Paper / Subject Code: 49601 / ANALOG ELECTRONICS - I

Duration: 3hrs **Max. Marks:80**

NB:

(1) Question No.**1** is compulsory.
(2) Answer any **three** from remaining questions.
(3) **Figures** to the right indicate full marks.
(4) Assume suitable data if required.

Q.1 Attempt **any four**

a Compare JFET and MOSFET **5**

b Explain the Significance of stability factor **5**

c Why crystal oscillator is most stable oscillator? **5**

d Describe thermal runaway in BJT **5**

e What is clipping and clamping explain with one example. **5**

Q.2

a Draw BJT CE amplifier with any biasing circuit and derive expression for voltage gain, input impedance and output impedance. **10**

b What is Varctor diode? Explain construction and operation of varactor diode. **10**

Q.3

a Sketch the circuit of Wein Bridge Oscillator using BJT and derive an expression for the frequency of oscillation. **10**

b For Common source amplifier with N-channel E0MOSFET determine A_V, Zi, and Zo. V_{DD}=21V,R_1=42K,R_2=33K, R_D=5K, R_S=1.5K. The MOSFET parameters are: V_{TN}=1.5V, Kn=0.5mA/V^2 **10**

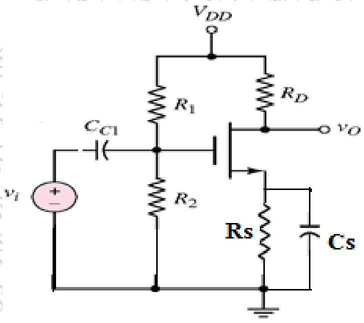

Fig.2

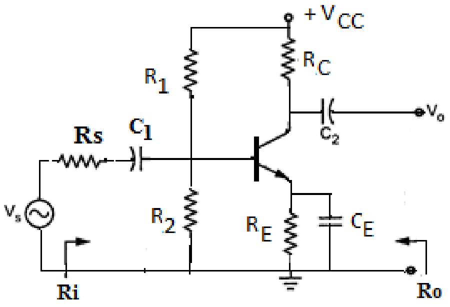

Fig.3

Q.4

a For the amplifier shown in Fig.3 analyze and determine. Derive the expression for small-signal voltage gain, input and output impedance. BJT and circuit parameters are: $\beta = 100, V_{BE} = 0.7V, V_A = 100V$ .R_1=93.7K, R_2=6.3k, R_C=6K, R_S=0.5K, V_{CC}=12V. **10**

b Draw the constructional diagram of N-Channel JFET, and explain the operation and thus obtain the V-I characteristics. **10**

Q.5

a An N-Channel FET with common drain amplifier shown in fig.4 has the following parameters: $I_{DSS}=10mA$, at $V_P=-4V$. Determine Small signal voltage gain, input impedance and output impedance. If $R_1=10M$, $R_2=2M$, $V_{DD}=18V$, $R_S=1.2k$, $R_L=10K$. **10**

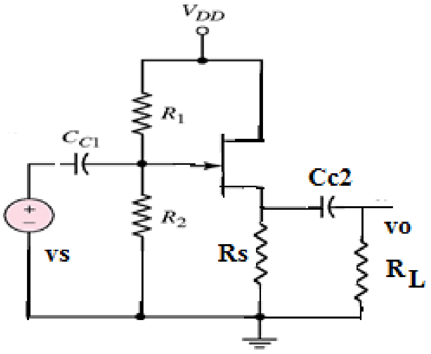

Fig.4

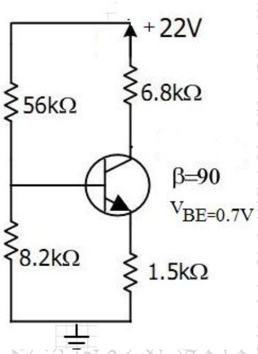

Fig.5

b For the circuit shown in figure 5. Determine Q point co-ordinates. **10**

Q.6 Attempt the following

a) LC oscillator and its application. **5**

b) Small signal h- parameter parameters of BJT **5**

c) Depletion MOSFET operation. **5**

d) Compare BJT and FET **5**

****