D 130254 **(Pages : 2)** **Name.....**

Reg. No.....

FIFTH SEMESTER (CBCSS—U.G.) DEGREE EXAMINATION
NOVEMBER 2025

Physics/Applied Physics

PHY 5B 09/APH 5B 09—ELECTRONICS (ANALOG AND DIGITAL)

(2019 Syllabus)

Time : Two Hours Maximum : 60 Marks

Section A

Answer **all** *questions in two* **or** *three sentences, each correct answer carries a maximum of* 2 *marks.*

1. How does the output of a bridge rectifier differ from a pure DC signal ?
2. What is the logical expression for a NAND gate ?
3. What are the three basic transistor amplifier configurations ?
4. Give the expression for the voltage gain of a CE amplifier.
5. What is a Zener diode, and what is its special characteristic ?
6. What are the three basic transistor amplifier configurations ?
7. Convert the binary no 101111 to Octal and decimal base
8. How can you implement an OR gate using only NAND gates ?
9. Simplify the expression : A + AB'
10. Which transistor configuration has a voltage gain of approximately one ?
11. Draw the circuit of the integrator using an op-amp.
12. What are universal gates, and why are they called so ?

(Ceiling 20 marks)

Turn over

Section B

Answer **all** *questions in a paragraph of about* **half a page** *to* **one page**, *each correct answer carries a maximum of* 5 *marks.*

13. Describe the nature of the output waveform of a bridge rectifier.
14. What is the function of a capacitor in a filter circuit ?
15. Why is the Common Emitter (CE) configuration widely used in amplifiers ?
16. What is the input and output impedance of a Common Base (CB) amplifier ?
17. Design a full adder using only NAND gates. Explain how it implements the addition of two binary digits.
18. Compare and contrast the RS flip-flop and the JK flip-flop. Discuss the advantages and disadvantages of each.
19. With a neat diagram explain the working of an Op-Amp as a differentiator.

(Ceiling 30 marks)

Section C

Answer any **one** *question in about* **two pages**, *the question carries* 10 *marks*.

20. With a neat Diagram Explain the significance of cut-off and saturation points in a transistor CE amplifier and how they affect the amplifier's performance.
21. Draw a neat diagram of an oscillator circuit. Explain the role of the active device (transistor or op-amp) in it. How does it contribute to the generation and sustainment of oscillations ?

(1 × 10 = 10 marks)