

# PHYSICS PRACTICAL SHEETS

CAMPUS

Date: .....

Class: .....

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Object of the Experiment (Block Letter) \_\_\_\_\_

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Chapter -2



1. Define map? Describe the different map elements  
Marks on a paper that stands for definable things on the earth's surface. It is a representation usually on a flat surface of whole or a part of it. It is usually refers to a geographic representation.

Different map elements are:-

i) Main map body:-

This is map itself. All other elements provide supplementary information meant to clarify it.

ii) Legend:-

Legend explains any symbols used on map. It also include short description of what that symbol indicates.

iii) Title:-

Map title reflect subject of map.

iv) Inset map:-

smaller map featured off to side or in corner of your main map. It show a specific area of main map on larger scale.

v) Orientation indicator:-

map's orientation & the relationship between the direction shown on map vs compass directions in reality.

vi) Scale indicator:-

The scale is typically a ratio that relate a single map distance unit to a corresponding distance in real world.

vii) Source note:-

It shows viewer where the information displayed on map came from.

2. Describe the geographic features and attributes.

Geographic features are components of a planet that can be referred to as location, sites, areas or regions. There are natural geographic features, abstract geographic features and artificial geographic features.

### Natural geographic features

It includes landforms and ecosystem. Landforms are terrain types and bodies of water. Ecosystems are natural units consisting of all plants, animal and microorganism in an area functioning together with all non-living physical factors of environment.

Abstract geographic features:- It includes politically designed areas and geographic features like equator.

Artificial geographic features:- It includes settlements and engineered constructs eg dams, building.

An attribute is a data value associated with a particular feature in a GIS layer eg name associated with a particular street. Attributes are non-spatial characteristics that describes spatial data model. each object have multiple attribute to describe objects.

3. Short note on thematic map.

A thematic map is a type of map that portrays the geographical pattern of a particular subject matter in a geographic area. It illustrate spatial relationships focusing on a specific theme or subject. This usually involve the use of map symbols to visualize selected properties of geographic features that are not naturally visible such as temperature, language or population. Alternative name have been

suggested for this class such as special subjects or special purpose maps, statistical maps or distribution maps.

It is used to illustrate relationship between theme and physical space.

4. Define term map layers, map resolution and map scale and representation.

A map layer is a GIS database containing group of point, line or polygon features representing a particular class or types of real-world entities such as customer, street or postal codes. Layer can also be of raster images such as those taken by satellite. A layer contains both visual representation of each feature and a link from feature to its database attribute.

Map resolution refers to how accurately the location and shape of map features can be depicted for a given map scale. In large-scale maps the resolution is greater because the reduction factors used to put real-world features on a map is less. As a map scale decreases, features are simplified, smoothed or not represent at all.

Map scale and representation.

Naturally it is impossible for real world features to be drawn on map as large as their true size. So, in order to represent real world, maps are made to the specific scale. Map scale is defined as the ratio of distance between points on map to corresponding distance on ground. Maps comes on variety of scales including fraction, bar, verbal and fraction.

1:50000 represents the map scale as mathematical ratio here one unit of measurement on map is equal to 50000 of some unit on ground.

5. Describe the process of layout a map.

Five step process for creating an effective map layout.

1. Define a problem:-

map should be the visual representation of answer to a question so first define the questions.

2. choose a map type:-

Maps aren't one size fits all. Different map types are better suited to displaying different types of information. According to your question choose the map whether thematic or reference.

3. consider your map elements:-

Apply the appropriate map elements which are required to describe map.

4. Establish a visual hierarchy:-

put most important element on top and less important in base / bottom.

5. Decide on design elements:-

use appropriate colors, fonts, outlines, border etc.

6. How can you design your map?

Map making is both science and art. A beautiful map becomes more popular even if it is less accurate than a plain map.

(i) Generalization:-

Maps contain certain level of details depending upon its scale and purpose. Large scale maps usually contains more details than smaller maps. The process of reducing the amount of detail in a map in a meaningful way is called generalization. Generalization is done normally when map scale has to be reduced.

(ii) Graphic variables:-

Different graphic character of symbol gives different perceptions to map reader. These graphic characteristics are termed as graphic variables which can be summarized as size, color, shape etc.

(a) color:-

colors should complement the intent of your map adding another level of clarity. Use appropriate color to show the objects.

b. outlines, borders and stroke widths:-

- When adding outlines and borders or adjusting stroke widths  
- Be sure it fits within the context of map.

c. Fonts:-

Serif/sans serif are map standards. Always use bold or normal fonts as opposed to italic or cursive.

