



Duration: 3hrs

Max. Marks: 80

- N.B. : (1) Question No. 1 is compulsory.
 (2) Solve any **three** questions from the **remaining five**
 (3) Figures to the right indicate full marks
 (4) Assume suitable data if necessary and mention the same in answer sheet.

Q No.1

Attempt any 5 questions

- a Compare Depletion and Enhancement MOSFET. 5
- b Why LC oscillators are preferred for high frequency applications. 5
- c Draw small signal model of JFET & explain each parameter. 5
- d Write down current equation of diode and explain significance of each parameters. 5
- e State and explain Barkhausen's criteria for oscillations. 5
- f Find Q point for the following circuit shown in fig.1. Assume $\beta=100$ and $V_{BE}=0.6V$ 5

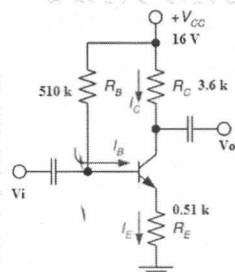


Fig.1

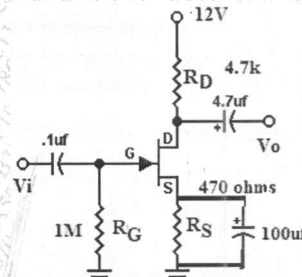


Fig.2

Q No.2

- a Explain the working of wein bridge oscillator and derive the expression for frequency of oscillation. 10
- b Derive the expression for voltage gain, Current gain, Input impedance and output impedance for bypassed voltage divider CE BJT amplifier. 10

Q No.3

- a Explain Construction and operation of varactor diode. 10
- b For JFET amplifier shown in fig.2, find A_v , R_i , R_o . Assume FET parameters: $I_{DSS}=8mA$, $V_P=-3V$, $r_d = 100k\Omega$ 10

Q
No.4

- a Determine A_v , A_i , R_i , R_o for unbypassed BJT amplifier shown in fig.3. 10
Assume $\beta=120$ and $V_{BE}=0.6V$.

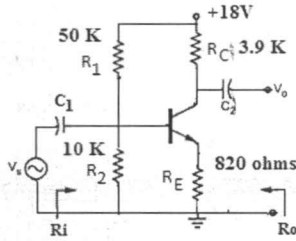


Fig.3

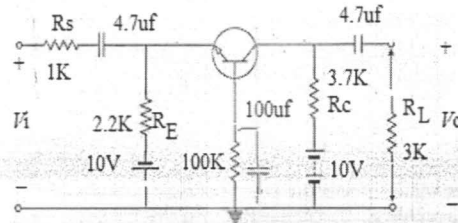


Fig.4

- b For the circuit shown in fig.4 Determine voltage gain, Input and output impedance. Assume $\beta=120$ and $V_{BE}=0.7V$. 10

Q
No.5

- a For MOSFET amplifier shown fig 5 . Determine A_v , Z_i , Z_o . Assume MOSFET DATA: $K_N = 1 \text{ MA/V}^2$, $V_{TN} = 0.7 \text{ v}$ (10 M)

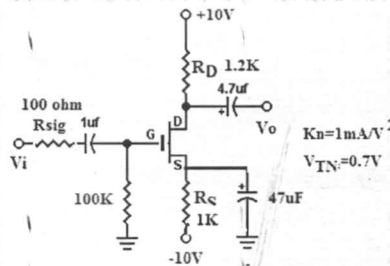


Fig.5

- b Define stability factor. Derive the expression for stability factor of voltage divider bias. Explain which biasing technique is more stable.

Q
No.6 Write short notes on (any Two)

- a D.C. load line & significance of Q pt. 10
b Clipping Circuit 10
c Comparison of BJT CE & JFET CS Amplifier 10
