GENERAL CERTIFICATE OF EDUCATION BOARD

Technical and Vocational Education Examination

JUNE 2022 **ADVANCED LEVEL**

Specialty Name and Acronym	CIVIL ENGINEERING – CE-BC, CE-AD and CE-PW
Centre No.	
Centre Name	
Candidate No.	
Candidate Name	

Mobile phones are **NOT** allowed in the examination room

7220 Survey And Soil Mechanics 1: MULTIPLE CHOICE QUESTION PAPER

One and a half hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the examination begins:

3. Check that this question booklet is headed **Advanced Level – 7220 Survey and Soil Mechanics 1**
4. Fill the information required in the spaces above.
5. Fill the information required in the spaces provided on the answer sheet using your HB pencil: **Candidate Name, Exam Session, Subject Code, Centre Number and Candidate Number.** Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.
6. **Answer ALL questions**
7. Each question has FOUR suggested answers: **A, B, C** and **D**. Decide on which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.
   For example, if **C** is your correct answer, mark **C** as shown below:

   [A] [B] [~~C~~] [D]

8. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
9. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
10. Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
11. Texts, notes and pre-prepared materials of any kind are also **NOT** allowed in the examination room.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet after. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

1. Select the alternative way to measure a distance in the absence of chains.
   A Wheels
   B Ranging poles
   C Marking arrows
   D Line

2. Give the meaning of reconnaissance in chain survey
   A Recognizing the chaining equipment
   B Understanding the method of chaining
   C Identifying the points to chain
   D Inspecting the area to be surveyed

3. Determine if the land shown by the contours of Figure 1 below is a:

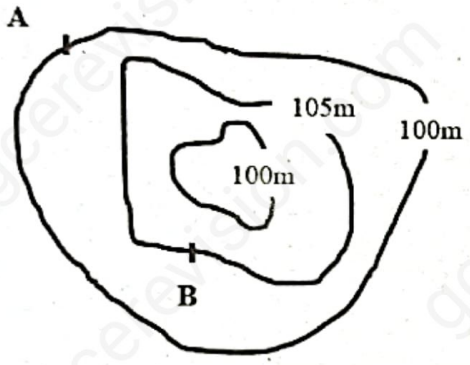


Figure 1

   A Flat land
   B Sloppy land
   C Hilly land
   D Valley land

4. The depth of footings pits on a construction were requested to be -1.80m from the datum level. Indicate what action has to be taken if the reading of the staff placed in a pit is 1.80m and 0.20m on the datum level.
   A The pit has to be dug deeper
   B The pit prescribed depth is reached
   C The pit has to be filled up a little
   D The pit sides have to be dressed

5. During leveling, the first reading taken from the staff is known as:
   A First reading
   B Foresight reading
   C Backsight reading
   D Intermediate sight reading

6. The overall purpose of leveling is to:
   A Create horizontal plateforms
   B Establish a horizontal plane to read points altitudes
   C Determine the coordinates of a point.
   D To mark horizontal lines on buildings

7. Identify what the symbol below means on a survey drawing:

Figure 2

   A A hospital
   B A school
   C A road
   D A building

8. Specify the exact role of leveling screws in a survey instrument.
   A To keep the instrument vertical
   B To keep the instrument on the tripod
   C To keep the instrument in the horizontal position
   D To keep the instrument from moving

9. The method used to survey a very large area of land is called:
   A Photogrametry
   B Aeral photography
   C Cartography
   D Contour

10. The instrument used to center the theodolite on a reference is called:
   A Staff
   B Peg
   C Plumb bob
   D Spirit level

11. The survey technology abbreviated EDM stands for :
   A Electronic distance mapping
   B Electronic digital measurement
   C Electronic data measurement
   D Electronic distance measurement

12. Identify among the instruments below the only EDM instrument.
   A Theodolite
   B Transit level
   C Compass
   D Total station

13. Specify the situationsin which ranging is needed in chain surveying.
   A When the chain is not in good state
   B When the length of the survey line is shorter than the length of the chain
   C When the length of the survey chain is longer than the length of the line
   D When the length of the survey line is longer than the length of the chain.

