



PROGRAM : BACHELOR OF ENGINEERING TECHNOLOGY
IN CIVIL ENGINEERING

SUBJECT : **CONSTRUCTION METHODS & SAFETY 1B**

CODE : **CMSCIB1**

DATE : NOVEMBER EXAMINATION
26 NOVEMBER 2019

DURATION : (SESSION 2) 08:30 - 10:30

WEIGHT : 40 : 60

TOTAL MARKS : 100

ASSESSOR : H ZONDI

MODERATOR : MA KASENGE

NUMBER OF PAGES : 8 PAGES

INSTRUCTIONS : ONLY ONE POCKET CALCULATOR PER CANDIDATE MAY
BE USED.
THIS QUESTION PAPER MUST BE SUBMITTED WITH THE
ANSWER SHEET

REQUIREMENTS : NONE.

INSTRUCTIONS TO STUDENTS

PLEASE ANSWER ALL QUESTIONS.

QUESTION 1

Complete the following sentences by writing ONLY the missing word.

- 1.1 _____ is a massive wall built out in to the sea that is used to protect the harbour from wave action.
- 1.2 Harbour _____ vessels from the destructive forces of wind, currents and waves.
- 1.3 _____ refers to a thin layer of water on a surface that can result in loss of friction.
- 1.4 _____ plans are more detailed versions of the airport layout plan, showing the size and location of buildings within terminal area.
- 1.5 _____ in industrial terms means that there should be a proper place for everything at all times.
- 1.6 To prevent water table from affecting the, _____ drains are installed below the subgrade.
- 1.7 _____ are shafts with removable covers that lead down to the sewers or drains through which a person can enter. They are often referred to as inspection chambers.
- 1.8 _____ involves smoke being pumped into the pipes and the float on the smoke machine is checked for any fall in pressure.
- 1.9 _____ are wire baskets manually filled with large stones and placed in positions where they can provide protection against erosion.
- 1.10 The _____ formula is used to determine the velocity of flow in a channel.
- 1.11 A _____ is a natural or artificial lake for collecting and storing water for domestic or community consumption.

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- 1.12 Storm _____ measures the amount of water that fall when it rains.
- 1.13 A _____ dam is constructed from the same kind of material throughout.
- 1.14 _____ is a term used to describe the very fine soil particles carried in suspension when water flows fast.
- 1.15 _____ refers to water that is fit or suitable for human consumption.

[15]

QUESTION 2

Indicate whether the following statements are true or false.

- 2.1 Dry dock is an area of harbour that can accommodate a ship and be closed off. The water is then drained, leaving the dock dry, making it easy for repairs to take place.
- 2.2 The shape of the dollos is specially designed to counteract the destructive forced of waves.
- 2.3 A slipway is an area in a dock where repairs take place.
- 2.4 One of the main functions of the Workman's Compensation Act is to prevent industrial accidents.
- 2.5 Airside includes all activities on the airport side of the terminal – for example, runways, taxiways, aprons etc.
- 2.6 The volume of air traffic, the runway configuration and the location of the terminal buildings and other ground facilities determine the number of taxiways at an airport.
- 2.7 Airport apron is a graded and paved load-bearing area allowing for aircraft take-off and landing. It is also commonly referred to as a landing strip.
- 2.8 The lighter the aircraft the longer it takes to become airborne.
- 2.9 The primary objective of the Machinery and Occupational Safety Act is to control the working conditions of all workers in industry and commerce, helping to prevent accidents and diseases.

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- 2.10 If a worker is guilty of a serious and wilful misconduct and the accident leads to his disability or death, the Commissioner will pay compensation if he or she was injured while engaged in the employers business.
- 2.11 Housekeeping means that there should be a proper place for everything at all times. Good housekeeping will ensure a lower risk of accidents and increased organisational aspects of any company.
- 2.12 Hydrological study is concerned with liquids in motion and pressures exerted in this motion as well as the design of facilities to handle these liquids.
- 2.13 Vitrified pipes are made of clay and baked in ovens.
- 2.14 Either its length or its slope does not govern the hydraulic performance of a culvert.
- 2.15 Storm duration measure the amount of water that falls when it rains.

