24U208 (Pages: 2) Name : .....

Reg. No : .....

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2025

(FYUGP)

CC24UPHY2MN100 - ELECTRONICS - I

(Physics - Minor Course)

(2024 Admission -Regular)

Time: 2.0 Hours Maximum: 70 Marks

Credit: 4

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 3 marks.

1. Discuss the working principle of a LED with diagram. [Level:2] [CO3]
2. Discuss different factors affect the breakdown voltage of a diode? [Level:2] [CO2]
3. Differentiate between half-wave, full-wave, and bridge rectifiers based on efficiency. [Level:4] [CO3]
4. Compare the output frequency of a half-wave rectifier to that of a full-wave rectifier. [Level:4] [CO3]
5. Express the formula for collector-emitter voltage (VCE) in voltage divider bias. [Level:2] [CO4]
6. Explain the power rating of a transistor. [Level:2] [CO4]
7. Define an analog signal and a digital signal. [Level:1] [CO6]
8. Identify the decimal equivalent of the BCD number 1001 0001. [Level:1] [CO6]
9. Convert the decimal number 25 into hexadecimal. [Level:1] [CO6]
10. Mention the binary equivalent of the decimal number 64. [Level:1] [CO6]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

Answer ***all*** questions. Each question carries 6 marks.

11. Calculate the conductivity of an intrinsic semiconductor given the following data: electron mobility $\mu_e = 0.14\ m^2/V$, hole mobility $\mu_h = 0.05\ m^2/V$ and intrinsic carrier concentration $n_i = 1.5 \times 10^{16}\ m^{-3}$. (The electronic charge $e = 1.6 \times 10^{-19}\ C$. [Level:1] [CO1]
12. The reverse saturation current (Is) of a PN junction diode is 5 nA at room temperature. If the thermal voltage (VT) is 26 mV, calculate the forward current [Level:1] [CO1]

(If) when the diode is forward biased with 0.3 V.

13. A full wave rectifier uses two diodes , the internal resistsance of each diode may be assumed as constant at 20 Ω. The transformer rms secondary voltage from centre tap to each end of secondary is 50 V and load resistance is 980 Ω. Compare mean load current and rms value of load current. [Level:4] [CO3]

14. Analyze the differences in output stability between center-tapped and half wave rectifiers. [Level:4] [CO3]

15. Discuss the biasing with collector feedback circuit. [Level:2] [CO4]

16. Discuss the working principles of n-p-n and p-n-p transistors based on charge carrier movement. [Level:2] [CO4]

17. Find and discuss the relationship between current amplification factors in CB and CC arrangement in transistor connection. [Level:2] [CO4]

18. Name the place values of the digits in the binary number 10110. Then, write its decimal equivalent. [Level:1] [CO6]

(Ceiling: 36 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

19. Examine current paths in voltage doublers by considering the circuit action. [Level:4] [CO3]

20. Explain the concept of faithful amplification in a transistor and analyse its importance in transistor biasing. Illustrate how improper biasing affects faithful amplification. [Level:2] [CO4]

(1 × 10 = 10 Marks)

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