

Subject Code : 40 (NS)

0482385

ELECTRONICS

Time : 3 Hours 15 Minutes]

[Total No. of questions : 37]

[Max. Marks : 70

- Instructions :** i) Question paper has four Parts A, B, C and D.
- ii) Part - A has no choice.
- iii) Part - D has two Parts.
Part - I is from problems
Part - II is of essay type questions.
- iv) Circuit diagram/timing diagram/truth tables are drawn wherever necessary.
- v) Problems without necessary formula/formulae carry no mark.

PART - A

Answer all questions :

(10 × 1 = 10)

- 1) Write the function of source in JFET.
- 2) Name the power amplifier in which conduction angle is 360°.
- 3) Define slew rate.
- 4) What is the frequency of modulating signal if the bandwidth of AM wave is 10 KHz?

P.T.O.



- 5) Define demodulation.
- 6) Draw the circuit symbol of IGBT.
- 7) What is a counter?
- 8) Convert $(1101)_2$ into gray code.
- 9) How many interrupt sources are there in 8051 microcontroller?
- 10) Write C equivalent expression for the mathematical expression $\sqrt{a^2 + b^2}$.

PART – B

Answer any five questions :

(5 × 2 = 10)

- 11) Write any two differences between FET and BJT.
- 12) Mention the steps involved to obtain DC equivalent circuit of an amplifier.
- 13) Distinguish between positive feedback and negative feedback.
- 14) Write any two advantages of RC oscillators over LC oscillators.
- 15) Write Shockley's diode equation for current through the power diode and explain its terminology.



- 16) Determine average value of DC from chopper. Given $T = 2\text{ ms}$, $T_{ON} = 0.5\text{ ms}$ and supply voltage is 24 V.
- 17) Realise NOT and OR-gate using NOR-gate.
- 18) Distinguish between uplink and downlink signals.

PART – C

Answer **any five** questions :

(5 × 3 = 15)

- 19) What is a DC load line? Mention any two advantages of voltage divider bias.
- 20) Calculate the input impedance of a negative feedback amplifier if input impedance without feedback is $10\text{ K}\Omega$. Given $A = 100$ and $\beta = 0.01$.
- 21) With block diagram, explain basic communication system.
- 22) Draw the equivalent circuit of transmission lines for low frequency. Mention any two types of antennas.
- 23) Write the circuit diagram, input and output waveforms of SCR half wave rectifier with RC triggering circuit.
- 24) Draw the labelled block diagram of microcontroller.



- 25) How do you represent
- logical AND
 - logical OR
 - logical NOT
- operators in C programming?
- 26) What is internet? Write few applications of fibre optic communication system.

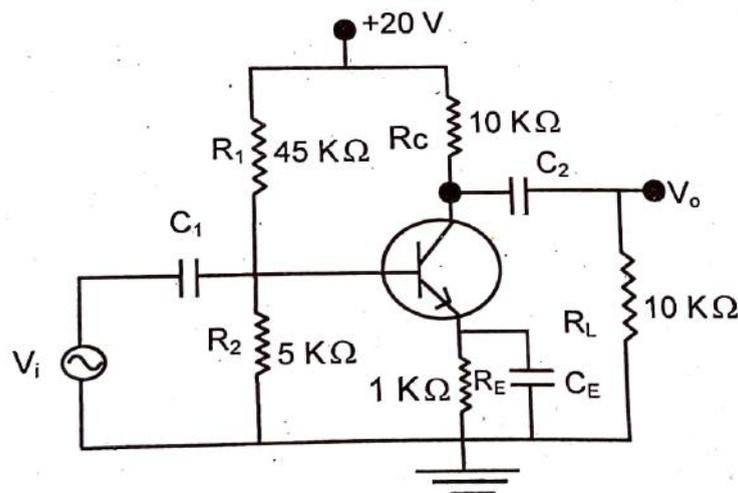
PART - D

I. Answer any three questions :

(3 × 5 = 15)

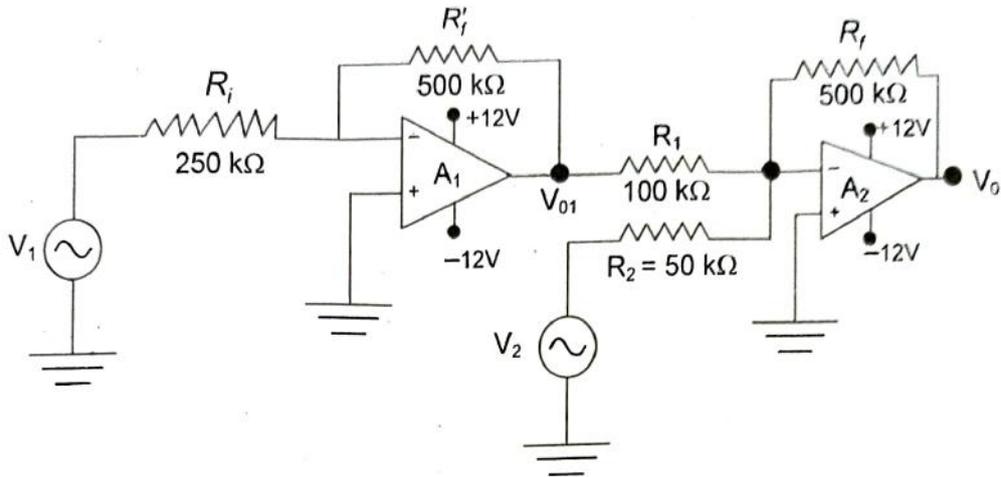
27) For the given CE amplifier circuit using silicon transistor, Calculate

- Voltage across R_2
- I_E
- $Z_{in(base)}$
- Z_{in} and
- Z_O . Given $r'e = \frac{26 mV}{I_E}$ and $\beta = 100$.





28) Calculate the output voltage if $V_1 = 300\text{ mV}$ and $V_2 = 700\text{ mV}$ in the following circuit.



29) A Hartley oscillator oscillates at 15 KHz. If the capacitor in the tank circuit has a value of $0.01\ \mu\text{F}$ and one of the inductors value is 1 mH, Calculate the value of the other inductor.

30) A frequency modulated signal is given by $10\sin[6 \times 10^8 t + 5\sin 1250 t]$
Determine :

- i) Carrier frequency
- ii) Modulating frequency
- iii) Modulation index
- iv) Maximum deviation
- v) Carrier swing.

31) Simplify the Boolean expression $Y = \sum m(1,2,3,8,9,11,13) + \sum d(0,10,15)$ using K-map. Draw the logic diagram using NAND-gates to realise the simplified expression.



II. Answer **any four** questions:

(4 × 5 = 20)

- 32) Give the comparison between CB, CC and CE amplifiers on the performance characteristics.
- 33) What is a logarithmic amplifier? With circuit diagram, obtain an expression for output voltage of logarithmic amplifier using OP-amp.
- 34) With a labelled block diagram, explain the working of AM transmitter.
- 35) Explain with circuit diagram and truth table, the working of clocked SR flip-flop using NAND-gates.
- 36) Write an assembly language instructions to move 45 H into register A and 5 EH into register R_0 . Then add them together and save the result in R_1 . What is the content of R_1 after execution of the program?
- 37) Write a C program to accept three integers and find their sum and average. Find the sum and average of 5, 6 and 7.
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