WORKFORCE DEVELOPMENT AUTHORITY

WDA

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ADVANCED LEVEL NATIONAL EXAMINATIONS, 2016, TECHNICAL AND PROFESSIONAL STUDIES

EXAM TITLE: Surveying Applications

OPTION: Surveying (SUR)

DURATION: 3hours

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**

Note:

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

01. What do you understand by surveying?   **2marks**

02. Outline the six (6) applications of surveying?   **3marks**

03. The work of the surveyor which is mainly consists of making measurements can be divided into two parts: Field work and office work. Briefly discuss them.

4marks

04. The figure below indicates the control points A, B, C, D, E, F, in the area to be surveyed. It is required to obtain the coordinate positions of each point.
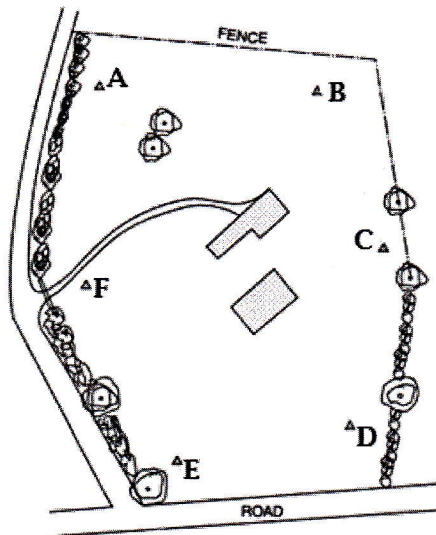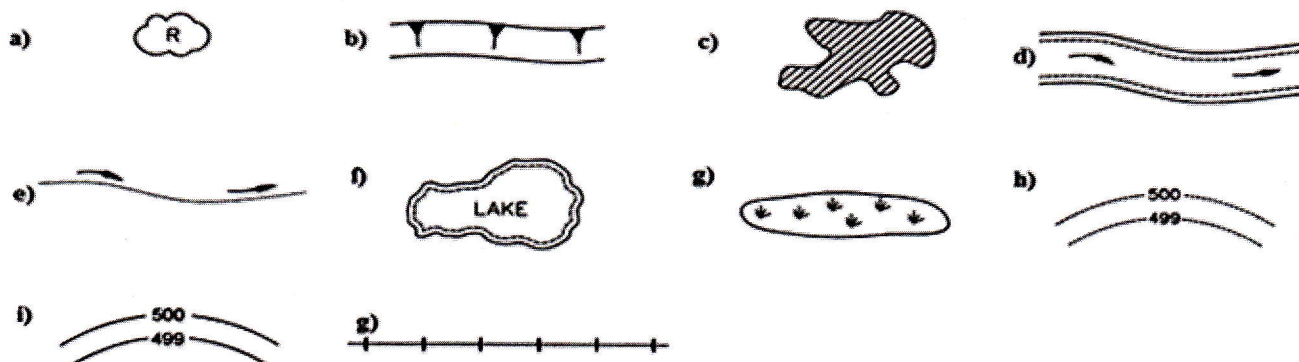

By which methods the practice could be done?

4marks

Control points

05. If a preliminary route survey is to be prepared for a proposed pipeline, discuss on three important procedures to be followed.

3marks

06. When developing a street layout plan for a new subdivision, a surveyor should do consultation where and for what reasons?

2marks

07. What is irrigation? What are the necessary factors that oversee the need for Irrigation?

4marks

08. List out at least six (6) direct benefits of irrigation.   **3marks**

09. After an irrigation water is taken from the sources by any of the techniques (Diversion from river or reservoir or pumped from the ground sources etc), it can be distributed to the agricultural field by different methods.
Mention at least five methods that may be applied.   **5marks**

10. What do the following shapes mean? **5marks**

a) [symbol with R]   b) [symbol]   c) [hatched shape]   d) [lines]

e) [curved line]   f) LAKE   g) [oval with stars]   h) [500 / 499 contour lines]

i) [500 / 499 contour lines]   g) [line with tick marks]

11. Outline the procedure that should be followed to come up with mass diagram.

5marks

12. While developing road projects making tentative alignment is necessary after primary investigation regarding the justification of construction of new road, give any five (5) key points that must be considered.