[15]**QUESTION 3**

- 3.1 Discuss the following terms: (10)
- 3.1.1 Bearing capacity
 - 3.1.2 Bearing pressure
 - 3.1.3 Deep foundations
 - 3.1.4 Diaphragm wall
 - 3.1.5 Bentonite

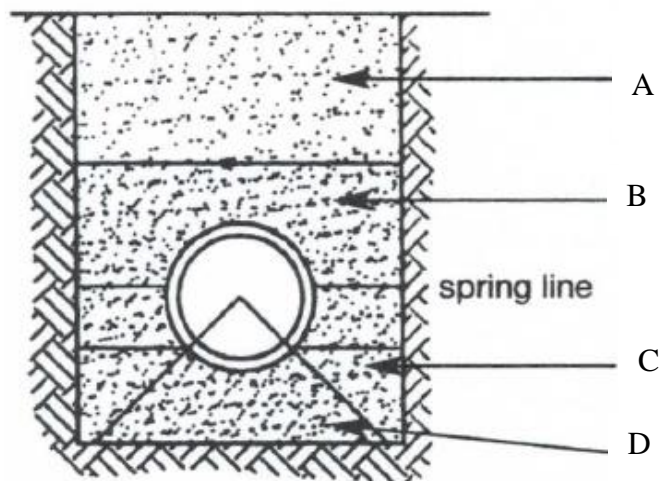
[10]**QUESTION 4**

- 4.1 State three positions of wing walls in a bridge and explain their function(s) (5)
- 4.2 What is the function of expansion joints in bridge construction (2)

- 4.3 Differentiate between an abutment and a pier in a bridge construction (2)
- 4.4 Fully define the zoned dam (earth dam) (5)

[14]**QUESTION 5**

- 5.1 Assume that the bearing capacity of a soil is 1800 kN/m^2 , gravitational acceleration is $9,81 \text{ m/s}^2$ and the density of concrete is 2400 kg/m^3 . You need to support a concrete wall, which is 12 meter long, 0.5m wide and 3 m high, carrying a vertical downward load of 1225 kN/m . Calculate the minimum width required for this foundation. (10)
- 5.2 The diagram below is a section through class c bedding used for pipe backfill. Label all the layers correctly. (4)

