wall

D. Doors

- 11. \_\_\_\_\_ such as dusts and fibres are likely to be produced during construction and renovation activities.
  - A. Recyclable material

B. Toxic material

C. Particulate material

D. Micro components

12. The following table shows the management function and the relevant actions and tools to be utilised by managers.

| Management Function | Action                      | Applicable Tools |
|---------------------|-----------------------------|------------------|
| Organising -        | i                           | Work Breakdown   |
| Coordinate          | -                           | Structure (WBS)  |
| Directing -         | Analyze problems early -    | ::               |
| Controlling         | measure project performance | ii               |

Complete the table with appropriate action (i) and applicable tools (ii).

|    | i  | ii           |  |
|----|--|--------------|--|
| Α. | Explain clearly to team members what is expected | WBS,         |  |
|    | of them - show interest and enthusiasm           | Bar Chart    |  |
| В. | Systematise all works to be done -               | Bar Chart,   |  |
|    | synchronization of responsibilities and command  | S-Curve, CPM |  |
| C. | Synchronization of responsibilities and command  | WDC C C      |  |
|    | - establish clear and well-defined milestones    | WBS, S-Curve |  |
| D. | Be available to the project staff - avoid        | WDC CDM      |  |
|    | reprogramming or re-planning the project         | WBS, CPM     |  |

- 13. Based on the following organisational criteria, determine the most suitable organisational structure for the developer.
  - Currently have a single development of housing scheme at Batu Pahat
  - Comprising of 10 staffs
  - Using conventional method of construction
  - Headquarter in Batu Pahat

A. Matrix structure

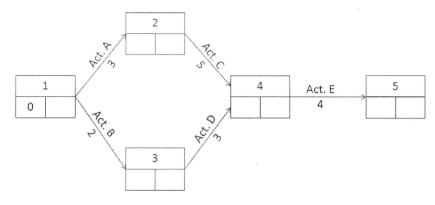
B. Traditional structure

C. Functional structure

D. Pure-project structure

- 14. You have bought a new house and intended to renovate the kitchen. You have a tight budget and schedule, and willing to pay lump-sum for the renovation. Which project delivery method will be the most suitable for your house renovation?
  - A. Traditional

- B. Design-Build
- C. Construction Management
- D. Owner-builder arrangement
- 15. Which of the following is a method used for project planning?
  - A. Arrow Diagram Method
- B. Precedence Diagram Method
- C. Work Breakdown Structure
- D. Linear Scheduling Method
- 16. The following figure shows an arrow diagram for a project. What is the critical path for this project, and what is the duration of the critical path?



A. 1-2-4-5,12 days

B. 1-3-4-5, 12 days

C. 1-2-4-5, 9 days

- D. 1-3-4-5, 9 days
- 17. Based on the figure in previous question (Q1(16)), how many days on activity D can be late in starting without effecting the project completion date?
  - A. One day

B. Two days

C. Three days

- D. Six days
- 18. Which of the following statements on the significance of cost control in construction project is **NOT TRUE**?
  - A. Early detection of actual cost overruns in construction activities is vital to management.
  - B. Provides opportunity to initiate remedial action and increase chance of eliminating or minimize the impacts.
  - C. Cost overruns may increase project costs and diminish profit.
  - D. Cost overrun may cause quality of project decrease.

- 19. Which of the following are variable overhead costs?
  - I. Project manager salary
  - II. Official trip cost
  - III. Material testing cost
  - IV. Marketing cost

A. I and II

B. I. II and III

C. I, II and IV

D. All the above

- 20. Which of the following four general rules in exercising resource levelling is **NOT TRUE?** 
  - A. Never use critical activities when levelling the resources.
  - B. Drag resources within its float or slag limit.
  - C. Do not separate or break the Gantt bar.
  - D. Always allocate the critical bar at the top of your graph.

#### **SECTION B**

Q2 (a) Explain why project planning is important.

(2 marks)

(b) Explain two (2) purposes of project scheduling.

(2 marks)

(c) A network diagram of Precedence Diagram Method (PDM) for a construction project is shown in Figure Q2. Determine the overall project duration and list out activities that lay on critical path. The duration of each activity is given in unit of week.

(4 marks)

(d) Draw a bar chart of the project based on the data obtained from **Q2** (b). Based on the additional data given in Table **Q2**, prepare a physical S-Curve for the project.

Table Q2

| Activity   | Duration<br>(week) | Work progress percentage (%) |
|------------|--------------------|------------------------------|
| Activity A | 2                  | 10                           |
| Activity B | 4                  | 15                           |
| Activity C | 4                  | 25                           |
| Activity D | 4                  | 10                           |
| Activity E | 3                  | 12                           |
| Activity F | 4                  | 16                           |
| Activity G | 2                  | 12                           |
|            |                    | 100                          |

(12 marks)

- Q3 Table Q3 shows the duration, predecessor activity, lag and resource distribution for each activity in a construction project. A network diagram for the project is shown in Figure Q3.
  - (a) Calculate the Early Start (ES), Early Finish (EF), Late Start (LS) and Late Finish (LF) for each activity to complete the network diagram in Figure Q3.

(5 marks)

(b) Determine the total Float (TF) and show Critical Path Activity (s) on the network diagram in Figure Q3.

(5 marks)

(c) Based on the data obtained from Q3 (a) and Q3 (b), and the total number of workers available is 25, do the resource leveling for this project. Your answer must consist of bar chat and histogram, before and after the resource leveling exercise.

