MAP SCALE

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Q1. What is Scale?

Scale is the ratio between the original and the representative.

Q2. What is map scale?

Map scale is the relationship between a distance measured on map and the corresponding distance on the ground.

Q3. Why scale is necessary in map?

A map is a graphical representation of the features on the earth surface. Therefore a map is the storehouse of spatial information. It is impossible to represent the earth surface with its original size on map. So reduction of area is a must. That means the distance between any two points on the earth surface is not same with the corresponding points on map. So there is a relationship between map distance and ground distance. This relationship is called map scale. So, virtually map cannot be drawn without scale. There must be a ratio between ground and map distances.

Q4. How many ways can scale be expressed?

Scale in map can be expressed or represented in three ways:

a. By a statement- **Statement Scale**
b. By a numeric ratio- **R. F. Scale**
c. By a graph- **Graphical Scale**

Q5. Mention the merits and demerits of the three types of scale.

1. **Statement scale:**

When map scale is expressed by a simple statement, in which the map distance is always expressed as a unit length, is called statement scale.

Example: 1 cm to 10 km; 1 inch to 5 mile etc.

Merits:

i. It is the simplest form of scale.
ii. No complexity of drawing or calculation.
iii. Anyone can understand the ratio.

Demerits:

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i. A layman, ignorant of various scales of measurements, will not able to read map.

ii. During the reduction or enlargement of the original map scale needs recalculation for the new maps.

2. **Representative Fraction (R. F.):**

When a map scale is expressed as a numeric ratio, in which the numerator is the map distance and the denominator is the corresponding ground distance and both are expressed in same unit of measurement is called R. F.

Example: 1:50000

Merits:

i. It is unit free. So it has universal application.

ii. It can easily be converted into statement or graphical scale.

Demerits:

i. Main demerit of this scale is to recalculate the scale for the new map after enlargement or reduction.

3. **Graphical scale:**

When a map scale is represented cartographically by a line graph, is called Graphical Scale. Normally a straight line is divided into a number of equal parts- i.e. *primary* and *secondary* divisions. Actual ground values are indicated there.

Merits:

i. It can easily be constructed from a statement or a numeric ratio scale. So a layman can easily use the scale.

ii. During enlargement or reduction of map scale also enlarged or reduced. So recalculation is not needed.

Demerits:

i. Graphical construction is complex. Any person without having cartographic knowledge cannot use this scale.

Q6. What are the different types of graphical scale?

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There are four different types of graphical scale in use. These are:

1. **Plain Scale** or **Linear Scale**- this is the simplest form of graphical scale and is shown as a linear graph. A line is equally divided to represent the primary parts and one primary division is subdivided into smaller secondary parts. Scale is drawn by map distance and actual ground distances are indicated on the scale.
2. **Comparative scale** or **Comparative Linear Scale**- in this scale two linear scales representing different units of measurement, or time and distance, or revolution and distance, or pace and distance are superimposed. These are respectively known as *unit scale, time scale, revolution scale* and *pace scale*. Here comparison is the prime objective.
3. **Diagonal Scale-** in this graphical scale there are three divisions, namely *primary, secondary* and *tertiary* divisions in order to measure $1/100^{th}$ part of a unit i.e. primary division is divided into $1/100^{th}$ part in the tertiary division.
4. **Vernier Scale-** this a kind of graphical scale developed by French cartographer P. Vernier and by this scale even the fractional parts of the smallest divisions of the main scale can be measured with the highest precision. It consists of two scales- a small scale called *Vernier scale* which freely moves with its graduated edge along a long fixed scale called *main* or *primary scale*. The Vernier scale carries an *index mark* indicating 'zero' of the Vernier divisions and denoted by an arrow.

Vernier scale is of two types:

1. Positive Vernier- least count of main scale is larger than least count of vernier scale.
2. Negative Vernier- least count of main scale is smaller than least count of vernier scale.

Q7. What is the principle of constructing diagonal scale?

In diagonal scale to draw the tertiary divisions "*law of similar triangles*" is followed.

Q8. Why diagonal scale is so named 'diagonal'?

When the secondary divisions are divided into tertiary divisions, secondary divisions are joined diagonally.

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Q9. What are the uses of Vernier scale?

Vernier scale is used in the precision instruments, like theodolite, sextant, barometer, planimeter, abney's level,m spherometer etc.

Q10. What do you mean by the 'least count' of scale?

It is the smallest value of the scale that can be measured by scale. Actually the value of smallest division is called least count of scale.

Q11. **What is Vernier constant?**

Vernier constant is the difference between least count of main scale and least count of Vernier scale and can easily be calculated by the following formula:

VC= d/n, where, d= least count of main scale and n= number of Vernier division.

Q12. What is the relation between scale and map?

Scale is one dimensional and on the other hand, map is two dimensional.

Q13. What is large and small scale?

Scale is the ratio between map distance and corresponding ground distance. Scale is used to represent earth surface on map.

When a large area is represented in small paper it is called small scale map. The scale of this map is small because **ratio** is small. *Example*: 1: 200000.

On the other hand when small area is represented on a small paper it is called large scale map. The scale of this map is large because **ratio** is large.

Example: 1: 25000

SOME IMPORTANT FORMULA:

Radius of Equator= $2\pi R$

Radius of any parallel of latitude = $2\pi R\cos\varphi$

Radius of meridian= $2\pi R$

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Area of square= length of one side^2

Or, side×side

Area of rectangle= length×width

Area of circle= πr^2

Perimeter of square= 4×length of one side

Perimeter of rectangle= 2(length+width)

Perimeter of circle= $2\pi r$

AREA AND SCALE RELATION

i. From scale to area:

Scale^2

ii. From area to scale:

/Area

SOME UNIT CONVERSION

1 mile= 63360 inch

1 mile= 5280 feet

1 mile= 1760 yard

I mile= 08 furlong

1 mile= 80 chain

1 furlong= 220 yard

1 furlong= 10 chain

1 chain= 22 yard

1 yard= 36 inch

1 yard= 3 feet

1 feet= 12 inch

N. B.: See “Map work and Practical Geography” by Gopal Singh Pp. 3-11

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