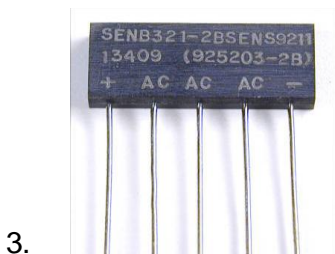
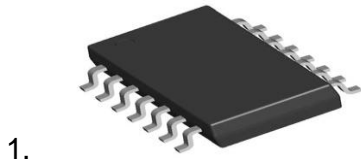

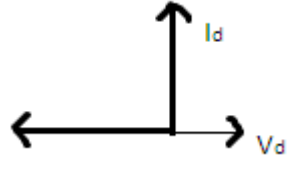
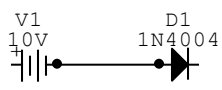
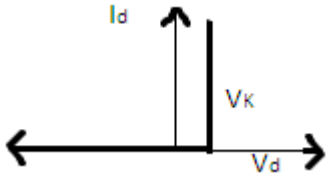


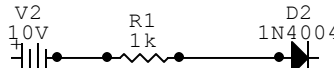
1. Form an AND gate using diodes and power supply. [Rs 15]
2. Express in simplest form: $f(a,b,c,d)=\sum(1,2,5,8,12)$ [Rs 15]
3. Match the chips to their packages:- [Rs 24]



- a. Small outline j lead package
- b. Single Inline package
- c. Quad Flat Package
- d. Dual Inline package
- e. Thin Small Outline Package
- f. Pin grid array

5. If characters of  are , and characteristics of

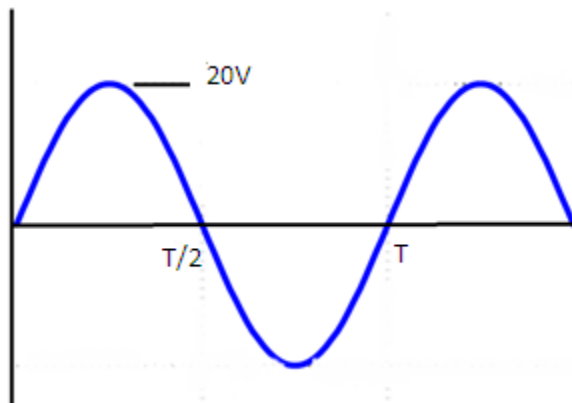
 are , draw the characteristics of



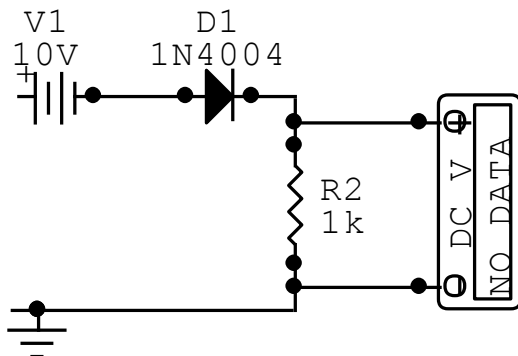
[Rs 20]

6. For a half wave rectifier, what is the relation between the mean value V_{dc} and maximum value V_{max} ? [Rs 10]
7. Name the universal gates? Implement $f(a,b,c) = (a+b).a'+b'.(a+c')$ using universal gates. [Rs 25]
8. Multiply $(0101)_2$ and $(1011)_2$ in unsigned arithmetic. [Rs 15]
9. Draw the output voltage (V_o) as a function of time [Rs 25]

Input =

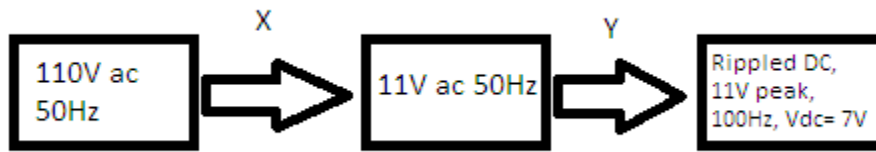


Circuit =



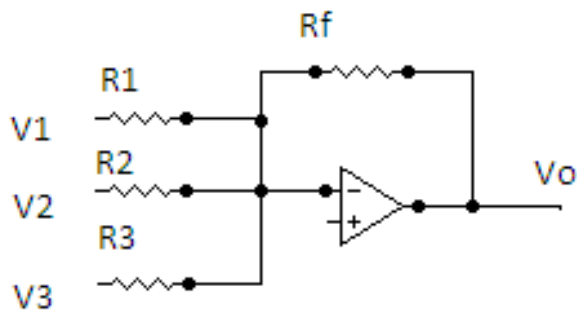
10. Express $f(a,b,c,d) = abc'+a'd'+a'bd'+bc'd'+ac'$? [Rs 30]
11. Expand MESFETs. [Rs 15]

