Registration No :

Total Number of Pages : 02 **B.Tech**
PEL3I102

3rd Semester Regular/Back Examination 2018-19
ANALOG ELECTRONIC CIRCUITS
BRANCH : EEE
Time : 3 Hours
Max Marks : 100
Q.CODE : E664

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) Prove that FET is a voltage controlled device.
b) Compare fixed bias and self-bias of BJT.
c) Derive an expression for total collector current in CE configuration.
d) Give the load line of BJT amplifier if V_{CC} = +9V and R_C = 1.8k
e) Write Shockley's equation. How it is used to design d.c biasing of JFET?
f) Differentiate between FET and BJT.
g) An amplifier is burst into oscillation when the loop gain Aβ=1, but for sustained oscillation Aβ>1, Why so?
h) What is linear amplification factor of a transistor if its gain is 100 ?
i) What do you mean by CMRR? How it affects the performance of Op-Amp
j) What do you mean by distortion in a power amplifier? Which power amplifier gives least amount of distortion?

Part- II

Q2 **Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Explain the characteristics of a JFET.With diagram, explain the self-biasing scheme used in JFET.
b) Sketch the hybrid π-model of CB amplifier .Derive the relations of gain, input and output impedances.
c) Explain the frequency response of BJT amplifier.
d) Consider a general feedback system with parameters $A=10^6$ and A_f =100. If the magnitude of A decreases by 20%, what is the corresponding % change in A_f?
e) Explain how operating is selected in a self-bias configuration of JFET.
f) Draw the cascade configuration and explain its operation.
g) Find the input resistance, output resistance of an amplifier that employs voltage series feedback.
h) Derive the conditions of oscillation in a Wein-bridge oscillator.
i) Draw the Op-amp phase shift oscillator and derive the expression for frequency of oscillation.
j) Explain how Op-Amp can be used for voltage summing amplifier.
k) Draw an emitter follower circuit. What is the type of feedback observed? Find the feedback factor. Determine the voltage gain with and without feedback.
l) The pinch –off voltage of a p-channel JFET is V_p=5V and I_{DSS}=- mA. The drain source voltage V_{DS} is such that a saturated drain current I_{DS}=-15 mA is maintained. Find the gate source voltage V_{GS} .

Part-III

Long Answer Type Questions (Answer Any Two out of Four)

Q3 **a)** Explain the frequency response of BJT amplifier. **(8)**

b) Sketch the CE and CB hybrid equivalent model, given $I_{E(dc)}$=1.2 mA,β=120 and r_0=40 KΩ. **(8)**

Q4 Briefly explain the principle and operation of N-channel and P-channel MOSFET with its transfer characteristics. **(16)**

Q5 **a)** State and explain theBarkhausen criterion for sustained oscillation. Discuss its importance in operation of an oscillator circuit. **(8)**

b) Describe Miller's effect and derive an equation for Miller input and output capacitance. **(8)**

Q6 Draw the circuit diagram of a class-A transformer coupled power amplifier using an npntransistor. This amplifier drives a 16 ohm speaker through a 4:1 transformer, using a power supply of V_{CC} =36V, the circuits delivers 2 watts to the load. Calculate **(16)**

a)AC power across transformer primary

b)AC voltage across the load

c)the RMS value of load current