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RCS-001

**Ph. D. IN COMPUTER SCIENCE
(PHDCS)**

Term-End Examination

December, 2023

RCS-001 : RESEARCH METHODOLOGY

Time : 3 Hours

Maximum Marks : 100

Weightage : 50%

***Note :** Question Number 1 is compulsory. Attempt any **three** questions from the rest.*

1. (a) What is Digital Object Identifier (DOI) ?
Discuss the role of DOI in active research. 5
- (b) What is impact factor ? How do you
calculate impact factor ? Discuss the role of
impact factor in active research. 5
- (c) What would P-NP imply ? How are P, NP
and NP-complete problems related ? 5
- (d) Mention the ways and means of
processing/finding the relevant literature
on your research topic. 5

P. T. O.

- (e) Differentiate between 'Term Paper' and 'Review Paper'. 5
- (f) Compare and contrast external and internal sorting mechanism. Classify the algorithms for external and internal sorting. 5
- (g) Briefly discuss the relevance of h-index and i-10 index in research. Give the formulation of both parameters. 5
- (h) The average temperature of 8 weeks of city A and city B is shown below :

City A (°C)	City B (°C)
10	31
15	28
29	30
35	27
44	33
41	34
27	28
33	30

Draw the side to side Box Plot and compare the two. 5

2. (a) Discuss various kinds of research publications. Also discuss the 'IMRAD' format used for writing the scientific research paper. 10
- (b) How is acceleration simulated in animation ? Give a detailed discussion over the factors involved in simulating non-zero acceleration in animation. 10
3. (a) What do you understand by Ethics in Research ? What are the various ethical issues that arise from computer technology ? 10
- (b) What is a decision problem ? Can every decision problem be solved in the polynomial time ? Elaborate. Formulate independent set and vertex cover as decision problems. 10
4. (a) Formulate the following problems and explain their complexities : 10
- (i) Travelling Salesman Problem (TSP)
- (ii) Assignment Problem

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(b) Briefly discuss the following : $2\frac{1}{2} \times 4 = 10$

- (i) Level of significance
- (ii) Type-I and Type-II errors
- (iii) Null and Alternate Hypothesis
- (iv) P-value

5. Write short notes on any *four* of the following :

$4 \times 5 = 20$

- (i) Types of Research
- (ii) Dynamic programming
- (iii) Undecidability
- (iv) Diagonalization
- (v) Reductions

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