(10 marks)

Table Q3

| Activity | Duration (week) | Predecessor | Lag | Number of worker/week |
|----------|-----------------|-------------|-----|-----------------------|
| A        | 2               | -           | -   | 25                    |
| В        | 6               | A           | _   | 10                    |
| С        | 10              | A           | _   | 15                    |
| D        | 4,              | A           | 4   | 20                    |
| Е        | 7               | В           | -   | 10                    |
| F        | 5               | В           | 3   | 10                    |
|          |                 | С           | -   |                       |
| G        | 3               | C,D         | -   | 5                     |
| Н        | 5               | E,F         | -   | 5                     |
| I        | 2               | G           | -   | 25                    |
|          |                 | Н           | 1   |                       |

#### **SECTION C**

Q4 (a) With the aid of a construction project lifecycle diagram, explain and differentiate roles of project manager, construction manager and site manager.

(10 marks)

- (b) Figure **Q4** shows a comparison of time saved between two project delivery methods, i.e. Design-Build and Construction Management.
  - (i) Explain why the time saved between the two project delivery methods is different.

(6 marks)

(ii) Explain how the use of information and communication technology (ICT) can help to increase the amount of time saved for a project applying Construction Management project delivery method.

(4 marks)

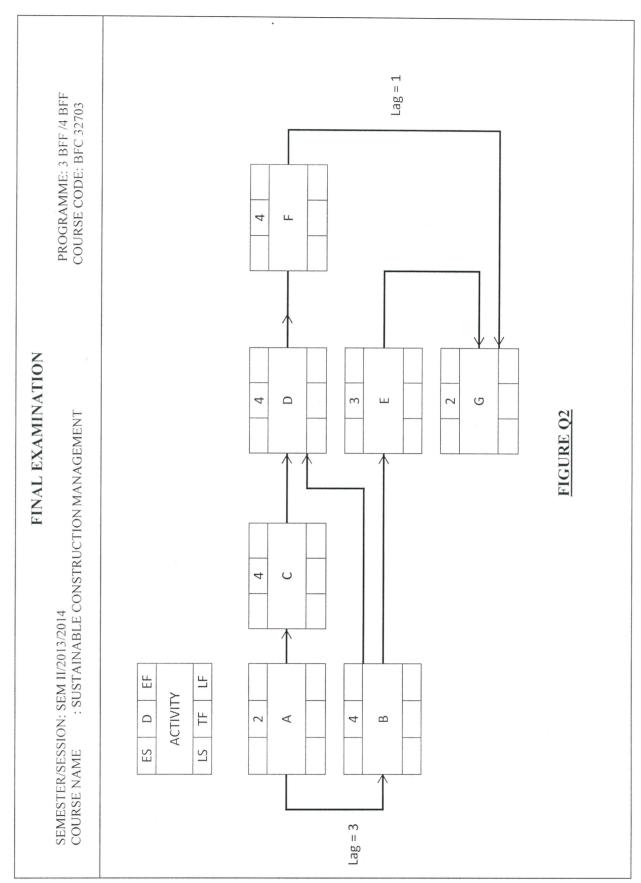
Q5 (a) As a consultant who is responsible to assist your client in procurement phase suggest FIVE (5) possible procurement strategies in order to make the construction project a sustainable one.

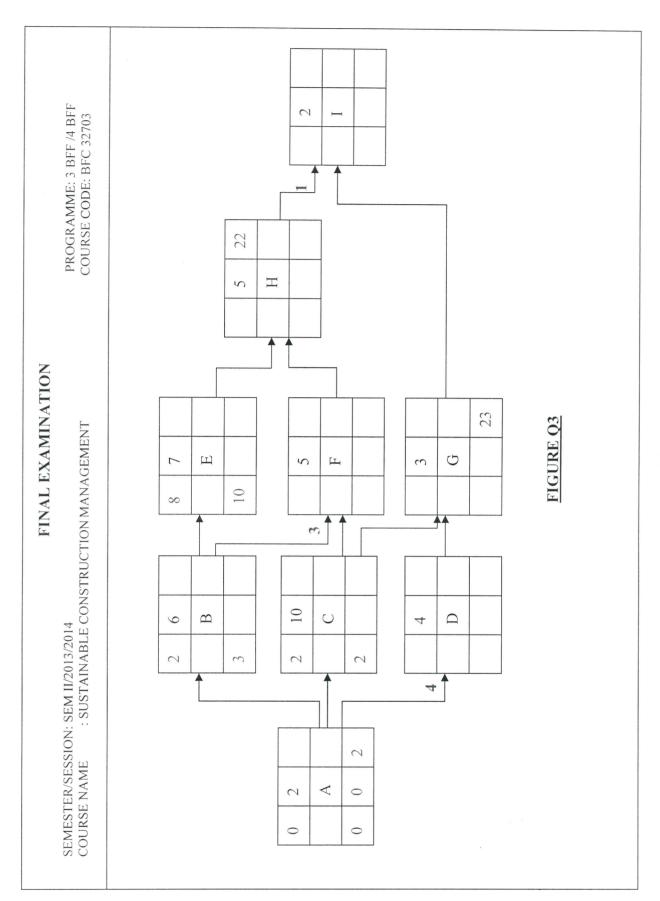
(10 marks)

(b) Discuss how the adoption of 'value management' can contribute to materialise a sustainable construction project.

(10 marks)

- END OF QUESTION -





#### FINAL EXAMINATION

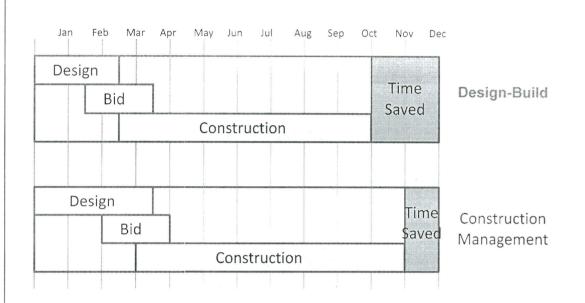
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### FIGURE Q4