5. (a) Describe the construction and working of a ring counter with its applications. **8**

(b) Explain the role of shift registers in serial-to-parallel conversion. **7**

Unit III

6. (a) Discuss the working of a balanced modulator in amplitude modulation systems. **8**

(b) Explain the concept of pulse width modulation (PWM) and its applications. **7**

7. (a) Describe the principle of operation of a magnetron, focusing on hot electrons. **8**

(b) Explain the working of an IMPATT diode and its significance in microwave applications. **7**

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51044

M.Sc. Physics EXAMINATION, 2026

(Second Semester)

(Re-appear Only)

ELECTRONICS-II

(2019-20 Onwards for Colleges and 2018-19 Onwards for UTD)

Time : 3 *Hours*] [*Maximum Marks :* 80

Before answering the question-paper, candidates must ensure that they have been supplied with correct and complete question-paper. No complaint, in this regard will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Question No. **1** is compulsory. Use standard notations and assume necessary data where required.

Compulsory Question

1. Answer all parts : **5 each**

(a) Explain the working principle of a half adder and its implementation using NOR gates.

(b) Discuss the differences between serial-in parallel-out and parallel-in serial-out shift registers.

(c) Describe the principle of operation of a reflex klystron in microwave generation.

(d) Explain the purpose of epitaxial growth in semiconductor device fabrication.

Unit I

2. (a) Describe the construction and operation of an RTL NOR gate with a circuit diagram. **8**

(b) Explain the programming and applications of Read-Only Memory (ROM). **7**

3. (a) Discuss the working of a BCD-to-decimal decoder with its logic diagram. **8**

(b) Explain the operation of a data selector/multiplexer in parallel-to-serial conversion. **7**

Unit II

4. (a) Explain the working of a T flip-flop and its application in a toggle circuit. **8**

(b) Discuss the operation of a 4-bit up-down. counter with a block diagram. **7**

Unit IV

8. (a) Discuss the process flow for fabricating monolithic diodes, including sputtering and packaging. **8**

(b) Explain the role of testing in integrated circuit fabrication. **7**

9. (a) Describe the construction and working of integrated resistors in monolithic circuits. **8**

(b) Explain the differences between analog and digital integrated circuits with examples. **7**

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Unit IV

8. (a) Discuss the process flow for fabricating monolithic diodes, including sputtering and packaging. **8**

(b) Explain the role of testing in integrated circuit fabrication. **7**

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(b) Explain the differences between analog and digital integrated circuits with examples. **7**

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