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S. No. of Question Paper : **1962**

Unique Paper Code : **2173012019**

Name of the Paper : **Research Methodology for Chemists**

Name of the Course : **B.Sc. (H) Chemistry**

Semester : **VI**

Duration : **3 Hours**

Maximum Marks : **90**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any *six* questions.

All questions carry equal marks.

Use of a calculator is allowed.

1.
 - (a) Discuss the role of the TRIPS agreement in protecting intellectual property.
 - (b) Write short notes on any *two* :
 - (i) Sci finder
 - (ii) PubMed
 - (iii) Web of science
 - (c) What is the difference between qualitative and quantitative data ?
Give examples. 5,5,5

P.T.O.

2. (a) Explain :

(i) i-10 index

(ii) Self-plagiarism

(b) ResearchGate is a social network for researchers. Justify the statement, giving arguments based on its usage and utility.

(c) A company from Hyderabad makes perfumes using traditional distillation methods. They sell it under a brand name “Itr-e-Hyderabad” and in a uniquely shaped glass bottle. The exact ratio of flower extracts is kept confidential. Identify the four forms of IPRs which can be used for protection and state the validity period for each protection in India. 5,5,5

3. (a) Differentiate between primary and secondary sources of information. Give *two* examples for each one.

(b) Riya, an M.Sc. Chemistry student, was working on a project to develop an eco-friendly dye. She submitted her project report to the department. In her report, she copied two paragraphs about dye chemistry from Wikipedia without any reference. She also did not mention her classmate Arjun. Who helped her with the UV-Vis spectra.

Based on the above case, answer the following :

(i) Discuss the *two* unethical practices done by Riya.

(ii) Why is it important to give credit to sources and co-workers in research ?

(c) Differentiate between Copyright and Patent.

5,5,5

4. (a) How does the h-index help in assessing the quality of a researcher's publications ? A researcher has citation counts : 25, 20, 15, 8, 6, 4, 2 for the seven research papers. Calculate the h-index of the researcher.
- (b) Describe the role of software tools like Turnitin and Urkund in upholding research ethics.
- (c) What do you understand by search techniques ? How do search techniques improve the literature survey ? 5,5,5
5. (a) Give the journal abbreviations (any *five*) :
- (i) Journal of Physical Chemistry A
 - (ii) Chemical Reviews
 - (iii) Journal of the American Chemical Society
 - (iv) Bioorganic Medicinal Chemistry Letters
 - (v) Journal of Organic Chemistry
 - (vi) Chemical Physics Letters.
- (b) What is binomial distribution ? Represent it graphically.
- (c) What is a digital database in research ? Why are databases like Science Direct and Google Scholar important for researchers ? 5,5,5

P.T.O.

6. (a) How should a scientific oral presentation be planned and delivered to effectively communicate research findings ?
- (b) Discuss the structure of a thesis. What is the layout of a standard thesis chapter ?
- (c) A researcher wants to publish a paper. What factors should be considered while selecting a journal and outline the complete submission process. 5,5,5
7. (a) Write a short note on SPSS and Microsoft excel.
- (b) The percent purity of a gold sample was determined experimentally as :
10.2, 10.4, 10.3, 10.5, 10.6.
Calculate mean and standard deviation.
- (c) A project proposal includes strong methodology but very weak literature review :
- (i) How does a poor literature review affect the proposal ?
- (ii) What steps should be taken to strengthen it ? 5,5,5
8. (a) The percentage of uranium in pitchblende ore was found to be 1.2, 1.4, 1.8, 2.0, 2.4. Using the t test whether the result differs significantly from the true value = 1.0 at 95% confidence level. Degrees of freedom, $df = 4$, $t(\text{table})$ at 95% confidence = 2.776.
- (b) What is short communication in scientific writing ? How is it different from a full-length research paper ?
- (c) What is Correlation ? Explain the different types of correlation with graphical representation. 5,5,5