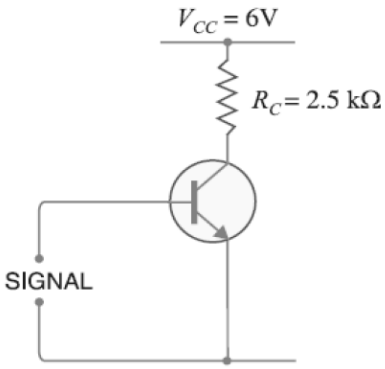
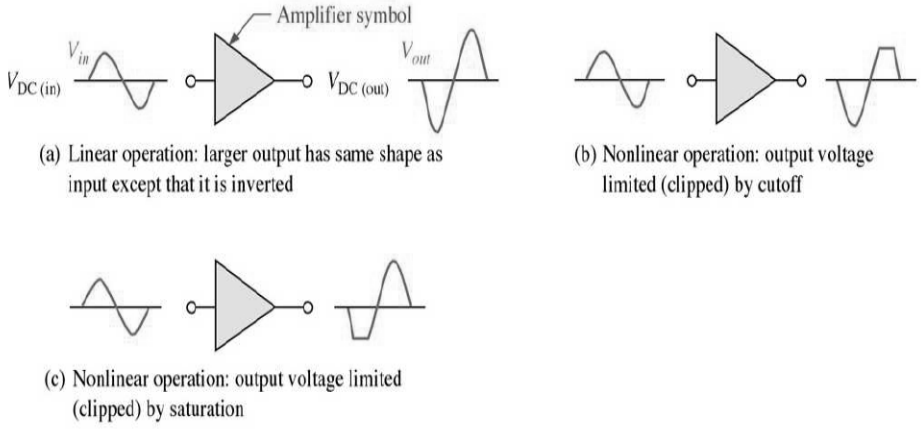
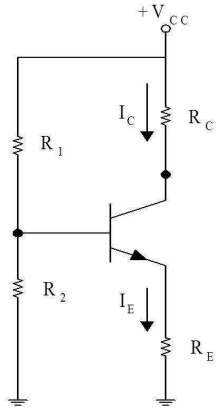
Thapar Institute of Engineering & Technology, Patiala

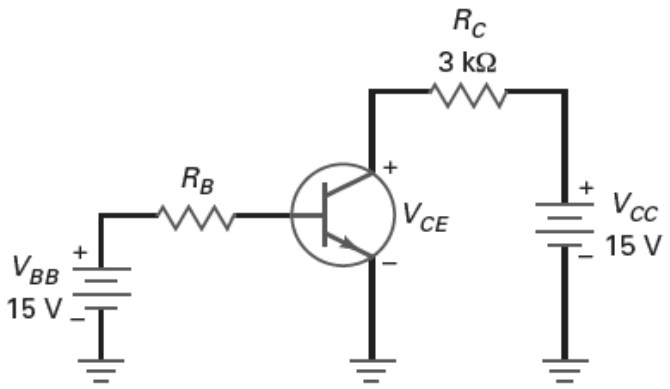
Department of Electronics and Communication Engineering

Course Code: UEC-301; **Course Name:** Analog Electronic Circuits

B.E. (ECE/ENC) (IV-Sem), "Tutorial Sheet No. - 3"

[1]	Explain the concept of Faithful Amplification in connection with using BJT as an amplifier. [*Hint*: consult books by Prof. Millman/Boylestad]
[2]	Explain the role of transistor biasing for proper faithful amplification through BJT. [*Hint*: consult books by Prof. Millman/Boylestad]
[3]	For the following circuit shown, an npn transistor has $V_{cc} = 6\text{V}$ and the collector load $R_c = 2.5\ k\Omega$.  Find: [i] the maximum collector current that can be allowed during the application of signal for faithful amplification, [ii] The minimum zero signal collector current required.
[4]	Explain the importance of Quiescent (Q) or Operating point of BJT. Also, the students are required to explore books and find answer by themselves of following question::-- We all know that transistor or BJT is a non-linear device, then how we get the linear amplification through BJT. Consult the following figure shown for your answer:

	 (a) Linear operation: larger output has same shape as input except that it is inverted (b) Nonlinear operation: output voltage limited (clipped) by cutoff (c) Nonlinear operation: output voltage limited (clipped) by saturation
[5]	Explain the role of DC load line to determine the Q-point for BJT operation as an amplifier. Define *DC load line* and what is the meaning of *load* in DC load line? How to draw DC load line and which two operating regions of BJT are considered while determining DC load line?
[6]	Discuss with your class-mates that, while determining the DC load line, is it that we are applying an AC signal of interest for amplification purpose or not and state the reason if it is yes or no? [*Hint*: consult books by Prof. Millman/Boylestad]
[7]	For the following circuit shown, plot the DC load line [*it's not a numerical problem, but the student should be aware for drawing Dc load line!!*] 
[8]	For the following circuit, draw the DC load line?

	
[9]	For the circuit given below, draw the DC load line. Also, determine $I_{B_Q}, I_{C_Q}, V_{CE_Q}, V_{CB}$