



# **TQUK Level 3 Diploma in Design, Engineer, Construct: The Digital Built Environment (RQF)**

(603/1993/8)

Paper ID: KNIL - 10 Diploma

Assessment date: PAST PAPER1

**Please complete the details below using black or blue ink.**

**Use BLOCK CAPITALS.**

**You must use the Resource Document provided.**

Learner Name: \_\_\_\_\_

Learner Number: \_\_\_\_\_

Learner Signature: \_\_\_\_\_

Centre Name: \_\_\_\_\_

Centre Number: \_\_\_\_\_

## **Student instructions:**

- Use **black** or **blue** ink.
- Read each question carefully.
- Answer **all** questions.
- You should have **2** documents on your desk: this Examination Paper and the Resource Document.

## **Student information:**

- You may use a calculator.
- The total mark for this paper is **120 (one-hundred and twenty)** marks.
- The marks for **each** question are shown in brackets.
- The use of dictionaries is **not** permitted.
- Use the Resource Document alongside the questions
- Additional writing space can be found on pages **28** and **29**. If you use this, clearly indicate which question number you are answering.

**Time allowed:** 2 hours.

This paper **MUST** be invigilated in accordance with TQUK Invigilation Requirements.

**Do not open this examination paper until you are told to do so.**

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### Question 1

- 1a. Identify **two** elements that should be included in a mission statement.

**Answer:**

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[2]

- 1b. What does 'ethical sourcing' mean?

**Answer:**

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[1]

- 1c (i). What does 'sustainability monitoring and reporting procedures' for the lifecycle of the project mean?

**Answer:**

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[1]

**Questions continue on the following page**

- 1c (ii).** State a benefit of sustainability monitoring and reporting procedures on the lifecycle of a construction project.

**Answer:**

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**[1]**

- 1d.** Identify **four** ways an eco-building project team could commit to minimising construction waste.

**Answer:**

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**[4]**

## Question 2

- 2a (i).** Identify **one positive** and **one negative** of using larch for an eco-house construction.

**Positive answer:**

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[1]

**Negative answer:**

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[1]

**Total for Question = 2 marks**

- 2a (ii).** Identify **one positive** and **one negative** of using oak for an eco-house construction.

**Positive answer:**

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[1]

**Negative answer:**

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[1]

**Total for Question = 2 marks**

**Questions continue on the following page**

- 2a (iii).** Identify **one positive** and **one negative** of using bamboo for an eco-house construction.

**Positive answer:**

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[1]

**Negative answer:**

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[1]

**Total for Question = 2 marks**

- 2b.** Choose **one** material from **either** bamboo, larch, **or** oak to clad the exterior of an eco-build house.

Explain **two** reasons why you have chosen the material.

**Answer:**

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[4]

**Question 3**

**3a.** Explain **three** purposes of a hydrology study.

**Answer:**

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**[3]**

**3b (i).** Identify **two** objectives of a geotechnical survey during the initial planning stages of a project.

**Answer:**

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**[2]**

**Questions continue on the following page**

**3b (ii).** Identify **two** methods of study in a geotechnical survey.

**Answer:**

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[2]

**3b (iii).** Explain the importance of a geotechnical survey in construction.

**Answer:**

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[2]



- 3c (i).** Identify **two** objectives of a topographical survey in the initial planning stages of a construction project.

**Answer:**

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[2]

- 3c (ii).** Identify **two** methods of study in a topographical survey in construction.

**Answer:**

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[2]

**Questions continue on the following page**

**3c (iii).** Explain the importance of a topographical survey in construction.

**Answer:**

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**[2]**

**Question 4**

**4a.** Identify **four** different aspects of occupancy comfort.

**Answer:**

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**[4]**

**4b.** Look at the Resource Document.

Calculate the average total lumens required for the footprint of **Plot 3**.

You **must** show your workings.

**Answer:**

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**[2]**

**Questions continue on the following page**

**4c.** Look at the Resource Document.

The average room height for a private home is 2,400mm.

Using the equation:

$$\text{air change per hour} = \text{airflow rate (m}^3\text{/h)} \div \text{room volume (m}^3\text{)}$$

Calculate the air change per hour for the footprint of **Plot 3**.

Give your answer to **one** decimal place.

You **must** show your workings.

**Answer:**

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**[4]**

- 4d.** Identify the meaning of **each** of the symbols in the formula.

$$U = Q \div (A \times \Delta T)$$

You **must** write your answers in the table below.

Where:

<b>U =</b>	
<b>Q =</b>	
<b>A =</b>	
<b><math>\Delta T</math> =</b>	

[4]

Questions continue on the following page

### Question 5

**5a.** Look at the Resource Document.

The allocation of a building budget covers the house shell and internal walls for **each** of the four houses plus additional costs. Calculate the total maximum budget for the shells and internal walls for **all** four houses combined.

