

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway
SECOND SEMESTER EXAMINATIONS, 2001
Third Year Civil Engineering Examination

CONSTRUCTION OPERATIONS II

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Time Allowed: **Two hours**. Answer **three** questions

Use **separate answer books** for each question

- a) Explain the following:
- i) Estimating
 - ii) Bond
 - iii) Retention
 - iv) Liquidated and ascertained damages
 - v) Nominated sub-contractor
 - vi) Domestic sub-contractor
 - vii) Bill of quantities
 - viii) P.C. sum
 - ix) Provisional sum
 - x) Conditions / Form of contract
- b) List the members of a design team and briefly describe each of their roles as a member of that team.
- a) Define Strategic Planning and list the main elements in a strategic plan.
- b) Answer **two only** of the following sub-questions:
- i) Give the reasons for the introduction of "Condoc" and give general examples of the contract elements it attempts to control and regulate.
 - ii) Broadly describe the purpose of a Planning Authority's County Development Plan, including general objectives and what is defined as development under the Planning Acts.
 - iii) Outline EU Procurement Policy, its purpose and general requirements. Name three relevant directives.
 - iv) Discuss the implications of Public Private Partnerships for Civil Engineering projects.

P.T.O.

3. a) Discuss Engineering Economy Studies and give examples of why a civil engineering company may need to carry out this type of study.
- b) Use the appropriate expressions from below to solve the following engineering economics problems:
- An item of mechanical plant has an initial cost to the contractor of £200,000 and annual maintenance expenditure is expected to average £18,000 for its 8 years of life.
If the interest rate is 10% and the equipment has no salvage value, what is its equivalent annual cost, excluding labour, fuel, etc.?
Draw the Cash Flow Diagram for the problem.
 - A contractor estimates that he will require £10,000 per year for the maintenance and operation costs of an item of machinery. Calculate the amount he needs to invest in an account offering an interest rate of 8% at the beginning of the machine's working life so that he can withdraw the £10,000 at the end of each year for 7 years.

Factor	Expressions		Find	Given
<i>A. Single payment</i>				
1. Compound amount	$F = P[1 + i]^n$	$(F P, i\%, n)$	F	P
2. Present worth	$P = F \left[\frac{1}{(1 + i)^n} \right]$	$(P F, i\%, n)$	P	F
<i>B. Uniform series</i>				
3. Compound amount	$F = A \left[\frac{(1 + i)^n - 1}{i} \right]$	$(F A, i\%, n)$	F	A
4. Sinking fund	$A = F \left[\frac{i}{(1 + i)^n - 1} \right]$	$(A F, i\%, n)$	A	F
5. Present worth	$P = A \left[\frac{(1 + i)^n - 1}{i(1 + i)^n} \right]$	$(P A, i\%, n)$	P	A
6. Capital recovery	$A = P \left[\frac{i(1 + i)^n}{(1 + i)^n - 1} \right]$	$(A P, i\%, n)$	A	P
<i>C. Arithmetic gradient</i>				
7. Uniform series equivalent	$A = G \left\{ \frac{1}{i} - \frac{n}{i} \left[\frac{i}{(1 + i)^n - 1} \right] \right\}$	$(A G, i\%, n)$	A	G

4. a) Outline and discuss briefly the main impediments to ensuring health and safety on construction sites.
- b) In reference to the “Safety, Health and Welfare at Work (Construction) Regulations, 1995”, discuss the following:
- i) Project Supervisor (Design Stage)
 - ii) Preliminary Safety & Health Plan
 - iii) Project Supervisor (Construction Stage)
 - iv) Safety & Health Plan
 - v) Safety File
- c) List six areas of work deemed to involve particular risks to the safety and health of persons at work, as contained in the Second Schedule to the 1995 Regulations.
- d) Identify the hazards associated with excavations and describe the appropriate controls or accident preventative measures to be adopted for such work.

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