(PAGES: 2)

D5BPH2304 **Reg. No.....**

Name: .....

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

(Regular/Improvement/Supplementary)

PHYSICS

GPHY5B09T: ELECTRONICS (ANALOG & DIGITAL)

Time: 2 Hours **Maximum Marks: 60**

SECTION A: Answer the following questions. Each carries *two* marks.

1. What is the main application of a common collector circuit?
2. What is the importance of CMRR in an op-amp?
3. Discuss the essential circuit elements of a transistor oscillator.
4. What do you mean by sum-of-product equation?
5. Why is the binary number used in digital systems?
6. Draw the d.c and a.c equivalent circuit of a transistor amplifier.
7. Sketch the frequency response of RC coupled amplifier. Mark lower cut off frequency, upper cut off frequency and Bandwidth on it.
8. What is the function of a capacitor filter?
9. Mention the characteristics of a Zener diode.
10. What is the advantage of a differential amplifier over an ordinary CE amplifier?
11. Give 2's complement method representation of binary zero in four-bit representation.
12. State De Morgan's theorem.

SECTION B: Answer the following questions. Each carries 5 marks

(Ceiling 30 Marks)

13. A transistor in CE configuration has load resistance 4kΩ. If supply voltage is 9V, find operating point, given zero signal base current =5μA and current gain β=200.
14. Compare the features of LC and RC oscillators with one example for each.
15. What is an op-amp? Discuss the working of inverting, non-inverting and summing amplifiers using op-amp with necessary theory and circuit diagram.
16. Draw and explain the working of direct coupling in a multistage amplifier. What are its advantages over RC coupling?

(PTO)

17. The input voltage of a bridge rectifier is 220 V and frequency 50 Hz. The turns ratio is 10:1 and load resistance is 100Ω. Find 1) DC output voltage. 2) Peak inverse voltage. 3) Output frequency.
18. In a phase shift oscillator, the feedback RC network has the values of R = 2 k Ω and C = 33pF. Calculate the frequency of oscillation.
19. Explain 1's complement method of binary subtraction with example.

SECTION C: Answer any *one* question. The question carries *ten* marks.

20. Draw and discuss the characteristics of common emitter configuration and obtain expressions for output resistance and input resistance. Explain why CE configuration is preferred for amplifying purpose.
21. What are universal gates? Construct fundamental gates using NAND and NOR.

(1 x 10 = 10 Marks)