5marks

13. Before an irrigation project is undertaken, it should be examined whether the area concerned in fact needs to be irrigated. In line of this, what factors should be taken into consideration during the investigation.

3marks

14. Kigali city council decided to develop and expand water supply scheme. During the preparation it has been noticed that the demand is higher due to expansion of the city with new neighborhood second cities, hence a primary investigation has to be conducted on the concerned area and a primary report prepared regarding implementation of the scheme.

Advise the points that should be noted during reconnaissance. **3marks**

15. Location of site for rain gauge station depends on the topography of the catchment area. To get the proper rainfall records from the catchment area, the stations should be so selected that they fully cover the basin.

List out the four (4) recommendations to be considered while selecting rain gauge station.

4marks

16. The table below illustrates coordinates of a closed figure in meters.

Points	North (Y)	East (X)
A	100	802
B	711	802
C	635	852
D	994	902
E	241	952
F	884	1002
G	266	1052
H	811	1102
I	100	1102

Compute the area of the Figure using:

(1) Coordinate method.
(2) Trapezoidal rule.   **10marks**

17. The following consecutive readings were taken with a level and a 4 meter levelling staff on a continuous sloping ground at common intervals of 30 m:

Reading (m)	Reading (m)	Reading (m)
A 0.855	0.455	0.585
1.545	1.380	1.015
2.335	2.055	1.850
3.115	2.855	2.755
3.825	3.455	B 3.845

The reduced level of A was 380.500. Make entries in a level book and apply the usual checks.

Determine the gradient of AB.   **10marks**

18. What is the effect of miscentring a theodolite on the measured angle? Show that special care must be exercised in centring when sighting over short distances.
                                                                         10marks

19. The figure below illustrates a curve joining straight lines AB, BC and CD in a road alignment. The following table shows recorded data during topographic survey.

Straight	Bearing (°)	Distance (m)
AB	34	735.70
BC	74	210.50
CD	124	640.40
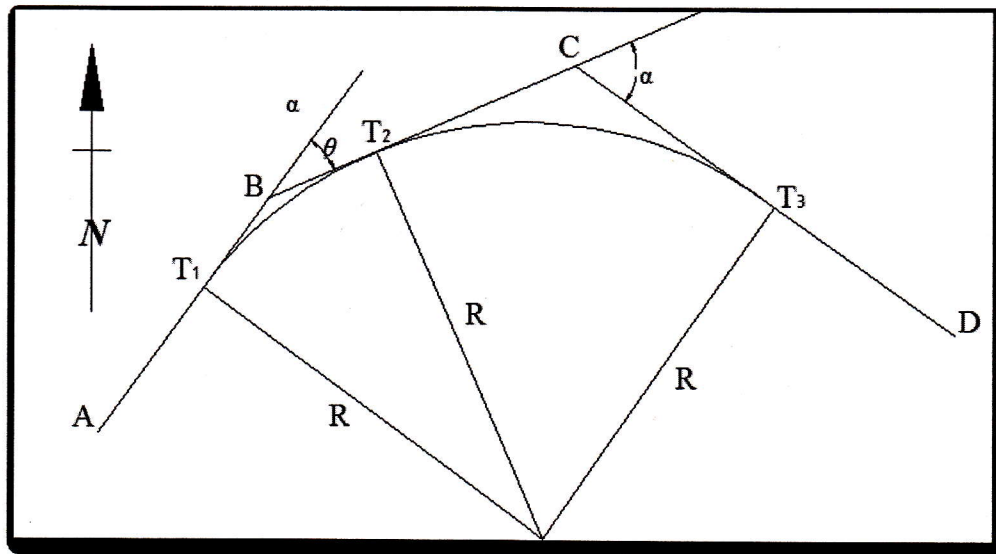
Calculate:
   a) The radius of the curve joining the straights,
   b) The length of curve.   **10marks**

20. Hydrographic survey includes all types of hydrological investigations which are necessary for the design of hydraulic structures.

By the use of neat sketch, discuss the process of determination of cross-sectional area of a river:
   a) When the river is small
   b) When the river is large   **10marks**