7. What is map projection? Describes its types.

Map projections are attempts to portray the surface of the earth or a portion of earth on flat surface. Some distortions of conformality, distance, direction, scale and area always from this process. Map are flat by they represent curved surface. Transforming 3D space to 2D space map is called projection.

Basically there are three types of map projections.

i) cylindrical projections:-

It is assumed to circumscribe a transparent globe (marked with meridians and parallels) so that cylinder touches the equator throughout its circumference. Assuming the light bulb is placed at the center of globe, the graticule of globe is projected on the cylinder. By cutting open the cylinder along a meridian and unfolding it, a rectangle shaped cylindrical projection is obtained. Cylindrical are true at equator and distortion increases towards poles.

ii) conical projection:- A cone is placed over the globe in such a way the apex open of cone is exactly over the pole. A cone must touch the globe along a parallel of latitude known as standard parallel which can be selected by cartographer. Along this standard parallel, scale is correct and distortion is the least. When cone is cut open along a meridian and laid flat, a fan shaped map is produced with meridians as straight line radiating from vertex at equal angles, while parallels are arcs of circles all drawn using vertex as center.

iii) planer or Azimuthal projection:-

A plane is placed so that it touches the globe at the north or south pole. This can be conceived as the core

becoming increasingly flattened until its vertex reaches the limit of  $180^\circ$ . The projection resulting is better known as planer polar azimuthal projection. It is circular in shape with meridians projected as straight lines radiating from center of circle which is pole projection changes a round world into a flat one.

8. Define coordinate system. Listout projected coordinate systems.

A coordinate system is a standardized method for assigning codes to locations so that location can be found using the codes alone. It is a model that maps the earth's surface to a plane. A reference system used to represent the locations of geographic features, imagery and observations such as GPS.

Some projected coordinates system :-

i) The universal Transverse Mercator Grid system:-

The UTM grid system used worldwide. The UTM system divides the Earth's surface between  $84^\circ\text{N}$  to  $80^\circ\text{S}$  into 64 zones. Each zones covers  $6^\circ$  of longitude and is numbered sequentially with zone 1 beginning at  $180^\circ\text{W}$ .

ii) Military Grid Reference system (MGRS)

MGRS is extension of UTM. UTM zone number and zone character are used to identify an area of 6 degrees in east west extent and 8 degree in north south extent

### iii) Universal polar stereographic Grid system:-

Ups grid system covers the polar areas. The stereographic projection is centered on the pole and is used for dividing the polar area into a series of 100,000 meter squares. The ups grid can be used in conjunction with UTM to locate position on entire earth's surface.

### iv) State plane coordinate system:-

SPC system was developed to permanently record original land survey monument location in us.

## g. List out common map projections.

### i) Transverse mercator:-

The TM projection, a secant cylindrical projection also known as Gauss-kruger, a well known projection for mapping the world. It is a variation of mercator projection but two looks different. Mercator projection use standard parallel whereas TM use standard meridian. Both are conformal.

### ii) Lambert conformal conic:

LCC is a standard choice for mapping a mid-latitude area of greater east-west than north-south extent such as the state of montana. It is defined by following

parameters:- first and second parallels, central meridian, latitude of projection's origin, false easting and false northing.

### iii) Albers-Equal area Conic.

It has same parameters as LCC. In fact, both are quite similar except one is equal area and other is conformal. It is for national land cover data for conterminous US.

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iv) Equidistant conic :-

It is also called simple conic projection. It preserves the distance properties along all meridians and one or two standard parallels. It uses same parameter as LCC.

v) Web mercator :-

Web mercator is new invention by Googlemaps. It has since become the standard projection for online mapping. It is in shape of sphere which simplifies calculations. It preserves local angles and shape and has north on top of map.

10. How can you convert among coordinate system.  
Coordinate system are framework that are used to define unique position. In geometry, we use x (horizontal) and y (vertical) axis to define points on 2D. The coordinate system that is most commonly used to define location on 3D earth is called geographic coordinate system (GCS).

The unit of GCS is degree and location can be defined by longitude and latitude.

Latitude and longitude can be expressed in degree-minute-second (DMS) or decimal degrees (DD) so we convert each other from DMS to DD.

$$\text{eg: } 118^\circ 15 \text{ minutes} = 118 + \frac{15}{60} = 118.25^\circ$$

## 11. Short note on map output:-

The most common form of GIS is a map. Other non-cartographic forms of GIS output are tables and charts containing spatial and non-spatial information. Visualization is considered as the translation or conversion of spatial data from a database into graphics so we can visualize, analyze the map. Map output can be 2D, 3D, vector map, Hatch map etc.

Note!:- This is the exam digest for more detail visit youtube channel CSC-TEACH

Thank you.

**support me at**



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