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**

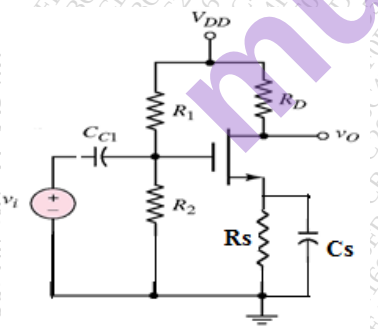

Fig.2

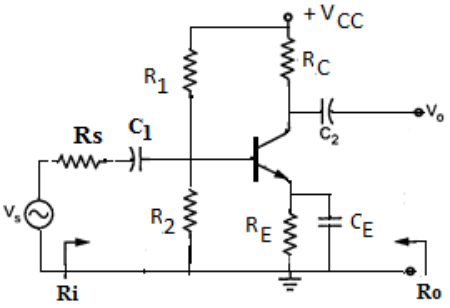

Fig.3

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**

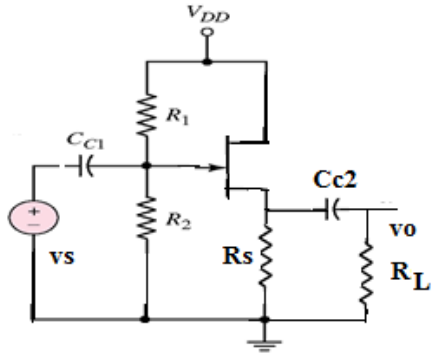

Fig.4

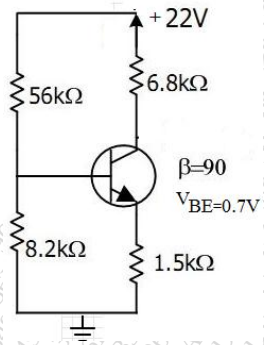

Fig.5

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**

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