(3 Hours)   [Total Marks:80]

N.B.   (1)   Question no.1 is compulsory.
        (2)   Attempt any three from the rest.
        (3)   Make any suitable assumption wherever required.

Q.1   Answer any four.
   (a)   Explain drift current and diffusion current.   5M
   (b)   Explain DC load line in common emitter BJT.   5M
   (c)   Explain why FET is free from thermal runaway.   5M
   (d)   Explain the re model of BJT.   5M
   (e)   Explain the sufficient and necessary conditions for the oscillation. 5M

Q.2   (a)   Explain the input and output characteristics of CE BJT amplifier. 10M
      (b)   Explain different biasing techniques in BJT   10M

Q.3   (a)   Write the working principle of enhancement and depletion type of MOSFET. 10M
      (b)   Draw the circuit diagram of bridge rectifier with LC filter with all the
            waveforms and derive the expression for ripple factor.   10M

Q.4   (a)   Draw the circuit diagram of current series feedback amplifier and derive the   10M
            expression for input and output impedance and voltage gain with feedback.
      (b)   Explain the working principle of the following semiconductor devices   10M
            i.   PIN diode
            ii.   FET
            iii.   L-C tank circuit
            iv.   Schottky diode

Q.5   (a)   Draw the circuit diagram of collpitt's oscillator and explain the working. Derive   10M
            the expression for the frequency of oscillation.
      (b)   explain the modeling of CE BJT in h- parameter and hence derive the expression   10M
            for voltage gain

Q.6   Write short note on any THREE of the following.   20M
   (a)   UJT relaxation oscillator.
   (b)   Zener diode as voltage regulator
   (c)   Two port network
   (d)   Input output and transfer characteristics of FET