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ENGINEERING TRIPOS PART IIB  
ENGINEERING TRIPOS PART IIA

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Thursday 26 April 2007 9 to 10.30

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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.*

*Attachments: None*

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) Outline briefly the process of control of new development in England and Wales, and the hierarchy of plans and planning guidance. What means are available to the planning authority to effect improvements to a scheme, or to arrange that the project benefits the broader community, before granting planning permission? Does the authority have means to ensure that the works are carried out in accordance with the approved plans? Illustrate your answer by referring to a recent development for Cambridge University or another scheme of your choice. [50%]

(b) Write brief notes on the current requirements for assessment of environmental impact before a major new construction project is approved. Concentrate particularly on the contribution that engineers make to the various assessments, illustrating your answer by examples. [50%]

2 (a) The design process for a major building project may vary, depending on the type of project and the intended route to procurement. Illustrating your answer by examples, describe the different stages of design for (i) a fairly standard commercial development with a 'traditional' procurement route, and (ii) a more unusual temporary building needed rapidly. What sorts of engineering calculation are appropriate in the various stages, and how might estimates of cost be made? [60%]

(b) Discuss how to ensure effective cooperation between the various professionals involved in the design team, and who carries the main responsibility for design and leadership at the different stages of the main procurement routes. [40%]

3 (a) What are the main causes of accidents on construction sites, and why is management of safety important in construction? Outline the development over the past few decades of legal requirements and regulations relating to safety and health on site. Who bears the main responsibility for safety at the various stages of a construction project? [60%]

(b) 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, and the possible effect of this on the value of the contract to the different parties. [40%]

4 (a) Describe briefly the different main routes to procurement of major construction in Britain, discussing the advantages and disadvantages of each, and in what circumstances each may be appropriate. Discuss how procurement has changed in recent decades, and how Cambridge University's policy on procurement of major new buildings has evolved. Illustrate your answer by referring to at least one recent building scheme. [70%]

(b) Answer **either** (i) **or** (ii).

(i) Quoting example(s), discuss why and to what extent the preferred procurement route for a major building scheme abroad might differ from that for a similar scheme in Britain.

(ii) Outline how the procurement route in Britain may be arranged to ensure that the expertise of a main contractor and/or specialist sub-contractor(s) influence the design process effectively, and discuss the possible advantages and disadvantages of such arrangements. [30%]

5 (a) Discuss the legal concepts of 'reasonable care and skill', 'fitness for purpose', and 'collateral warranty' as they apply to construction. In what circumstances may a designer find that his or her level of liability for defects is raised by new contractual arrangements, and what steps might be taken to combat that? In what circumstances does a designer, party to a contract for a major construction project, owe a 'duty of care' to anyone beyond the parties to that contract? [60%]

(b) Outline the main features of professional indemnity insurance for engineers in construction, explaining what is and what is not covered by a typical policy. Who should take out such insurance, why, and for how long? [40%]

**END OF PAPER**