1.1 What is meant by ‘scales of measurement’? Explain different type of scales.

Ans: The Scales of Measurement are used to quantify or categorize the variables and before any research one must identify the type of the variable under study. As different methods are used to measure different variables.

The Scales of measurement are mainly of four types:

1. **Nominal Scale**: The nominal scale represents the name or categories of the objects. This scale has none of the three qualities as mentioned above.

2. **Ordinal Scale**: The ordinal scale possesses the quality of magnitude. Here the numbers are assigned to the object to determine the relative extent to which certain characteristics are possessed, i.e., identifying whether an object has less or more characteristic than another object.

3. **Interval Scale**: It is a scale in which the objects are rated in such a way that numerically equal distance on the scale depict the equal distance in the traits being measured. The interval scale possesses both the magnitude and equal intervals, but no absolute zero.

4. **Ratio Scale**: It is the highest scale that allows the researcher to identify the objects, assign rank or order to the objects and compare the differences or intervals. This shows that ratio scale possesses all the three qualities, viz. Magnitude, equal intervals and absolute zero.

OR

1.2 Describe ‘informativeness’ and discuss its properties.

Ans: Relevance is a dynamic concept and depends on the judgments of users on the quality of the relationship between information provided by the information item and information need felt by the user at that particular point of time. Degree of relevance can be used in quantitative terms if it is approved from the user's point of view both conceptually and operationally. Thus relevance can be related to the amount of ‘information wanted’ and ‘informativeness’. A text, which is more relevant for a particular user, should be more informative to that user. If measurableness of information depends on such a concept of informativeness then it is actually an approach for measurement of information services. An information service and hence measurement of informativeness is also somewhat contextual. Ultimate user interaction with text depends on how the collection in the database has been developed, how an item of collection and the collection as a whole have been organized and described (indexed), how the text or information items are retrieved and how they are packaged and repackaged and supplied.

Property 1 - Informativeness is a non-negative number associated with interaction of records with users. Informativeness of a record or a text may vary from user to user.

Property 2 - Informativeness can not be measured directly. However, user's preference for ranking of records relative to the amount of information, preserves any ordering of informativeness values. So a user may be asked to help prepare a rank order list of informativeness for a number of texts, documents or records.

Property 3 - Informativeness is not necessarily commutative or additive under concatenation. Concatenation means different records or texts are read or used in sequence (i.e., one after another). The order in which records are concatenated (sequence for interaction or use) may affect their informativeness ranking.

2.1 Discuss the importance of citation analysis in scientometric studies. Explain the different types of scientometric maps.

Ans: Citation analysis is the examination of the frequency, patterns, and graphs of citations in documents. It uses the pattern of citations, links from one document to another document, to reveal properties of the documents. A typical aim would be to identify the most important documents in a collection. A classic example is that of the citations between academic articles and books. The judgements produced by judges of law to support their decisions refer back to judgements made in earlier cases so citation analysis in a legal context is important. Another example is provided by patents which contain prior art, citation of earlier patents relevant to the current claim.

Documents can be associated with many other features, in addition to citations, such as authors, publishers, journals as well as their actual texts. The general analysis of collections of documents is known as bibliometrics and citation analysis is a key part of that field. For example, bibliographic coupling and co-citation are association measures based on citation analysis (shared citations or shared references). The citations in a collection of documents can also be represented in forms such as a citation graph, as pointed out by Derek J. de Solla Price in his 1965 article "Networks of Scientific Papers". This means that citation analysis draws on aspects of social network analysis and network science.

An early example of automated citation indexing was CiteSeer, which was used for citations between academic papers, while Google Scholar is an example of a modern system which includes more than just academic books and articles reflecting a wider range of information sources. Today, automated citation indexing has changed the nature of citation analysis research, allowing millions of citations to be analyzed for large-scale patterns and knowledge discovery. Citation analysis tools can be used to compute various impact measures for scholars based on data from citation indices. These have various applications, from the identification of expert