WORKFORCE DEVELOPMENT AUTHORITY

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ADVANCED LEVEL NATIONAL EXAMINATIONS, 2018, TECHNICAL AND PROFESSIONAL STUDIES

EXAM TITLE: CONSTRUCTION TECHNOLOGY AND R.C.C

OPTION: Construction (CST)

DURATION: 3 hours

INSTRUCTIONS:

The paper is composed of **three (3) main Sections** as follows:

Section I: Fifteen (15) compulsory questions.   **55 marks**

Section II: Attempt **any three (3)** out of five questions.   **30 marks**

Section III: Attempt **any one (1)** out of three questions.   **15 marks**
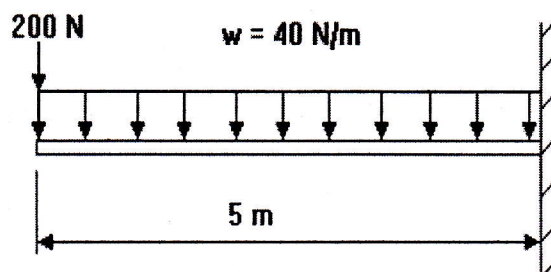
The use of calculator is allowed

Note:

Every candidate is required to carefully comply with the above instructions. Penalty measures will be applied on their strict consideration.

Section I. Fifteen (15) Compulsory questions   55 marks
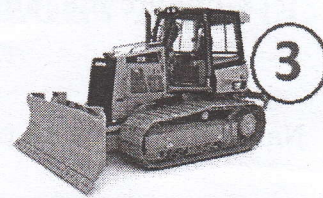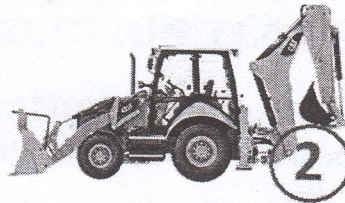
01. How should a good foundation be?   (4 marks)

02. What is the main reason why steel is the most suitable building material among metallic materials?   (3 marks)

03. Mention the classes of walls based on the materials in which they are constructed.   (2 marks)

04. What is the special function of a retaining wall in comparison to the other types of walls?   (3 marks)

05. What are the properties of good cement for construction?   (4 marks)

06. Differentiate the terms "hydration, setting and hardening" of cement.
                                                                         (3 marks)

07. In order to construct a stair for joining two floors; the admitted slope being 35^0 and the height between the two floors is 2.8m. Using the relation 2R+G=60cm, Calculate:

    a) Rise;   b) Going;   c) Number of rises;   d) Number of goings
    e) Run   (5 marks)

08. During the construction of foundation, when do you adopt the use of combined footing?   (3 marks)

09. Describe the process that happens to the ingredients of concrete to set to a hard mass and make concrete.   (3 marks)

10. What are the objectives of plastering?   (3 marks)

11. Draw and discuss the graph that illustrates the relation between strength and water/cement ratio of concrete.   (5 marks)

12. What are the purposes of soil exploration for an existing structure? (3 marks)

13. Find the bending moment at x = 3m and draw the bending moment for the beam shown below:

                                                                         (4 marks)
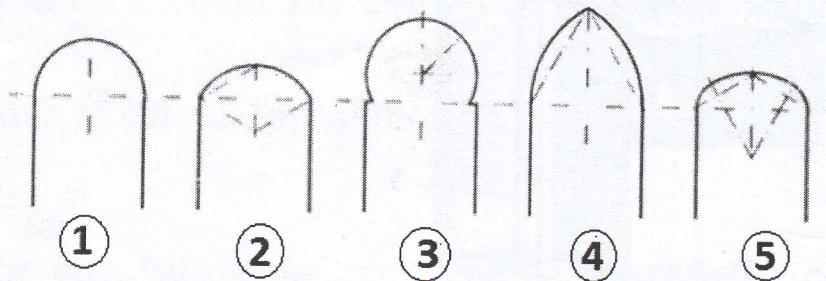
14. Indicate the possible causes of settlement in a foundation of an engineering structure.

    (5 marks)

15. After explaining the term "creep" as used for concrete technology, discuss briefly the factors that can affect it.

    (5 marks)

Section II. Choose and answer any three (3) questions.   30 marks

16. Explain clearly the meaning of differential settlement for foundations and provide its main eight (8) causes.

    (10 marks)

17. Describe clearly five (5) properties of good aggregates for concrete.

    (10 marks)

18. Name each of the machines below.   **(10 marks)**

19. Name the following types of Arches as demonstrated in figures below

    (10 marks)

20. With a net diagram show the cement production process.   **(10 marks)**

21. a) What do you understand by the term "SEGGREGATION"?

b) Discuss the meaning of concrete cover with its function and give four examples of concrete structure where necessary;

c) Calculate the young's modulus of rod with a diameter of 30mm and length of 30m subjected to a compressive load of 60KN and decreasing in length of the rod is 0.4mm.

(15 marks)

22. a) By using a sketch, show the section of beam reinforced by 2bars of 16mm diameter in compression zone of 3 bars of 20 mm in tension zone and 2side bars of 12mm for shear and show also the effective depth of the beam.

b) Write two types of hooks for reinforcement on your choice.

c) What are the functions of hooks?

(15 marks)

23. Name the following parts of the closed eaves' details: **(15 marks)**