



K26U 1040

Reg. No. :

Name :

**IV Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Supplementary/
Improvement) Examination, April 2026
(2020 to 2023 Admissions)
CORE COURSE IN PHYSICS
4B04PHY : Electronics – I**

Time : 3 Hours

Max. Marks : 40

PART – A

Short answer questions. Answer **all** questions. **Each** question carries **1** mark.

1. What do you mean by the DC load line of a PN junction diode ? What is quiescent point ?
2. What are the most temperature sensitive parameters of a transistor ?
3. What do you mean by punch-through in a transistor ?
4. What is D-MOSFET ?
5. Convert the decimal numbers 98 and 170 to BCD.
6. Give truth table for a 2 input AND gate. (6×1=6)

PART – B

Short essay questions. Answer **any 6** questions. **Each** question carries **2** marks.

7. Draw the equivalent circuits of a forward and reverse biased pn-junction diode.
8. What do you mean by the stability factor of a transistor circuit ? What is its physical significance ? What is the ideal value of stability factor ?
9. Compare the performance of basic bias circuits in terms of their stability.
10. Explain the gate bias for a p-channel JFET.

P.T.O.

K26U 1040

-2-



11. What are the basic parts of a MOSFET ? Give its schematic. Comment on the input impedance of a MOSFET.
12. Multiply the signed binary numbers : 01001101 (multiplicand) and 00000100 (multiplier) using the direct addition method.
13. Verify the relation $A + \bar{A}B = A + B$ using basic rules of Boolean algebra.
14. Apply de Morgan's theorems to the expressions :

- i) $\overline{(A+B+C)}D$ and ii) $\overline{AB+CD+EF}$ to simplify them. (6×2=12)

PART – C

Problems. Answer **any 4** questions. **Each** question carries **3** marks.

15. A 10 V Zener diode along with a series resistance is connected across a 40 V supply. Calculate the minimum value of the series resistance required, if the maximum Zener current is 50mA.
16. A transistor with $\alpha = 0.98$ has a base current 50 micro amperes. It produces a collector to base leakage current of 5 micro amperes. Determine the collector and emitter currents.
17. A transistor in CE configuration is biased using the voltage divider method. The supply voltage is 12 V. When the transistor works as an amplifier, a current of 0.1mA flows through the two resistors. If $V_{BE} = 0.7$ V and $V_E = 1.3$ V, determine the values of the resistances used.
18. An FET has a drain current of 5 mA. If $I_{DSS} = 10$ mA (shorted-gate drain current) and $V_{GS(off)} = -6$ V (gate-source cut-off voltage), find the values of V_{GS} (gate-source voltage) and V_p (pinch of voltage).
19. Convert the decimal numbers 28, 1357, 2693 and 58.1836 to hexadecimal.
20. Write down the Boolean expression and the truth table for an exclusive OR gate. (4×3=12)



-3-

K26U 1040

PART – D

Long essay questions. Answer **any 2** questions. **Each** question carries **5** marks.

21. Explain the working principle of a full wave bridge rectifier illustrating the current flow in each half cycles. Show the input and output waveforms. Compare its performance to a centre tapped rectifier.
22. Using a suitable circuit draw the input and output characteristics of a transistor in common base configuration.
23. Explain the drain and transfer characteristics of a p-channel JFET.
24. What are universal gates ? Explain how NOR gate can be used to produce NOT, OR, AND and NAND gates. (2×5=10)