

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

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

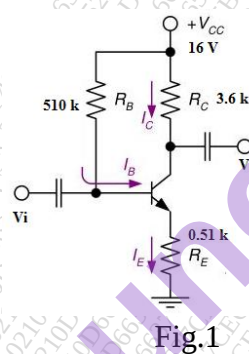


Fig.1

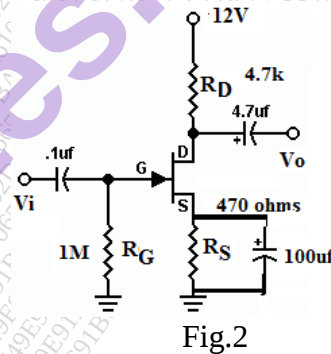


Fig.2

- Q No.2**
- Explain the working of wein bridge oscillator and derive the expression for frequency of oscillation. 10
 - Derive the expression for voltage gain, Current gain, Input impedance and output impedance for bypassed voltage divider CE BJT amplifier. 10

- Q No.3**
- Explain Construction and operation of varactor diode. 10
 - 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 $V_{BE}=0.6V$.

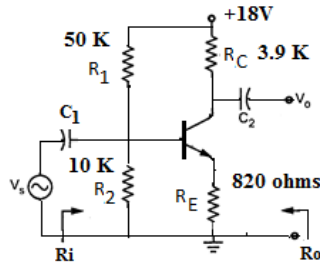


Fig.3

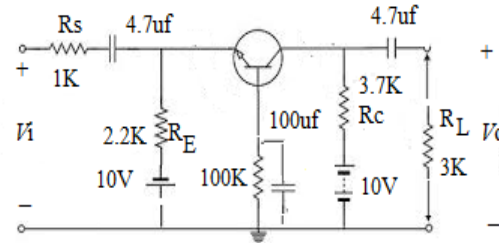


Fig.4

- 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)

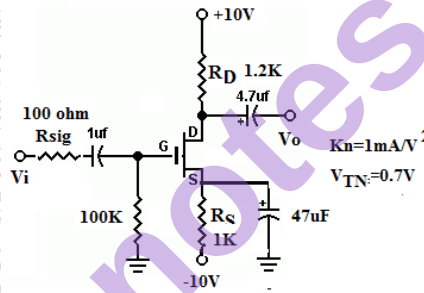


Fig.5

- 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**
