

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

Term-End Examination

December, 2017

00470

RCS-001 : RESEARCH METHODOLOGY

Time : 3 hours

*Maximum Marks : 100
(Weightage : 50%)*

Note : *Question no. 1 is compulsory. Attempt any three questions from the rest.*

1. (a) What is a Decision Problem ? Can every decision problem be solved in polynomial time ? Elaborate. Formulate Independent Set and Vertex Cover as decision problems. 8
- (b) The administration of a school claims that the percent (%) obtained by their students is higher than the National average, which happens to be 55%, with a standard deviation of 20%. To prove this, they collected the data of four students which is : 68%, 79%, 90%, 62%.
- (i) Write H_0 and H_1 Hypotheses.
- (ii) Is their claim valid ? Justify. 8

- (c) Explain the process of identifying suitable literature, narrowing your search, analyzing the literature and writing the review of it. 8
- (d) What is Simulation ? How does simulation differ from modelling ? Is it always good to do simulation ? Justify. Discuss the working of a simulation model, through proper diagram. 8
- (e) Determine the Best case, Average case and Worst case complexities of Quick Sort algorithm. Verify the statement “Best case for Bubble Sort is the Worst case for Quick Sort”. 8
2. (a) Formulate any *two* of the following problems and explain their complexities : 10
- (i) Knapsack Problem
- (ii) Travelling Salesman Problem
- (iii) Assignment Problem
- (b) Draw the Box plot for the following data and identify the possible outliers, if any :
Marks of students in Research Methodology Course (out of 100) :
7, 71, 69, 39, 85, 95, 65, 83, 61, 55, 45, 75, 97, 33, 96
- Also, calculate the mean value with outliers and without outliers. 5

- (c) What is i-10 Index ? How will you calculate the i-10 index ? Demonstrate it. What is the role of i-10 index in active research ? 5
3. (a) Explain the key components of a research proposal and also mention the tentative format for a research proposal in Computer Science. 10
- (b) How is acceleration simulated in animation ? Give a detailed empirical discussion over the factors involved in simulating non-zero acceleration in animation. 10
4. (a) Discuss the organization of Ph.D. Thesis. 5
- (b) What is DOI ? Discuss the role of DOI in active research. 5
- (c) What are Monographs ? Discuss the role of monographs in literature review. 5
- (d) How does the term 'paper' differ from review paper and technical paper ? 5

5. (a) What do you understand by Ethics in research ? What are the various ethical issues that arise from computer technology ? 10
- (b) Differentiate between Qualitative and Quantitative research. 5
- (c) Write short notes on any *two* of the following : 5
- (i) Dynamic Programming
 - (ii) Major Research Areas in Data Mining
 - (iii) Empirical Studies
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