

**9210-106**

**Level 6 Graduate Diploma in Engineering**

Building engineering

**Sample Paper**

**You should have the following for this examination**

- one answer booklet

**No additional data is attached**

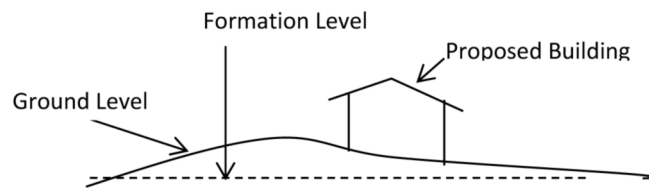
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**General instructions**

- This examination paper is of **three hours** duration.
- This paper consists of **eight** questions.
- Answer **five** questions selecting **four** from Section A and **one** from Section B.
- All questions carry equal marks. The maximum marks for each section within a question are given against that section.
- An electronic, non-programmable calculator may be used but candidates **must** show clearly the steps prior to obtaining final numerical values.
- Drawings should be clear, in good proportion and in pencil. Do **not** use red ink.

## Section A

- 1 a) i) Describe the use of an outline plan of work for building projects. (5 marks)  
 ii) Identify the main **five** work stages in a building project. (5 marks)
- b) When designing school buildings for disabled persons, give **five** specific features provided in,  
 i) car parks (5 marks)  
 ii) horizontal movement inside the building. (5 marks)
- 2 a) i) Describe the use of strip foundations in buildings. (5 marks)  
 ii) Sketch a strip foundation and name the components and materials. (6 marks)
- b) It is proposed to construct a three-storeyed building on the land as per the sketch in Figure Q2 below. It was found that subsoil is sandy gravel up to 3 m depth from the formation level.



**Figure Q2**

- i) By considering the given information in Q2b) above, propose the suitable foundation types for this three storeyed building. (5 marks)
- ii) Identify **four** types of excavation in the substructure construction by considering the proposed foundation types in Q2b) above and the levels in Figure Q2. (4 marks)
- 3 a) i) State **four** functional requirements of load bearing walls. (4 marks)  
 ii) Write the specification for constructing brickwork for load bearing walls. (5 marks)
- b) i) Define a doorframe. (3 marks)  
 ii) Sketch a single shutter doorframe of overall size 1200 mm x 2500 mm with 300 mm clear height of louvers on top. (5 marks)  
 iii) Name all components on the sketch drawn in ii) above. (3 marks)
- 4 a) A hip roof with asbestos sheets is to be constructed for a store building by taking 750 mm eaves. The external length and the width of the building are 10 m and 9 m respectively.  
 i) State the main timber members used for constructing this roof frame. (3 marks)  
 ii) Sketch the plan views of this roof and show the timber members stated in a) i) . (6 marks)  
 iii) Propose a suitable roof plumbing arrangement for this roof. (5 marks)
- b) i) Identify **two** methods of constructing ground floor paving. (2 marks)  
 ii) Discuss the purpose of providing a cement screed on floor paving. (4 marks)

- 5 a) Give the meaning of following building services.
- i) HVAC. (3 marks)
  - ii) People movers. (3 marks)
- b) State **two** types of pipes which are used for the following services.
- i) Cold water supply. (2 marks)
  - ii) Hot water supply. (2 marks)
- c) Two groups of sanitary appliances are in each floor of four storeyed flat. Each group consists of a water closet, washbasin and a bath, which are sited close to the stack.
- i) Propose a suitable arrangement of disposal of soil and wastewater with the aid of a clear sketch. (5 marks)
  - ii) Explain briefly the pollution caused by sanitation. (5 marks)
- 6 a) i) Sketch the sectional elevation of a passenger lift. (6 marks)
- ii) Name all main components in a) i). (4 marks)
- b) i) Explain the use of portable fire extinguishers in buildings. (5 marks)
- ii) Describe the consumer control unit with a sketch. (5 marks)

## Section B

- 7 a) Define,
- i) building line (2 marks)
  - ii) street line (2 marks)
  - iii) floor area. (2 marks)
- b) i) Describe the importance of building By-laws. (5 marks)
- ii) Describe briefly, building design in general. (5 marks)
- c) Give **four** key responsibilities of the client in a construction project. (4 marks)
- 8 a) i) Explain the use of life cycle cost analysis for construction projects. (5 marks)
- ii) State the four roles of a value manager. (4 marks)
- b) i) Describe building maintenance. (5 marks)
- ii) Explain the purpose of the annual maintenance programme of a building. (4 marks)
- iii) Give the **two** types of nominal maintenance. (2 marks)