

(2 Hours )

(Total Marks:60)

N.B:

1. All questions are compulsory.
2. Figures to the right indicate marks.
3. Illustration, in-depth answers, and diagrams will be appreciated.
4. Mixing of sub-questions is not allowed.

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| <b>1</b> | <b>Attempt any Two</b><br><b>a</b> Explain the concept of divide and conquer.<br><b>b</b> Describe the concept of randomized algorithm. Write down algorithm for the same.<br><b>c</b> Explain the Strassen's algorithm for matrix multiplication.<br><b>d</b> Explain The hiring problem. | <b>12</b> |
| <b>2</b> | <b>Attempt any Two</b><br><b>a</b> Write a short note on Rod Cutting.<br><b>b</b> State and explain the Elements of the greedy strategy.<br><b>c</b> Write a short note on Huffman codes.<br><b>d</b> Explain the Bellman-Ford algorithm   | <b>12</b> |
| <b>3</b> | <b>Attempt any Two</b><br><b>a</b> Write a short note on Elementary number-theoretic notions.<br><b>b</b> Explain the Chinese remainder theorem.<br><b>c</b> Explain Polynomial time and Polynomial-time verification.<br><b>d</b> Write a short note on NP-completeness.                  | <b>12</b> |
| <b>4</b> | <b>Attempt any Two</b><br><b>a</b> How to write a research paper?<br><b>b</b> Explain the steps in research process.<br><b>c</b> Write a short note on Internet Research.<br><b>d</b> Write a short note on purpose and products of research.  | <b>12</b> |
| <b>5</b> | <b>Attempt any Two</b><br><b>a</b> Explain insertion sort.<br><b>b</b> Explain Indicator Random variables.<br><b>c</b> Explain Algorithms of Kruskal and Prim.<br><b>d</b> Explain Breadth-first search Algorithms.  | <b>12</b> |

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