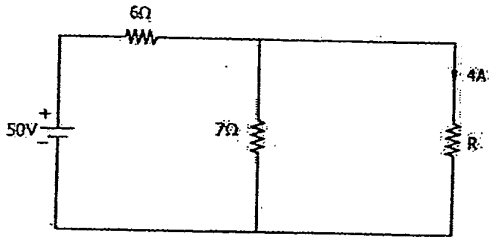
Circuit Debugging Round-I

Max.Time:15 minutes No of Questions: 15

1. Find the value of R if the current flowing through R is 4 Ampere.



a) 3.5Ω b) 2.5Ω c) 1Ω d) 4.5Ω

Applying KVL loop1&loop2

$50=6xi_1+7(i_1-i_2)$

i_2=4Amps given

$50=6xi1+7(i_1-4)$

$50+28=13i_1$

$i_1=78/13=6$Amps

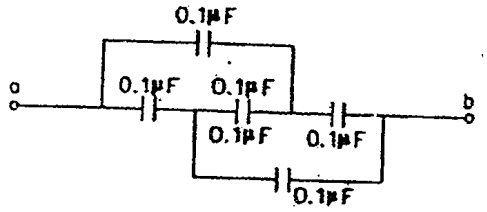
$0=7(i_2-i_1)+i_2xR$

$0=7x-2+4xR$

$4R=14$

R=14/4=3.5Ω

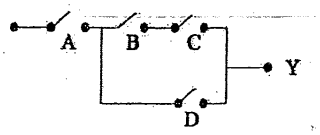
2. Find the equivalent capacitance across "ab".



a) 0.2μF b)0.1μF **c)0.5μF** d)0μF

All capacitors are in parallel so $\mathbf{C_{ab} = C_1+C_2+C_3+C_4+C_5=5x0.1=0.5\mu F}$

3. For the switch in the circuit, taking 0 as open and 1 as closed the expression of Y is



a)A+(B+C)D b)A+BC+D **c)A(BC+D)** d)None of this

Y=input

when A and B and C is ON or A and D is ON

y=A(BC+D)

4. If the memory chip size is 256x1 bits, then number of chips required to make up 1KB of memory is

a)32 b)24 c)12 d)1000

Chip size =256 bits

1 kilo byte = 1024 bytes

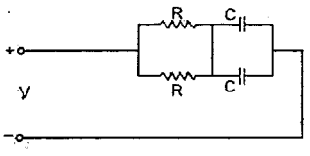
1 byte =8 bits

1 kilo byte = 1024x8 bits=8192 bits (or simply 1kB=1024x8=2^{10} x2^3bits)

1 chip can hold 256 bits

So number of chips required = 8192/256=32 or ($2^{13}/2^8=2^5$=32)

5. The time constant in the given network is



a)CR b)2CR c)CR/4 d)CR/2

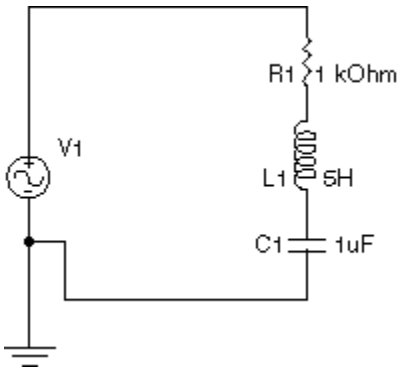
Time constant T=RC

$R_{eff}=R^2/2R=R/2$

$C_{eff}=C_1+C_2=2C$

T=(R/2)x(2C)=RC

6. What is the bandwidth of the circuit?



a)31.8 Hz **b)32.3 Hz** c)142 Hz d)7.2 kHz

Band width=BW=fr/Q;
fr Resonant frequency
Q Quality factor
fr=1/(2π*sqrt(L*C))

