



PART-A

I Answer all questions

10 x 1 = 10

- 1 Expand VLSI.
- 2 Define electric potential at a point.
- 3 What is a Pulse Oximeter?
- 4 Define time constant of a RL circuit.
- 5 Draw the symbol of thermistor.
- 6 What is doping?
- 7 What happens to the light emission in LED as the forward current is increased?
- 8 Mention the heavily doped region of a transistor.
- 9 Write the 2's complement of the binary number 11001.
- 10 Write the boolean expression of NAND gate.

PART-B

II Answer any FIVE questions.

5 x 2 = 10

- 11 Mention any two applications of internet.
- 12 State Superposition theorem.
- 13 Write any two advantages of digital thermometer.
- 14 Define quality factor. Write the relation between quality factor, bandwidth and resonance frequency.
- 15 Write a note on zener breakdown in zener diode.
- 16 Derive an expression for α in terms of β .
- 17 What is the binary equivalent of [DEAF]₁₆?
- 18 What is a NOR gate? Write its circuit symbol.

PART-C

III Answer any FIVE questions.

5 x 3 = 15

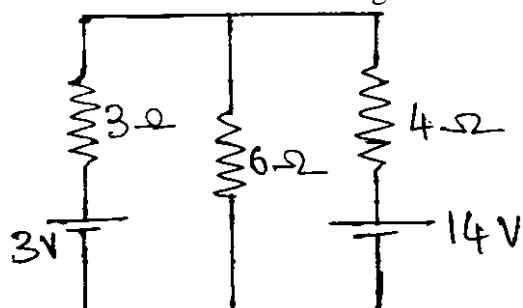
- 19 State Kirchhoff's law and explain KCL.
- 20 State and explain voltage divider rule.
- 21 Name the factors on which capacitance of a capacitor depends. Write an expression for effective inductance, when the inductors are connected in series.
- 22 Explain lowpass filter with its frequency response.
- 23 Write a note on third approximation of the diode.
- 24 What is half wave rectifier? Mention the value of ripple factor and PIV of a full wave rectifier.
- 25 What is clipping? Draw the circuit diagram and waveform of a negative clamper.
- 26 Mention any three advantages of PCB.

PART-D

IV Answer any THREE questions.

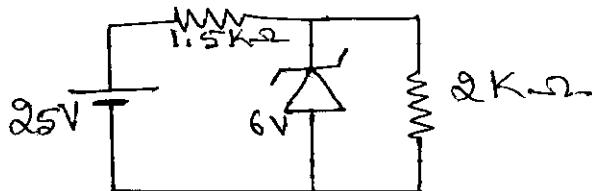
3 x 5 = 15

- 27 Using Kirchoff's Laws, find the currents in the following circuit.



- 28 A step down transformer having a power output of 10KW and efficiency 90% reduces the voltage from 11 KV to 220V. Calculate the i) the voltage ratio ii) the number of turns in the primary if the secondary has 100 turns iii) the current in the primary.

- 29 a) Determine the time constant of an RC circuit when resistor is $20\text{k}\Omega$ and capacitor is $0.05\ \mu\text{F}$.
 b) A resonant circuit having $R=100\Omega$ and $C=0.1\ \mu\text{F}$ produces a resonant frequency of 3KHz. Find the value of inductance.
- 30 For a zener diode voltage regulator, determine (a) Load voltage (b) Voltage across the series resistor (c) Zener current (d) Input current (e) Load current.



- 31 (a) Simplify the following boolean expression and draw the logic circuit for the simplified expression using basic gates.

$$(A \bar{B} C)(\bar{A}\bar{B}) + BC.$$

- (b) Subtract $11100_{(2)} - 1111_{(2)}$

PART-E

V Answer any FOUR questions

4 x 5 = 20

- 32 State and explain Thevenin's theorem with an example.
- 33 a) Explain the construction of wire wound resistors.
 b) What is the resistance value of a carbon resistor having following colour code-Brown, Black, Orange, Silver.
- 34 Explain the construction and working of a microphone. Mention any one application of LDR.
- 35 a) Derive an expression for resonant frequency for a series resonant circuit.
 b) Define: (i) average power and (ii) impedance.
- 36 With a neat circuit diagram and waveform explain the working of a bridge rectifier.
- 37 With a neat circuit diagram and truth table explain the working of two input DTL NAND gate.