12. An amplifier with gain $A = 10,000$ working with supply of $+15V$. For an input of 0.1 , what is the output ? [Rs 15]
- 13.

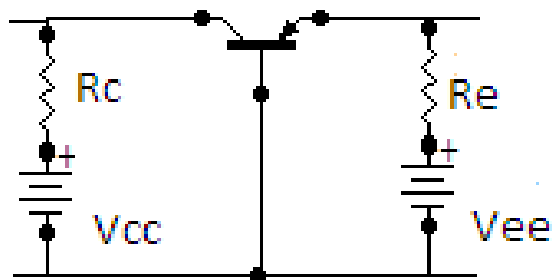


Find X,Y [Rs 20]

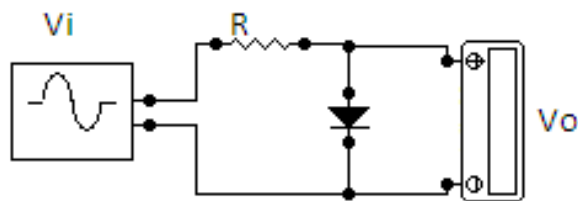
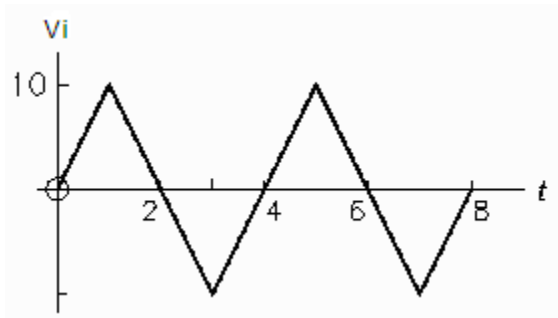
14. You have a 6V supply with you, but you need a 3V supply to perform your experiment. How many Op-amps do you need to obtain this supply? [Rs 20]
15. What do the following stand for : D in D-flip flop, T in T-flip flop? [Rs 10]
16. Find the gain of the following circuit [Rs 20]



