(2 ½ Hours)   [Total Marks: 75

N.B. 1) All questions are **compulsory.**
2) **Figures** to the **right** indicate marks.
3) **Draw** suitable **diagrams** and illustrations **wherever necessary.**
4) **Mixing** of sub-questions is **not allowed.**

Q. 1   **Attempt All the Questions**
    A.   **Choose the correct alternative**   (5M)
      i.   b- $a^n b^{2n} \mid n \geq 1$
      ii.   a-(P*+Q*)*
      iii.   True
      iv.   c- push down automata
      v.   a-Moor

    B.   **Fill in the blanks (Choose correct one from the pool)**   (5M)
      i. a^+
      ii.   final
      iii.   not regular
      iv.   three
      v.   Type 1

    C.   **Explain the following terms in one or two lines**   (5M)
      i.   Theory of Computer Science, 3rd Ed, KLP Mishra, Page 78, Definition 3.5.
      ii.   Theory of Computer Science, 3rd Ed, KLP Mishra, Page 136, section 5.1
      iii.   Theory of Computer Science, 3rd Ed, KLP Mishra, Page 233, section 7.2
      iv.   Detailed sequence of applying productions from the given gramma to generate the string.
      v.   Theory of Computer Science, 3rd Ed, KLP Mishra, Page 311, section 10.3

Q.2   **Attempt the following: (Any THREE)**   (15M)

    A.   Theory of Computer Science, 3rd Ed, KLP Mishra, Page 75,77
    B.   Theory of Computer Science, 3rd Ed, KLP Mishra, Page 87, section 3.8
    C.   Theory of Computer Science, 3rd Ed, KLP Mishra, Page 99, Example 3.17
    D.   Theory of Computer Science, 3rd Ed, KLP Mishra, Page 109-110,
    E.   Explain how non determinism is introduces with outgoing arcs. Explain the transition function differences in both cases (3 marks), Examples (2 Marks)

F. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 126, section 4.5

Q.3   Attempt the following: (Any THREE)   (15M)

A. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 160, Example 5.17
B. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 187
C. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 188, section 6.2
D. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 201, section 6.4.1
E. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 162, section 5.3
F. Each diagram 2.5 marks.

Q.4   Attempt the following: (Any THREE)   (15M)

A. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 228, definition 7.1
B. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 279, section 9.2
C. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 285, example 9.5
D. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 297, example 9.8
E. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 295, example 9.7.2
F.

Q.5   Attempt the following: (Any THREE)   (15M)

A. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 92, Example 3.9.1
B. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 125, Example 4.18
C. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 156, Example 5.14
D. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 286, section 9.7
E. Explain its characteristics.
F. Theory of Computer Science, 3rd Ed, KLP Mishra, Page 285, section 10.5

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