

JK Lakshmipat University, Jaipur

Institute of Engineering and Technology

End Term Examination

B.Tech.[2nd Year]/[3rd Semester]/[2013-14]

Course Name: Electronic Devices and Circuits

Course Code: ECE 301

Instructions:

1. Attempt all sections.

Max Marks: 40

Time: 03.00 hr



Section A

Q.1.

- (a) Write the full form of IGFET. (1)
- (b) In a BJT, size of collector is larger than size of emitter. (True / False) (1)
- (c) In amplifier circuits, a capacitor is used to block AC Current. (True / False) (1)
- (d) Reverse saturation current of PN junction diode increases with decrease in temperature. (True / False) (1)
- (e) FETs are used in RF amplifiers in FM tuners and in communication equipment. (True / False) (1)

Q.2.

- (a) Draw proper circuit diagrams of the followings: (2)
 - (i) Positive Clipper
 - (ii) Negative Clipper
 - (iii) Positive biased clamper
 - (iv) Negative biased clamper
- (b) Determine I_B , I_E , and α for a transistor circuit having $I_C = 2.25$ mA and $\beta = 150$. (3)

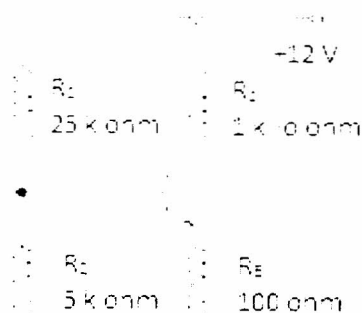
Section B

(20)

Attempt any 4 questions out of 5. All questions contain equal marks.

- Q.3. Calculate the operating of the self-biased JFET having the supply voltage $V_{DD} = 20$ V, maximum value of drain current $I_{DSS} = 10$ mA and $V_{GS} = -3$ V at $I_D = 4$ mA. Also, determine the value of resistors R_D and R_S to obtain this bias condition.

Q.4. For the CE amplifier circuit shown in figure below, find the percentage change in collector current if the transistor with $h_{fe} = 50$ is replaced by another transistor with $h_{fe} = 150$. Assume $V_{BE} = 0.6$.



Q.5. Explain the following methods of transistor (BJT) biasing techniques with use of proper circuit diagram and Equations:

- (i) Fixed bias (ii) Emitter-Feedback bias (iii) Collector to Base bias
- Also write down the stability factor equations for all three methods.

Q.6. What is Hall Effect? What does it tell us? Explain Hall co-efficient. Derive the expression for Hall voltage and Hall co-efficient.

Q.7.

(a) Write down and explain the following characteristic parameters of the JFET:

- (i) Mutual conductance (ii) Drain resistance

(b) Explain the followings:

- (i) Zener Break down (ii) Working of Zener diode as voltage regulator

Section C

Q.8.

- (a) Explain the construction of N-Channel JFET. (3)
- (b) Explain the Operation of N-Channel JFET. Draw the **drain characteristic** curve with proper naming and explain it. (4)
- (c) A FET has a drain current of 4mA. If $I_{DSS} = 8$ mA and $V_{GS(off)} = -6$ V. Find the values of V_{GS} and V_P . (3)

OR

- (a) Write down 5 applications of JFET. (3)
- (b) Write down the principle of MOSFET. (2)
- (c) Explain the followings: (5)
- (i) Construction and Operation of Enhancement MOSFET
- (ii) Construction and Operation of Depletion MOSFET