Indian Statistical Institute
Document Research and Training Centre
MS in Library and Information Science
Semester IV Paper 16 – Scientometrics and Informatrics

Answer any 10 complete questions. Answer should be in detail. **10X10=100 Marks**

1. Describe the key features of Scopus and Web of Science. How do these databases support researchers in literature review, citation tracking, and impact analysis?
2. Describe how the doubling time of publications is related to the relative growth rate in Scientometric analysis. Use relevant examples and illustrations to explain how this relationship helps in understanding the expansion of scientific literature.
3. Explore the concepts of exponential growth, power law, and logistic function in the context of modeling the growth of literature. Discuss the unique characteristics and applications of each model in analysing publication trends.
4. Illustrate the phenomenon of half-life of a subject or a domain by taking few examples. Explore its importance in determining the obsolescence of a domain.
5. Define diachronous studies and explain its significance in scientometrics research. Compare and contrast diachronous studies with synchronous studies, highlighting their respective strengths and weaknesses.
6. Explain the significance of the annual ageing factor in scientometrics, including how it is calculated and interpreted to assess a journal's impact over time. Also, define the Utility Factor, its calculation, and what it reveals about a publication's usefulness.
7. Compare the Impact Factor and SCImago Journal Rank (SJR) by defining each metric, explaining how they are calculated, and discussing their differences, strengths, and limitations in assessing journal quality and influence.
8. Define Source Normalized Impact per Paper (SNIP) and its significance in assessing the impact of scientific journals. Explain how SNIP differs from other citation-based metrics such as Impact Factor and SJR.
9. What is Eigenfactor and how does it measure the influence of scientific journals within the academic community? Discuss the components involved in calculating Eigenfactor and how they contribute to its assessment of journal importance.
10. Explain the concept of Cite Score and its role in evaluating the citation impact of scholarly journals. Define Journal Impact Factor (JIF) and its significance in academic publishing and evaluation.
11. Compare the h-index with the g-index, highlighting the advantages and limitations of each, and discuss situations where one metric may be more suitable than the other for evaluating research impact.
12. What is VOSviewer, and how is it used in scientometric and bibliometric analysis? Mention at least two types of visualizations it provides.
13. Define the Science Citation Index (SCI) and explain its role in academic research. Define the Arts and Humanities Citation Index (AHCI) and its significance in the academic community.
14. The number of research publications in a specific field follows an exponential growth model. The initial number of publications is 500, and the growth rate is 8% per year. Use the exponential growth formula:

    $$P(t)=P_0 * e^{r t}$$

    Where: P(t) is the number of publications after time t, P_0 is the initial number of publications, r is the annual growth rate, t is the time in years, e is the base of the natural logarithm.
    (a) Calculate the number of publications after 5 years.
    (b) How long will it take for the number of publications to reach 2,000?
15. Lotka's Law is frequently used to study author's productivity. Using Lotka's model $g(x) = k / x^n$, estimate the value of 'n' from the given data:
    g(x): 100, 25, 11, 6, 2
    x: 1, 2, 3, 4, 5