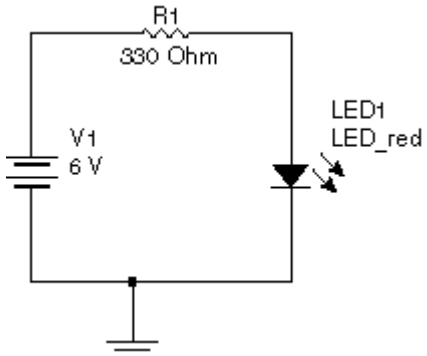
Q=(1/R)*sqrt(L/C);

BW=R/(2π*L);

=1Kohm/(2π*5H);

=32.3Hz

7. What is the current through the LED?



a)0 mA b)23 mA c)18 mA **d)13 mA**

I = V/R

R = 330 , V = 6 - 1.5V (LED drop voltage) So V = 4.5V

I = 4.5/330

I = 0.013 A or 13 mA

8.The depletion-mode MOSFET

a)can operate with only positive gate voltages

b)can operate with only negative gate voltages

c)cannot operate in the ohmic region

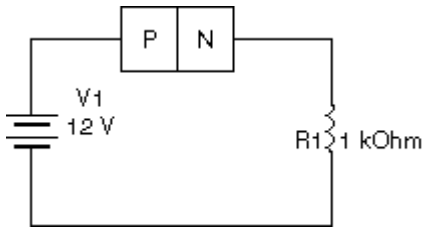
d)can operate with positive as well as negative gate voltages

9. Initially, the closed-loop gain (Acl) of a Wien-bridge oscillator should be

a)Acl < 3 **b)Acl > 3** c)0 d)Acl approximately equals to 1

1 + Rf/R ≤3 but initially it is greater than 3. **Wien Bridge fixed condition for working.**

10. What is the voltage across R1 if the P-N junction is made of silicon?



a)12 V b)11.7 V **c)11.3 V** d)0 V

Vout=Vin-Vsi,

Silicon diode potential barrier drop is 0.7V

Vout=12-0.7

Vout=11.3V

11. How many flip-flops are required to produce a divide-by-128 counter device?

a)1 b)4 c)6 **d)7**

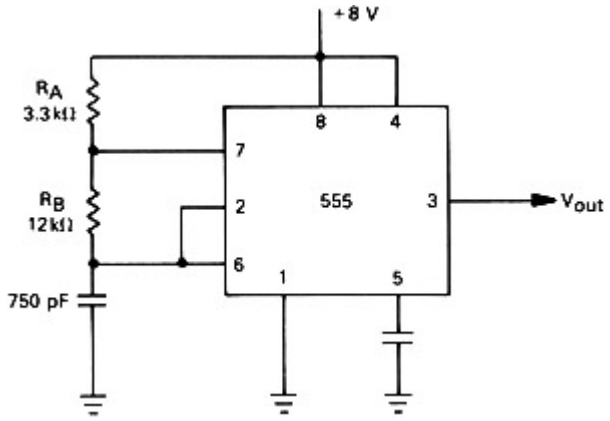
A 1bit counter can count two bits 1 and 0 which is stored by using a single bit storage digital device called flip flop ,for a single bit count it requires 2 flip flops.

For n bit counter it requires 2^n flipflops.

2^7 =128

7 flip flops are required.

12. If a diode is connected across resistor RB (positive end up) in the given figure, what is the new duty cycle of the output waveform?



a)56% b)44% **c)21.6%** d)17.4%

Tm=0.7*R1*C, Ts=0.7*R2*C

duty cycle= R1/(R1+R2) or Tm/(Tm+Ts)

13. The register in the 8085A that is used to keep track of the memory address of the next op-code to be run in the program is the:

a)stack pointer **b)program counter** c)instruction pointer d)accumulator

14.The 8-bit address bus allows access to an address range of:

a)0000 to FFFFH b)000 to FFFH c)00 to FFH **d)0 to FH**

8 bits address can assign from 0 to 15 , but address is always in Hexadecimal ie, **0 to F**

15.Which of the following will not normally be found on a data sheet?

a)Minimum HIGH level output voltage b)Maximum LOW level output voltage

c)Minimum LOW level output voltage d)Maximum HIGH level input current