

QUESTION 1

- (a) (p) Outline the operation to be carried out initially on a civil engineering project proposed on virgin land. (2 marks)
- (ii) Define:-
- excavation (1 mark)
 - hauling (1 mark)
 - compaction (1 mark)
- (iii) What is the meaning of stabilisation? Give the two types of stabilisation done in civil engineering. (4 marks)

Explain the process employed in the two types of stabilisation.

- (b) List five types of equipment employed in a civil engineering project and explain where the equipment is used. (10 marks)
- (c) (i) ^{Excavator} State the factors to consider when selecting plant to be used. (3 marks)

State three types of equipment where hourly rate is used.

- (ii) Explain with the aid of a diagram what is meant by mass/haul diagram label fully. (3 marks)

QUESTION 2

- (a) (i) Explain the two types of pavement employed in roads in Zimbabwe and give three advantages and three disadvantages of each type. (7 marks)
- (ii) Outline five types of failures experienced in each type of pavement. (5 marks)
- (b) (i) Explain fully the operation when constructing a subgrade layer on a road construction project. (6 marks)
- (ii) Explain fully the operation employed when constructing stabilised base layer on a road construction project. (7 marks)

QUESTION 3

- (a) (i) What are the main ingredients of concrete , explain the requirements of each. (4 marks)
- (ii) Explain the following properties of concrete:-
- Workability
 - Cohesiveness
 - Strength
 - Curing
 - Shuttering (10 marks)
- (b) Explain fully how fresh concrete is handled from raw materials upto placing highlighting the precautions taken in order to achieve the desired strength. (6 marks)
- (c) Outline five types of defects in concrete and the causes. (5 marks)

QUESTION 4

- (a) Explain fully three types of contracts used in civil works and tendering process. Give three advantages and three disadvantages in each process. (12 marks)
- (b) What are the basic documents used in a contract and the various parties involved in the execution of the contract? Explain the role of each. (6 marks)
- (c) What does the abbreviation BOQ mean? What are the requirements of the BOQ. (7 marks)

QUESTION 5

- (a) Explain fully the procedure employed when constructing a concrete footing of a bridge in a river with flowing water. Describe precautions fully. (6 marks)
- (b) What are the main elements of a double storey building structurally. These elements should be concrete elements only. Explain procedure used in constructing the elements and precautions taken in each case to ensure quality is achieved. (19 marks)
- Handwritten notes on the right side of the page:*
walls, beam, columns, slabs, but not