



ST. FRANCIS DE SALES COLLEGE

A FRANSALIAN INSTITUTE OF HIGHER EDUCATION **AUTONOMOUS**

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END SEMESTER EXAMINATION –NOV/DEC 2025

ELECTRONICS – I SEMESTER BSC

25BSC15A: ANALOG AND DIGITAL ELECTRONICS I

Time: 3 Hours

Max. Marks:80

Instruction: *Answer should be written completely in English.*

SECTION – A

Answer any **TEN** questions. Each question carries **TWO** marks.

(10X 2=20)

1. What is a Filter?
2. Define resonance in an RLC circuit.
3. List any two applications of a Zener diode.
4. Define Voltage Regulator. Give example.
5. Define current gain (β) in common-emitter configuration.
6. What do you mean by thermal run away in transistor?
7. Show the relation between α (alpha) and β (beta).
8. What do you mean by radix of a number system?
9. What is the difference between signed and unsigned numbers?
10. What does ASCII stand for? Mention its application.
11. What is a multiplexer?
12. What is a Full Subtractor?
13. Draw the symbol of a seven segment Display.

SECTION -B

Answer any **FIVE** questions. Each question carries **EIGHT** marks.

(5X8=40)

14. Draw the Symbol, and application of any four special purpose diode.
15. Explain the construction, working, and VI characteristics of a PN junction diode.
16. Explain the working of an NPN transistor.
17. Explain the output characteristics of a transistor in CE configuration.
18. Explain the basic logic gates, derived gates and universal gates with symbols, Boolean expressions, and truth tables
19. Explain the working of a Half Subtractor and Full Subtractor with circuit diagram, truth table and Boolean expressions.
20. Explain the following.
 - a) 2-bit magnitude comparator
 - b) 4-1 Multiplexer.
21. Explain the working of a BCD-to-Decimal decoder.



SECTION -C

Answer any **FOUR** questions. Each question carries **FIVE** marks.

(4X5=20)

22. A DC source of 12 V is connected at $t=0$ to a series RC circuit with $R=2.0\text{ k}\Omega$ and $C=100\text{ }\mu\text{F}$. The capacitor is initially uncharged. Find
- (a) The time constant
 - (b) V_C at $t=0.1\text{ s}$, 0.2 s , 0.5 s .
23. In a series RLC circuit, $R = 50\text{ }\Omega$, $L = 0.2\text{ H}$, and $C = 50\text{ }\mu\text{F}$. Calculate the resonant frequency, inductive reactance, and capacitive reactance at resonance.
24. For a CE transistor circuit, $V_{CC}=20\text{ V}$, $R_C=2\text{ k}\Omega$, and $R_E=1\text{ k}\Omega$. If the transistor has $\beta=100$ and $I_B=50\text{ }\mu\text{A}$, calculate:
- (a) I_C
 - (b) I_E
 - (c) V_{CE}
 - (d) Plot the DC load line.
25. Convert
- i) Decimal 255 to binary and hexadecimal.
 - ii) AF45 to binary and decimal.
26. Design a combinational logic circuit and truth table for the expression $Y=A\cdot(B+C')$
27. Simplify the Boolean expression using K-Map $F(A, B, C, D) = \sum m(0,2,5,7,8,10,13,15)$
28. Design a Half Adder for two binary inputs A and B. Draw the circuit diagram, Write the truth table, Find the Boolean expressions for Sum and Carry.

