(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Draw **suitable** diagrams wherever **needed.**
(4) Make **suitable** assumptions wherever **needed** and mention the same.

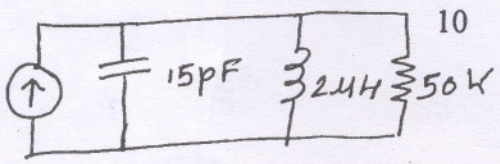
1. Answer the following questions in brief (any **four**) :— **20**
   (a) What is DDFS ?
   (b) Explain what is a hybrid transformer ?
   (c) What are the general features of audio amplifier ?
   (d) Explain the working of a PLL as variable modulus divider ?
   (e) What is meant by neutralization and mention the different methods ?

2. (a) Design a Direct Digital Frequency Synthesizer to generate 15.8×10^6 Hz from a 1×10^6 Hz reference oscillator. **10**
   (b) Derive the expression for output voltage of a double balanced mixer. **10**

3. (a) Derive the expressions for resistance and capacitance of a capacitive transformer and show that the turns ratio is [1 + C1/C2]. **10**
   (b) Design a lossless coupling network that matches a load of $(12 + j5)\Omega$ to a 40Ω source impedance at 20 MHz. **10**

4. (a) Explain with a neat diagram the basic operation of a PLL. Explain about capture and lock range. **10**
   (b) Write notes on :— **10**
      (i) Frequency modulation using PLL
      (ii) PLL as amplitude demodulator.

5. (a) Explain in detail the anlysis of the series RLC circuit and suggest any one application of it. **10**
   (b) For the circuit shown below calculate :— **10**
      (i) Resonant frequency
      (ii) Q of the coil
      (iii) BW of the circuit.



6. (a) What is meant by noise ? Define noise factor, noise figure and equivalent noise temperature. Discuss the noise that occurs in active deivces. **10**
   (b) Explain the setup and procedure to measure the noise figure of an amplifier. **10**

7. (a) Write notes on :— **10**
      (i) FET Mixer
      (ii) AM modulator using 1596.
   (b) Explain the characteristics of IC3040 video amplifier with circuit diagram. **10**