14. Classify eye ranging in one of the following types of ranging:
   A Indirect ranging
   B Direct ranging
   C Circular ranging
   D Incline ranging

15. Tell the formula that match the relationship between backward and forward bearing.
   A Backward =forward+180-α_R
   B Backward =forward-180-α_R
   C Backward =forward+180+α_R
   D Backward =forward*180*α_R

16. Give in degree the value of an angle that measures 400grades.
   A 350°
   B 360°
   C 300°
   D 200°

17. The angular difference between a fore bearing and back bearing is
   A 180°
   B 45°
   C 90°
   D 360°

18. Based on Figure 3 below, identify the correct writing of the line OA.

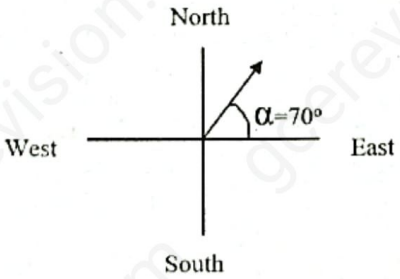


Figure 3

   A N20°E
   B S70°S
   C N70°E
   D E20°N

19. Identify the type of angles indicated in the polygonometric traverse bod Figure 4, at points A,B,C,D and E

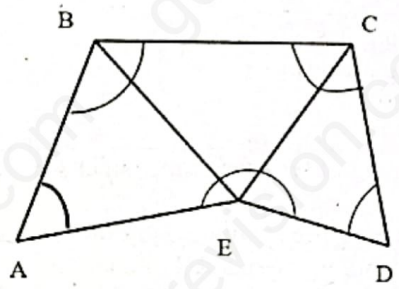


Figure 4

   A Vertical angles
   B Circular angles
   C Horizontal angles
   D Inclined angles

20. Categorize the type of loop shown in Figure 5 below, extracted from a survey field book.

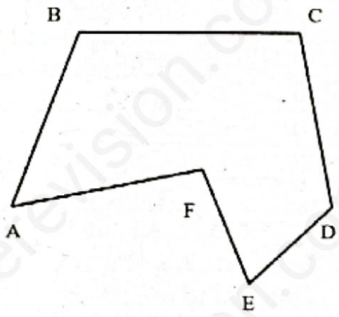


Figure 5

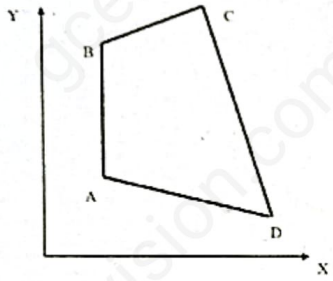
   A Straight loop
   B Circular loop
   C Close loop
   D Open loop

21. The theoretical sum of all the angles in each triangle of the triangulation network should be equal to:
   A 360°
   B 275°
   C 180°
   D 90°

22. Tell the problem that constructing inclined profile boards will create on the building.
   A Make the building inclined
   B Lead to reduction of the building size
   C Lead to the increase of the building size
   D Lead to the wrong depth of foundation

23. Indicate which instrument in the list below is fit for the 3-4-5 method of setting out.
A Level
B Theodolite
C Tape and line
D Builder's square

24. Deduce the X coordinate of beacon B of an ABCD plot in the Figure 6 below if the AB side is parralel to the Y axis.



A (20.3, 70) B (X, 100) C (70.45, 115) D (98, 15.21)

Figure 6

A	70
B	20.3
C	30
D	98

25. Every landscaping is done in two major phases :
A Mass leveling and details excavation
B Design and execution
C Site clearing and excavation
D Cut and fill

26. State the number of phases that a saturated soil has :
A 1
B 2
C 3
D 4

27. Select the description that fits the undisturbed sample of soil
A When there was silence during the sampling.
B When the sample was taken such that its properties were kept till the testing moment.
C When the sample was tested in-situ
D When the sample was taken before work began on site

28. Tell which of the formula below corresponds to the water content of a sample of soil.
A W=Mass water/mass sample
B W=Mass water/mass dry sample
C W= Mass dry sample / mass water
D W=Mass dry sample *Mass water

29. The drying of soil samples in the lab is done using
A Kerosene
B Oven
C Sun
D Frying pans

30. Identify the type of expert to invite to test if they are fractures beneath a land selected for an airport project.
A Civil engineer
B Geotechnician
C Geologist
D Physician

31. Explain the process of the formation of sedimentary rocks
A By volcanic eruption
B By Metamorphic reactions
C By mechanical crushing of rocks
D By the compaction of eroded materials and debris under pressure.

