

ENGINEERING TRIPOS PART IIB

Monday 6 May 2013 2 to 3.30

Module 4D16

CONSTRUCTION AND MANAGEMENT

*Answer not more than **three** questions.*

All questions carry the same number of marks.

*The **approximate** percentage of marks allocated to each part of a question is indicated in the right margin.*

There are no *attachments*.

STATIONERY REQUIREMENTS

Single-sided script paper

SPECIAL REQUIREMENTS

Engineering Data Book

CUED approved calculator allowed

You may not start to read the questions printed on the subsequent pages of this question paper until instructed that you may do so by the Invigilator

- 1 (a) What is Environmental Impact Assessment (EIA)? Briefly describe the general process of an EIA. [30%]
- (b) Using the CB1 Urban Redevelopment scheme in Cambridge as a case study, explain how the wind conditions and their implications were addressed as part of the EIA of that development. [50%]
- (c) Almost all countries have some form of EIA legislation. Briefly outline the variability observed in the implementation of EIA across the globe. [20%]
- 2 (a) Describe how the design process can be controlled for a traditional contract, (single tender) by reference to the six basic design stages from 'brief' to 'tender documentation'. [40%]
- (b) For a large scale project with high structural input (e.g. a major stadium) a design team has developed a concept design. The client has then opted for a two stage tender process leading to a Guaranteed Maximum Price contract on a design and build basis.
- (i) What are the advantages of this arrangement to the Client and the Main Contractor? [20%]
- (ii) How does the Contractor select his package contracts and arrive at cost certainty? [20%]
- (iii) How does this arrangement affect the Engineer's work? [20%]
- 3 (a) What are the weaknesses of the traditional procurement route on complex projects and what is a suitable alternative? [20%]
- (b) Describe the design and construction challenges of the Wimbledon centre-court roof and how they were overcome. [40%]
- (c) Westinghouse are providing the world's first four AP1000 nuclear power plants in China. What are the design objectives of such plants? What are the advantages and impacts of using modular construction? Give examples of lessons learnt so far. [40%]

4 (a) Define and describe the differences between ‘management contracting’ and ‘construction management’. [20%]

(b) What is professional indemnity insurance, why is it important for engineers and what are its major rating factors? [40%]

(c) How might the various risks arising during construction be identified, assessed and managed? Discuss ways in which different forms of contract for a construction project may apportion risk differently among the various parties involved. What are the possible effects of this on the value of the contract to the different parties. [40%]

5 (a) In traditional procurement, basic liability for design is carried by the client’s team; the contractor is obliged and entitled to build what the design requires. However, this basis position is frequently modified by ‘the duty to warn’. Use the case of *Plant Construction plc v Clive Adams* to illustrate this concept. [40%]

(b) In design and build (D&B) contracts, the contractor’s right of recourse against the consultant will depend upon which of three contractual models has been adopted:

(i) The contractor gives ‘fitness for purpose’ duty under the D&B contract and the consultant also gives ‘fitness for purpose’ under conditions of engagement; [20%]

(ii) The contractor gives ‘fitness for purpose’ duty under the D&B contract but the consultant accepts only ‘reasonable care and skill’ under conditions of engagement; and [20%]

(iii) The contractor only gives ‘reasonable care and skill’ duty under the D&B contract and the consultant only accepts ‘reasonable skill and care’ under conditions of engagement. [20%]

Explain the implication of each of those three scenarios.

END OF PAPER

