



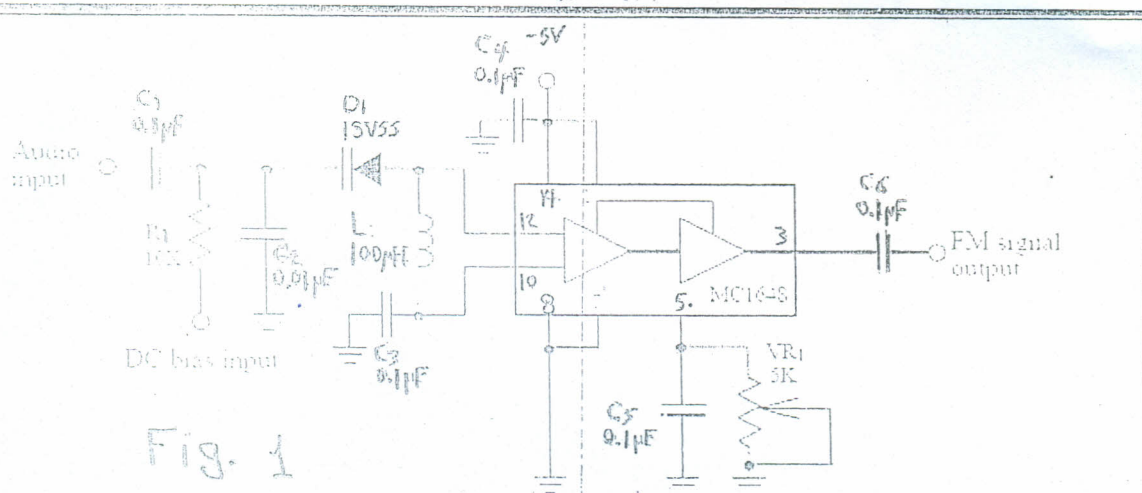
Solve all the following questions:-

Question One (15 marks)

1. Explain the basic idea of Wien bridge oscillator circuit operation and drive an expression for the oscillation frequency? (4 marks)
2. Calculate the oscillation frequency of a Wien bridge oscillator circuit when $R_1 = 10 \text{ k}\Omega$, $R_2 = 20 \text{ k}\Omega$, and $C_1 = C_2 = 1 \text{ nF}$. (3 marks)
3. What are the differences between Wien bridge oscillator, Switch-integrator oscillator and multivibrator oscillator? (4 marks)
4. What are the basic steps of troubleshooting a circuit problem? (4 marks)

Question Two (18 marks)

1. In RC coupled amplifier circuit experiment : Frequency response ; the size of coupling capacitor affects the frequency response and the bandwidth: Explain this statement with drawing the frequency response curve at $C_2 = 1.0 \text{ F}$ and $C_2 = 0.01 \mu\text{F}$? (4 marks)
2. Define the frequency modulation FM and state the equation of modulated FM signal and its frequency for a single tune input signal? (3 marks)
3. Explain the frequency modulator circuit based on MC1648 VCO illustrated in Fig. 1? (4 marks)



4. Explain the operation of phase-locked loop (PLL) circuit and its function? (4 marks)
5. Sketch and explain the block diagram of FM to AM conversion discriminator? (3 marks)

Question Three (17 Mark)

USE NEAT SKETCHES TO CLARIFY YOUR ANSWERS:

1) A- For microwave transmission line, define the following terms:

Characteristic impedance – Reflection coefficient –

Standing wave ratio (VSWR) – Matched load

B- Sketch the R.M.S wave form (standing and travelling) on transmission line for the following termination load cases:

$Z_L = 0, \infty, Z_0, 2Z_0,$ and $3Z_0$ – and calculate VSWR for each case

C- Sketch the setup of an experiment to measure the frequency of microwave inside waveguide. Explain the steps and the function of each component.