32. Explain why soil investigations are required for projects of a certain magnitude.
A Because they are government projects
B To know the landscape of the site
C To ensure the security of the future construction
D To give laboratories work

33. Select the test that is only done in-situ.
A Sand equivalent test
B Water table
C Sieve analysis
D Atterberg's limits

34. Tell what a lab should do before taking their machine to a site to carry out tests.
A They should prepare to carry all kinds of machines along
B They should first visit the site
C They should first visit the site and identify the tests required.
D They should c

35. Describe in which order of sieve opening sizes the sieves are mounted in a sieves-stack.
A By decreasing size of sieves from the bottom to the top
B By increasing size of sieves from the top to the bottom
C By decreasing size of sieve opening from the top to the bottom
D In any order

36. Recommend among the aggregates below the one suitable for the production of light weight concrete.
A Crushed aggregates
B Porous aggregates
C Stone dust
D Recycled aggregates

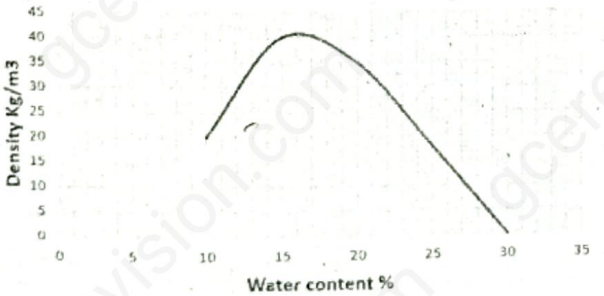
37. Describe the group of aggregate called fines in a sieve analysis chart
A It is the most abundant portion of the sample
B Is is made up of the good grains of the sample
C It is made up of the elements of smallest grains sizes
D It is made of grains of less importance

38. The Sizes of sand particles range from
A Coarse to fine
B Hard to fine
C Coarse to hard
D Soft to hard

39. What those a non-destructive test means in civil engineering ?
A It is a test carried out without destroying anything on the site
B It is a test carried out without destroying any equipment
C It is a test carried out without any worker having an accident
D It is a test carried out without destroying the sample

40. Name the secondary test that is carrried out during the Proctor test.
A Permeability test
B Water content
C Density test
D Triaxial test.

41. From the curve below, deduce the density of the sample when the water content is 10%.



A 20
B 25
C 15
D 30

42. Give the possible exact value of a sample of soil of mass 60g measured using a scale of+/-0.2%
A 61g
B 59.08
C 60.2
D 59.88g

43. Explain how the ratios of materials for a concrete element is professionally determined by the structural engineers.
A By using what is known in the environment
B By using previous information
C By proposing and testing ratios until they have the one meeting their needs
D By reading in books

44. Identify the test that helps to know at which temperature bitumen can inflamme.
A Flash point test
B Distillation test
C Hardening test
D Viscosity test

45. Name the test used to determine the tensile strength of a sample of soil.
A Tensile test
B Compressive test
C Proctor test
D Triaxial test

46. Explain why a water solution should be put in the sample of sand during the sand equivalent test
A It is used to increase the water
B It is used to disconnect impurities glued to sand particles
C It is used to facilitate the test
D It is used to kill bacteria in the water solution.

47. As a lab technician, recommend the type of admixture that should be used if the needed mix of concrete is obtained but it is hard to flow into the formwork.
A Accelerators
B Plasticizer
C Retarders
D Air entrainers

48. Identify which quantity of cement is needed for the setting time test using the VICAT apparatus.
A 100g
B 200g
C 500g
D 1000g

49. Water found in the mass of grains of a soil is called :
   A Grain's water
   B Adsorbed water
   C Absorbed water
   D Grain's fluid

50. Conclude on the cleanliness of a sand if its sand equivalence is 50%.
   A Sand is clean
   B Sand is dirty
   C Sand is averagely clean
   D Sand is very clean

STOP

NOW GO BACK AND CHECK YOUR WORK