**[14]****QUESTION 6****Multiple choice: write only the correct answer in your answer sheet**

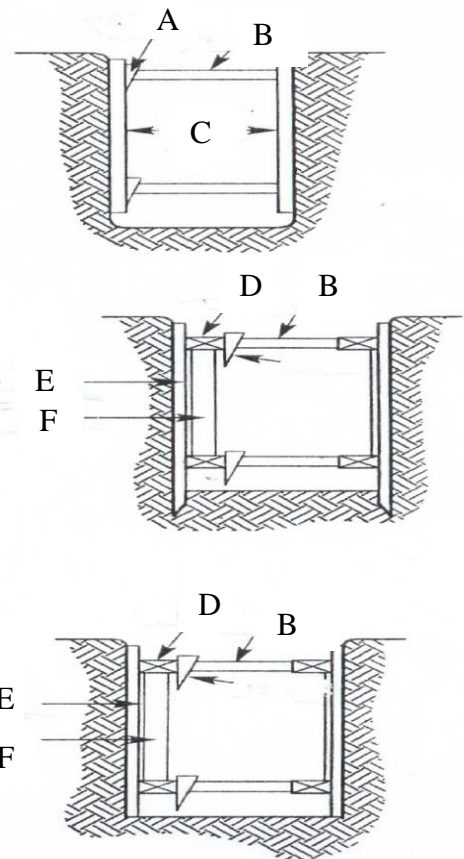
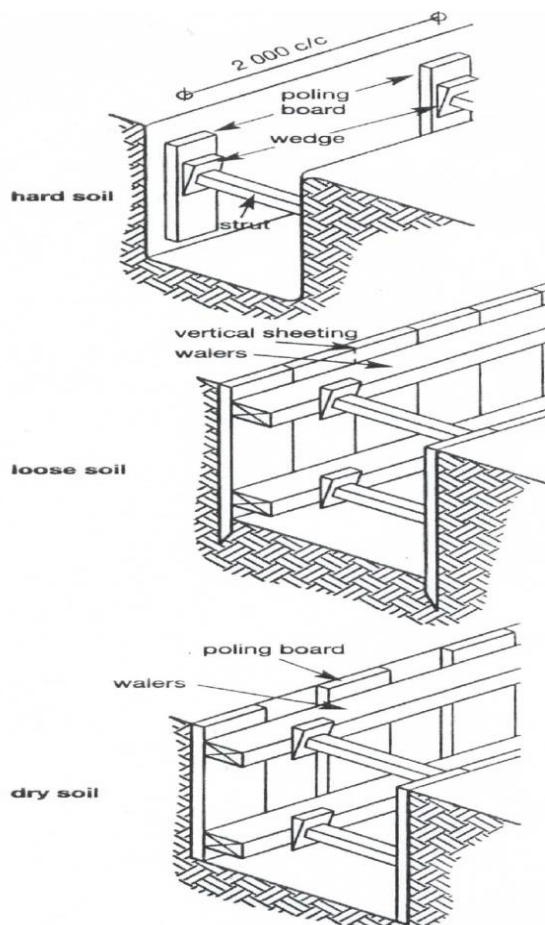
- 6.1 The arrangement of the internal layout is governed by:
- A. External pipes positions
 - B. The topography of the area to be served
 - C. Location of the public pipes
 - D. All of the above

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- 6.2 The problems associated with caulked joints in clay pipes are:
- A. environment expects
 - B. operation required skilled pipe layer
 - C. All of the above
 - D. none of the above
- 6.3 Cast iron pipes are not popular because they are:
- A. Environmental hazard
 - B. Corroding
 - C. Brittle
 - D. Expensive
- 6.4 Concrete pipes properties are:
- A. Relatively strong
 - B. Resistance to corrosion
 - C. All of the above
 - D. None of the above
- 6.5 Are pipes that are placed below the soil surface to control the water level.
- A. Subsoil drains
 - B. Natural drains
 - C. Surface drains
 - D. Culvert drains
- 6.6 The following is the method(s) used to test drains.
- A. Smoke
 - B. Air test
 - C. Visual inspection
 - D. All of the above
- 6.7 What are the shafts with removable covers that lead down to sewers or drains through which a person can enter?
- A. Bores
 - B. Conduits

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- C. Manholes
D. Pipes
- 6.8 What is the term used to call the overall area over which the influence of drainage will be experienced
- A. Boundary area
B. Rational area
C. Catchment area
D. Manning area
- 6.9 Barriers of concrete or earth built across a river to create body of water are called:
- A. Reservoirs
B. Lakes
C. Tanks
D. Dams
- 6.10 The surface drainage doesn't consist of.....
- A. Channels
B. Road side drains
C. Culverts
D. Curves
- 6.11 The surface water is obtained from.
- A. Ground water
B. Rainfall
C. Leakage of water from water treatment plants
D. None of the above
- 6.12 The drainage should have a minimum cover of.....
- A. 80 mm
B. 8.00 m
C. 800 mm
D. 150 mm

QUESTION 7

- 7.1 What information is supposed to be recorded on the accident and incident register according to Machinery and Occupational Safety Act? (4)
- 7.2 Because of the dangerous situations that can arise from unprotected trenches, the government, through the Department of Labour has laid down regulation to protect both public and workers. State five regulations. (5)
- 7.3 Shoring essential in trenches deeper than 1.5m for a number of reasons such as safety for workers. The type and the amount of timbering needed depends on a number of factors. State only 5 (5)
- 7.4 Label the figure below showing timbering in hard, loose and dry soil. (6)

**[20]****TOTAL = 100**