





# TVET NATIONAL EXAMINATIONS, LEVEL 5, 2022-2023

## INSTRUCTIONS TO CANDIDATES (ANSWER BOOKLET)

1. A candidate should fill in the actual names and the Index number on the cover of this questions and answer booklet on the provided place.
2. It is illegal for a candidate to write any of names, Index number or school name inside the answer booklet.
3. No candidate should remove or tear any pages or part of it in the answer booklet.
4. A candidate should answer in the language in which the examination is set.
5. A candidate should sign on the sitting plan when submitting the answer booklet. He/she has also to check if the answer booklet is well sealed.
6. No extra paper is allowed in the examinations room. If a candidate is caught with it his/her results will be nullified.
7. No candidate is allowed to write answers not related to the subject being sat for, otherwise it will be considered as a cheating case.
8. Write your answers on the 16 lined pages (From page 7 to page 22).
9. Use the last non-lined pages as draft.
10. Results for any candidate who is caught in examination malpractices are nullified. The cheating can be recognized during examinations administration, marking exercise or even thereafter.

**N.B:** 1) After results publication, there is no remarking and no candidate is given his/her answer booklet for review. This answer booklet is a property of NESAA.

2) Claims are only received online within 30 days after results publication. A link will be provided after results publication.

**T 043\_ Concrete technology**

**TVET NATIONAL EXAMINATIONS, LEVEL 5, 2022-2023**

**OPTION/TRADE: MASONRY**

**SUBJECT/EXAM: CONCRETE TECHNOLOGY**

**DURATION: 3 HOURS**

**INSTRUCTIONS TO CANDIDATES (QUESTION PAPER)**

**This Exam paper is composed of Three Sections (A, B, and C). Follow the instructions given below, and answer the indicated questions for a total of 100 marks**

**Section A: Fourteen (14) questions, all **Compulsory** 55 marks**

**Section B: Among the five (5) questions, attempt any three (3) 30 marks**

**Section C: Among the two (2) questions, attempt any one (1) 15 marks**

**Allowed materials:**

- **Blue** or black **pen**
- Mathematical set
- Non-programmable calculator

**Note:**

***Every candidate is required to carefully comply with the provided assessment instructions.***



**SECTION A: Attempt all questions**

**(55 marks)**

- 01.** Preliminary works are very important to smoothly run the future stages of construction including concrete pouring and casting. **(5marks)**
- a) Define the term preliminary works.
  - b) Highlight any four (4) most important preliminary works to be carried out before the casting of concrete.

- 02.** What is the good sequence of feeding the materials in the mixer for concrete during mechanical mixing of concrete? **(5marks)**

- 03.** Complete the following table with: Good or Poor. **(3marks)**

<b>Designation</b>	<b>Concrete</b>	<b>Steel bars reinforcement</b>
Strong in tension		
Strong in compression		
Fire resistance		

- 04. a)** What do you understand by the terms setting and hardening of concrete? **(5marks)**

- b) Give the two (2) distinct phases of setting time of concrete.

- 05.** After the mixing of concrete, the mixed concrete should be transported and poured in formworks. **(5marks)**

- a) What are the precautions to be taken while transporting concrete? Any three precautions.

- b) State any two effects of poor transportation of concrete

- 06.** In some cases, concrete ingredients are mixed with some admixtures or additives, **(5marks)**

- a) Give any three reasons of using admixtures in concrete.

- b) Distinguish between plasticizers and super plasticizers types of admixtures.

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07. Choose the correct answer: The property of ingredients to separate from each other while placing the concrete is called, (2marks)
- Compaction
  - Shrinkage
  - Segregation
  - Bulking
08. Aggregates for concrete are derived from rocks of various types. (4marks)  
When subjected to extreme heat and pressure most sedimentary rocks may change into metamorphic rocks. **The limestone** may become .....then **the shale** becomes .....
09. Determine the quantities of cement, sand and gravel, mixed at 1:2.5:5 as the ratios, for producing the concrete to be poured in foundation of  $5\text{m}^3$ . (3marks)
10. Describe any four (4) methods of storing cement at site with its effect on cement strength. (4marks)
11. A) Select the incorrect statement from the following: (2marks)
- With the passage of time the strength of cement decreases
  - With the passage of time the strength of cement increases
  - After a period of 24 months the strength of cement reduces to 50%
  - Concrete made with storage deteriorated cement gains strength with time.
- B) Consider the following oxides:  
1)  $\text{Al}_2\text{O}_3$  2)  $\text{CaO}$  3)  $\text{SiO}_2$   
The correct sequence in increasing order of their percentage in an ordinary Portland cement is: (a) 2,3,1 (b) 1,3,2 (c) 3,1,2 (d) 1,2,3
12. Suppose you are casting M15 concrete for moderate conditions, the maximum w/c ratio is 0, 6. If you are using  $240\text{kg}/\text{m}^3$  of cement, then calculate the quantity of water required. (4marks)
13. What is concrete cover and how does it differ from rebar or concrete spacer? (4marks)



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14. The term water to cement ratio denotes the ratio between the weight of water and that of cement used. **(4marks)**
- a) The w/c ratio is 0,500. The cement to be used in a mix is 600 pounds, how much water is needed?
- b) If w/c ratio is 0,450 and water 250 pounds, how much cement is needed?

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### **Section B: Attempt any three (3) questions (30 marks)**

15. a) What are the test procedures that can be used to calculate the percentage of bulking of sand? **(10marks)**
- b) Draw the graphical representation of bulking of sand
16. Describe any five (5) important rules to be followed while placing concrete to its final deposit. **(10marks)**
17. Explain clearly any five (5) methods of controlling horizontality of structures during concrete works. **(10marks)**
18. Give all the steps (Procedures) involved when making: **(10marks)**
- a) A reinforced concrete structure.
- b) A pre-stressed concrete member.
19. Using a table, discuss the five (5) common defects caused by improper cleaning of concrete mixing area, their causes and the recommended preventive measures. **(10marks)**

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**Section C: Attempt only one (1) question**

**(15 marks)**

20. The aim of finishing concrete is to provide the desired final concrete surface. Explain in details any five (5) ways of finishing concrete surfaces depending upon the effect required. **(15marks)**
21. The footing has 2m of length with cross-sectional area of 0.40m x 0.35m; this foundation is made in concrete with a ratio of 1:2:3. Determine the quantity of materials required (Cement, Sand and Coarse aggregates) if the dry factor=1.52, then the specific weight of cement is 1440kg/m<sup>3</sup>. **(15marks)**

**END OF ASSESSMENT**