KATHMANDU ENGINEERING COLLEGE

Department of Electronics, Computer and Electrical Engineering

Tutorial Set No.1 **ELECTRONIC CIRCUITS I**

BEX Section A Instructor: Ajay Kumar Kadel (AK)

Problem 1 (7 points)

Draw a circuit diagram of emitter unbypassed common emitter amplifier. Also find its input and output ac resistances. Also find its voltage gain.

Problem 2 (6 points)

Draw a basic circuit diagram to study the i_D-V_{DS} characteristics of a N-channel JFET. Also show the border line between triode and pinch off regions.

Problem 3 (2 points)

To use a transistor as an amplifier, why do you generally prefer common emitter (CE) configuration rather than common base (CB) configuration?

Problem 4 (6 points)

How does JFET behave for (i) small values of V_{DS} and (ii) for large values of V_{DS}? Why is the input impedances of such devices high?

Problem 5 (4 points)

How does an E-MOSFET differ from DE-MOSFET?

Problem 6 (5 points)

Draw large and small signal equivalent circuit model of NPN BJT operating in active mode as voltage controlled current source.

Problem 7 (2 points)

Draw large and small signal equivalent circuit model of a PN junction diode.

Problem 8 (4 points)

How is depletion type MOSFET different from a JFET? Why is the input impedances of such devices high?

Problem 9 (8 points)

Define transconductance g_m for a JFET and show how it depends upon the dc bias point. Compare BJT with MOSFET.

Problem 10 (8 points)

Draw a common emitter amplifier circuit using npn transistor with two emitter resistances (RE1 is NOT bypassed while RE2 is bypassed using CE). Find the voltage gain of this circuit. Explain how input resistance can be increased in the common emitter amplifier?