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Reg. No......

Name.....

**M.Sc. (BIOMEDICAL INSTRUMENTATION) DEGREE EXAMINATION
AUGUST 2026**

Second Semester

BMI 202—DIGITAL ELECTRONICS AND INTEGRATED CIRCUITS

(2025 Admission—Regular/2022–24 Admissions—Supplementary / 2021 Admission
– First Mercy Chance / 2020 Admission – Second Mercy Chance /
2019 Admission – Final Mercy Chance)

Time : Three Hours

Maximum Marks : 100

Part A

*Answer any **five** questions.*

Each question carries 10 marks.

1. Reduce the following switching function and realize the reduced function using NAND gates

$$f(ABCD) = \sum m(1, 3, 5, 7, 8, 10, 12, 14) + \sum d(0, 4, 9, 13).$$

2. Compare the characteristics of RTL, TTL, ECL and CMOS logic families.
3. Draw and explain the circuit of a 4-bit Johnson counter. What are its applications ?
4. Explain with a block schematic diagram the principle of operation of OP-AMP.
5. Draw and explain the circuit of a 4-bit flash ADC.
6. Draw the circuit of a second order LPF using OP-AMPs. Explain its working. Which components determine its parameters ?

(5 × 10 = 50)

Part B

*Answer any **ten** questions.*

Each question carries 5 marks.

1. Explain with examples, subtraction of BCD numbers.
2. Compare Karnaugh map and Quine-McClusley methods.
3. Explain with examples, the applications of T and D-flip-flops.





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4. Explain the transfer characteristics of TTL NAND gate.
5. What is current mirror ? Explain a simple current mirror circuit. Why such circuits are used in OP-AMPs ?
6. Draw and explain a differentiator circuit using OP-AMP. Show that the circuit will work as a differentiator.
7. Draw and explain a zero-crossing detector. What are its applications ?
8. Draw and explain the circuit of a Wien-Bridge oscillator.
9. Derive the transfer function of an active BPF.
10. Draw and explain the block diagram of 723 IC.
11. What are the applications of 555 IC ?
12. Draw and explain an antilog amplifier using OP-AMPs.

(10 × 5 = 50)

