



- Note:**
- 1) Question paper has **four** parts **A, B, C** and **D**.
  - 2) Part - **A** is **compulsory**.
  - 3) Part - **D** has **two** parts. Part- **I** is from **problems**.  
Part- **II** is of **essay type** questions.
  - 4) Circuit diagrams/timing diagrams/truth tables are drawn **wherever** necessary.
  - 5) Problems without **necessary** formula/formulae carry **no mark**.

**PART- A**

**II. Answer all questions: (10 x 1 = 10)**

1. Name any one voltage controlled device.
2. What is a DC load line?
3. Sketch the output of a differentiator, if input is a triangular wave.
4. Which layer of ionosphere is called Kennelly- Heaviside layer?
5. Mention the intermediate frequency of an AM receiver.
6. What is a transmission line?
7. Which code is used in shaft position encoders?
8. A four bit synchronous counter is applied with clock frequency of 16KHz.  
What is the frequency of MSB ( $Q_4$ ) bit?
9. How many 8 bit ports are present in 8051 microcontroller?
10. If  $a= 5$ ,  $b=10$ . What is the content of 'a' after the execution of  $a+= b$ ; in C programming?

**PART- B**

**II. Answer any FIVE questions: (5 x 2 = 10)**

11. Mention the advantages of voltage divider biasing circuit.
12. Distinguish between power amplifier and voltage amplifier.
13. The input and output voltages of an amplifier are 5mV and 2V respectively. If the gain with negative feedback is 200, find the feedback fraction.
14. Compare RC and LC oscillators.
15. Mention any two advantages of static switches.
16. Explain the function of the following instructions:
  - i) MOV DPTR,#ABCDH
  - ii) DIV AB
17. Write the symbol name and meaning in C programming for:
  - i) &
  - ii) |
18. Mention the important techniques used in Bluetooth operation.

**PART- C****III. Answer any FIVE questions:****(5 x 3 = 15)**

19. Explain the effect of  $V_{GS}$  on drain current  $I_D$  in JFET.
20. Compare input and output impedance characteristics of four types of feedback connections.
21. Define Critical angle, Critical frequency and Skip distance.
22. What is De- emphasis? Draw the equivalent circuit of transmission lines for low frequency.
23. What is a thyristor? Draw the static characteristics of thyristor for different gate currents.
24. At what firing angle does SCR of FWR must be triggered to supply  $V_{dc}$  of 60V to a load? Given  $V_m = 155.5V$ .
25. Distinguish between asynchronous and synchronous counter.
26. Write any three applications of fiber optic communication.

**PART- D****IV. Answer any THREE questions:****(3 x 5 = 15)**

27. For the given CE amplifier circuit using silicon transistor, find  
i)  $I_C$  ii)  $V_{CE}$  iii)  $r_e'$  iv)  $Z_{in}$  v)  $Z_o$   
Given  $R_1 = 100K\Omega$ ,  $R_2 = 10K\Omega$ ,  $R_C = 2.2 K\Omega$ ,  $R_E = 1 K\Omega$ ,  $V_{CC} = 15 V$  and  $\beta = 200$ .
28. Design an Op- Amp circuit to realize the output  
 $V_O = -(3V_1 - 2V_2 + V_3)$ . Assume  $R_F = 10 K\Omega$ .
29. A Hartley oscillator oscillates at 54 KHz. If the capacitor in tank circuit has a value of 96.61pF and one of the inductors is 30mH, calculate the value of the other inductor.
30. A carrier wave of frequency 10MHz and peak voltage of 14V is amplitude modulated by a sinusoidal wave of 5 KHz and amplitude 6V. Write the equation of the AM wave. What is the bandwidth of the modulated signal?
31. Simplify the Boolean expression  
 $Y = \sum m(0, 2, 4, 8, 10) + \sum d(12, 14)$  Using K- map. Draw the NAND gate Equivalent circuit to realize the simplified equation.

**PART- D****II. Answer any FOUR questions.****(4 x 5 = 20)**

32. Explain the working of Class B push- pull power amplifier with a neat circuit diagram.
33. Derive an expression for output voltage of logarithmic amplifier using Op-Amp with necessary circuit diagram.
34. Draw the block diagram of FM SHD receiver and explain the function of each block.

35. Explain the working of SISO shift register with relevant diagram.
36. Why 8051 microcontroller is known as 8 bit processor? Briefly explain data Transfer instructions and arithmetic instructions.
37. Write a C program to find the roots of a quadratic equation using switch case.

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