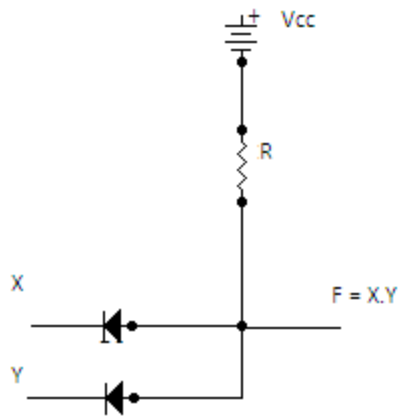


1.



2.  $f(a,b,c,d) = ac'd' + a'c'd' + a'b'cd'$

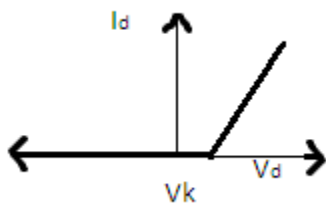
3. 1->d dual inline package

2->c Quad flat package

3-> Single inline package

4-> Small outline J lead package

5.



6.  $V_m/\pi$

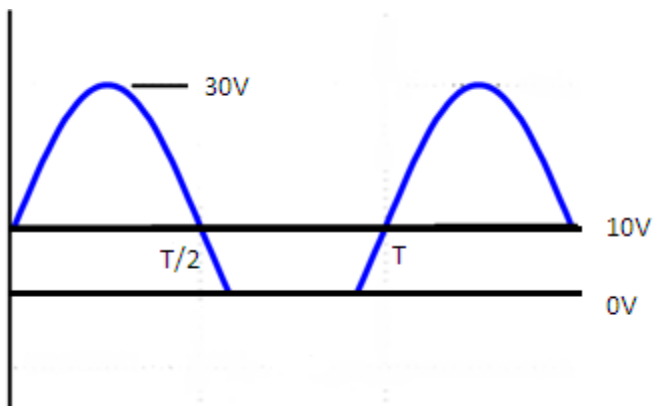
7. Nand and Nor gates

The given expression reduces to  $f(a,b,c) = ((a'b') \cdot (b'a)') \cdot (b'c')'$

The above expression can be obtained using 7 NAND gates. (alternate answers are possible)

8.  $(110111)_2$

9.



10.  $f(a,b,c,d)=ac+ab+a'd'$

11. METAL SEMICONDUCTOR FIELD EFFECT TRANSISTOR

12. +15V( considering an ideal amplifier)

13. X->Step down Transformer 10:1 turns ratio

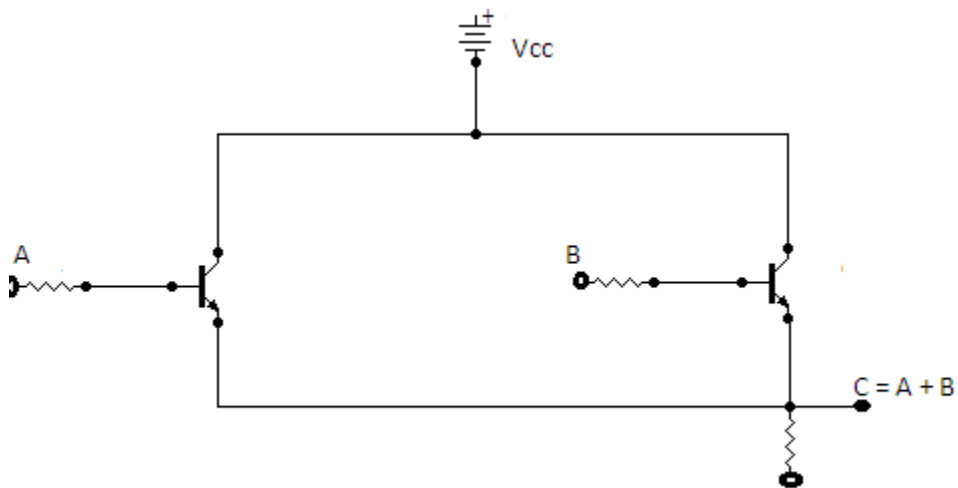
Y->Fullwave rectifier

14. 2 op amps (both in inverting mode )

15. D->Data T->Toggle

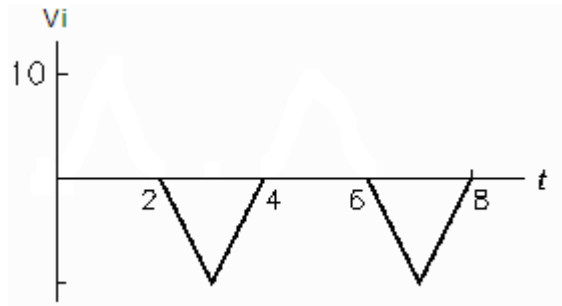
16.  $V_0 = -R_F((V_1/R_1)+(V_2/R_2)+(V_3/R_3))$

17.



18. Common Base Configuration

19.



20. 24KHZ, 12KHZ, 6KHZ, 3KHZ, 1.5KHZ

21.  $F(X,Y,Z,W)=X'W$

22. a> overflow b> sign bit is wrong, overflow

23. use the time per division knob to get a properly scaled wave. Then use the hold off knob and the trigger knob for the required sweep conditions to settle the input.

24. a. Asynchronous mod 10 counter will give glitches as it transits to 0000 state from the 1001 state instead of going to the 1010 state. (The 1010 state occurs and then gets reset to 0000 state. So you have a glitch.)

25. undefined state is one whose state cannot be predicted. (1,1) in a nor implementation of sr latch. (0,0) in a nand implementation of s'r' latch.

26. Thyristor

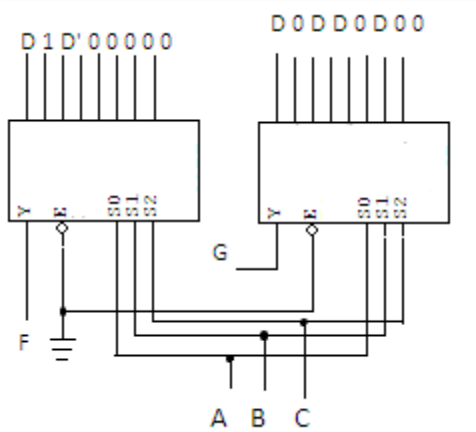
27.  $(1001001)_2$

28. Op Amp-> operational amplifier. It is so called because it can perform a lot of mathematical operations like addition, subtraction, differentiation, integration etc.

29. Use the magnification button on the CRO

30.  $\sum(0,1,2,3,4,5,8,11,12,13,15)$

31.



32.  $(0100000)_2$

33. Deterministic

34. Input is high, Output is low, acts as an inverter.

35.  $a'c+ab'$

36. Its preferable to tap output form Q' pin rather than using Not gate as, Not gate will introduce delays in the circuit.

37. Yes

38.  $x'y'w+ x'yz$

39. Use the trigger knob. Time knob might also help

40. 9 gates (assuming  $a', b', c'$  are already given to us, 3 more if they are not)

41. Led are in common anode. So IC output is connected to cathode.

42. LED will glow.