



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:II
Class:FY	Program:M.Tech
Branch Code:ETC	Pattern:2022
Name of Course:ML in Chip Design	Course Code:ETC225108
Max. Marks:60	Duration:2.30 Hrs.

**Instructions:** Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

**Question No. 1 Attempt following Question**

- 1a) Describe the expert system concept in depth using artificial intelligence (6) CO1
1. Rules Based System
  2. Fuzzy Logic Expert System
  3. Knowledge based expert system

**Question No. 2 Attempt following Question**

- 2a) What are Six Dominant Algorithmic Pathways in Artificial Intelligence? Explain any three. (6) CO2

**Question No. 3 Attempt following Question**

- 3a) What is hotspot detection? Explain along with a diagram what are different challenges of hotspot detection? (8) CO3

**OR**

- 3b) How layout features are extracted and encoded in Physical Verification using machine learning? (8) CO3

- 3c) Explain the principles of machine learning algorithms that are applied to mask synthesis and how they affect the effectiveness and quality of mask synthesis. (8) CO3

**OR**

- 3d) Describe the usage of CPMs (Compact Lithographic Process Models) to estimate the results of patterning procedures for integrated circuit designs, along with applications. Draw a diagram of it as well. (8) CO3

**Question No. 4 Attempt following Question**

4a) Why is aging analysis done in VLSI design and how ML is used in it? (8) CO4

**OR**

4b) How to process variation characterization by virtual probe? (8) CO4

4c) Describe the uses of wafer-level correlation modelling based on Gaussian processes. (8) CO4

**OR**

4d) How machine learning is used in process control and process improvements (8) CO4

**Question No. 5 Attempt following Question**

5a) Write short note on learning from limited data in VLSICAD (8) CO5

**OR**

5b) What is the need of failure modeling? What is the use of ML in failure modeling? How is it beneficial? (8) CO5

5c) Explain iterative feature search process how it is implemented by learning from limited data in VLSICAD (8) CO5

**OR**

5d) What is the need of statistical analysis? Elaborate concept of fast statistical analysis of rare circuit failure events (8) CO5

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