You **must** show your workings.

**Answer:**

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**[4]**

- 5b.** Explain **three** roles of building information modelling (BIM) in the financial control of a building project.

**Answer:**

[illegible]

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[6]

**Questions continue on the following page**

**5c.** Identify who is responsible for ensuring the project stays within its budget.

**Answer:**

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**[1]**

**5d (i).** State how a procurement manager is accountable for keeping a project within budget.

**Answer:**

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**[1]**

**5d (ii).** Provide **one** example of how a procurement manager can keep a project within budget.

**Answer:**

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**[1]**



**Question 6**

**6a.** Explain **four** advantages of an organogram in a construction project.

**Answer:**

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**[4]**

**Questions continue on the following page**

**6b.** Identify **four** fundamentals of a construction design brief.

**Answer:**

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**[4]**

Past paper

- 6c.** State **four** ways building information modelling (BIM) is used by an integrated project team

**Answer:**

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**[4]**

**Questions continue on the following page**

### Question 7

**7a** Explain **six** possible impacts of user **post-occupancy** behaviours.

**Answer:**

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[6]

- 7b.** State **four** benefits of involving the facilities manager early in the design process of a building project.

**Answer:**

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**[4]**

- 7c.** State **one** role of building information modelling (BIM) in the operation management phase of a sustainable building project.

**Answer:**

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**[1]**

**Questions continue on the following page**

### Question 8

**8a (i).** Look at the Resource Document.

Calculate the total cladding costs of **one** property using larch at £49.60 per sqm.

You **must** show your workings.

**Answer:**

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[2]

**8a (ii).** Look at the Resource Document.

Calculate the total cladding costs of **one** property using oak at £55.40 per sqm.

You **must** show your workings.

**Answer:**

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[2]

**8a (iii).** Look at the Resource Document.

Calculate the total cladding costs of **one** property using bamboo at £23.80 per sqm.

You **must** show your workings.

**Answer:**

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[2]

**8b.** Look at the Resource Document and use your calculations from answer **5a**.

Calculate the total profit from the development if all the properties achieve their individual value on completion of contracts.

You **must** show your workings.

**Answer:**

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[5]

**Question 9**

**Questions continue on the following page**

- 9a.** Name the legislation used to decide if planning permission is required for a **new** development.

**Answer:**

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**[1]**

- 9b.** Planning permission is a **six-stage process**.

Identify the **three** missing stages in order in the table below.

<b>Stage 1</b>	Pre-application advice.
<b>Stage 2</b>	Application submission.
<b>Stage 3</b>	
<b>Stage 4</b>	
<b>Stage 5</b>	
<b>Stage 6</b>	Implementation.

**[3]**



**9c (i).** Identify **three** purposes of Building Regulations.

**Answer:**

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**[3]**

**9c (ii).** Identify **three** reasons why you should apply for Building Regulations.

**Answer:**

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**[3]**

**Questions continue on the following page**

**9c (iii).** Discuss **one** impact of **non-compliance** with Building Regulations.

**Answer:**

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**[2]**

Past paper

**Questions continue on the following page**

### Question 10

**10a.** The Resource Document states that the houses will be ‘timber frame structures’ with ‘virtually no steel or concrete.’

Compare and contrast a timber-frame construction with a traditional concrete construction and a modern steel-frame construction.

You **must** consider their:

- aesthetic appeal
- appropriateness
- reliability
- sustainability.

**Answer:**

Fast paper

**Answer to 10a continued:**

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**[12]**

- 10b.** Justify why a timber-frame structure is a more cost-effective choice than a traditional concrete or modern steel frame.

**Answer:**

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**[1]**

### Extra Writing Paper

Please use the page below if you require additional space for answers. Clearly indicate which question number and part you are answering.

Past paper

### Extra Writing Paper

Please use the page below if you require additional space for answers. Clearly indicate which question number and part you are answering.

[illegible]

**This is the end of the assessment.**



Question	Marks	Question	Marks
1a		5b	
1b		5c	
1c(i)		5d (i)	
1c(ii)		5d (ii)	
1d		6a	
2a (i)		6b	
2a (ii)		6c	
2a (iii)		7a	
2b		7b	
3a		7c	
3b (i)		8a (i)	
3b (ii)		8a (ii)	
3b (iii)		8a (iii)	
3c (i)		8b	
3c (ii)		9a	
3c (iii)		9b	
4a		9c (i)	
4b		9c(ii)	
4c		9c(iii)	
4d		10a	
5a		10b	

<b>Total</b>	
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