17. Implement OR function using BJT's only [Rs 25]
18. Write the configuration of this circuit [Rs 15]

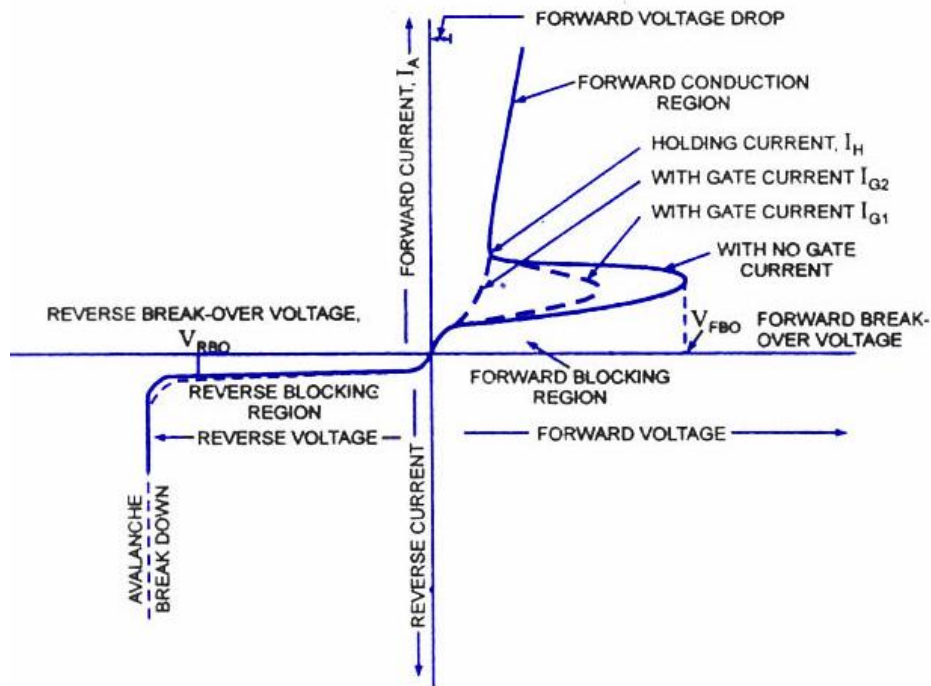


19. Draw the output waveform when input given below is applied to this circuit.
[Rs 25]



20. Tarun has a 4-bit mod 16 counter IC with him. He inputs a 24kHz to the IC. What are the various possible frequencies that he can tap out from the IC?
[Rs 20]
21. Simplify $f(x,y,z,w)=\sum(1,3,5,7)$ [Rs 20]
22. What could be the possible reason for the mistake in the following signed arithmetic, if any :
a) $0101 + 1101 = 0010$
b) $0101 + 0111 = 1100$ [Rs 10]
23. You are observing a sine wave on the CRO. Now on channel 2 you input a second sine wave. The channel 2 output on the CRO is like a sequence of overlapping waves. What do you do to observe both the outputs properly? (answer in not more than 20 words). [Rs 20]
24. Where can glitches be expected,
A : mod 10 asynchronous counter implemented on a mod 16 counter
B : mod 10 synchronous counter on a mod 16 counter using external gates. [Rs 15]
25. In the S-R latch, what is meant by undefined state ? (not more than 20 words) [Rs 15]

26. Which device has these I-V characteristics [Rs 10]



27. Add the following unsigned numbers $(10110)_2$ and $(110011)_2$ [Rs 10]
28. Why an Op-Amp is called a op amp? [Rs 15]
29. You need to measure the time delay between two signals but the second one is too small in its stable state. What do you do? [Rs 15]
30. Express in canonical form : $F(w,x,y,z) = w'x' + wyz + y'z' + xy'$ [Rs 20]
31. Implement $F(A,B,C,D) = \sum (1,2,3,4)$ and $G(A,B,C,D) = \sum (1,5,7,11)$ using 2 8:1 mux and gates if required. [Rs 15]

32. Subtract $(10111)_2$ from $(010111)_2$. Assume signed arithmetic.
[Rs 10]
33. Karthik implemented a circuit on a bread board and found that his circuit, consisting of latches and flip flops is behaving properly in accordance with the state diagram he had drawn. Is his state diagram deterministic? [Rs 15]
34. A series circuit consists of 5 EXOR gates, numbered 1 to 5 serially. All odd numbered gates have a common input 1, and all even numbered gates have common input 0. If the output of gate 3 is high, then what was the input to the circuit, output of the circuit. What is the circuit behaving as? [Rs 20]
35. Simplify $F(A,B,C) = \sum(1,3,6,7)$ [Rs 15]
36. Tarun has an IC that implements D flip flop, and gives Q and Q' as outputs from 2 pins. He has a fancy for NOT gates. In a certain circuit, he needs to get the inverted form of the input at the rising edge of the flip flop. Should he use NOT gates with Q as input? Justify. [Rs 20]
37. Can a 3-variable function in SOP form be implemented using a 8:1 mux and OR gate? [Rs 10]

38. Simplify $F(X,Y,Z,W) = \sum(1,3,6,7)$ [Rs 15]

39. Suppose you are performing a frequency division experiment using counter IC's, you are able to see the reference clock properly on the CRO, but the frequency division output is not proper. What do you do?

- a) Use the voltage knob
- b) Use the time knob
- c) Dismantle and redo the experiment
- d) Use the trigger knob [Rs 15]

40. If you want to implement a full adder using NAND gates only, what is the minimum number of NAND gates you require.

$$S = a \oplus b \oplus c$$

$$C = ab + bc + ca \quad [\text{Rs } 15]$$

41. In a certain experiment, the outputs are active low. In the course of the experiment, the LED glows for active outputs of the ICs. Which terminal of the LED is the output of the IC connected? [Rs 20]

42. What will happen when $V_i \geq 6V$? [Rs 20]

