

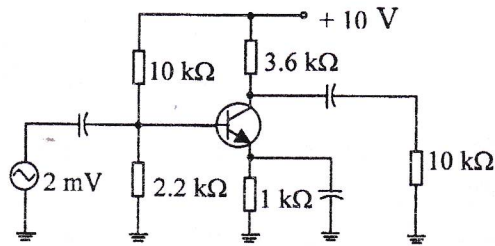
Bago University
Department of Physics
Second Semester Examination, September 2019

Third Year (BSc)
(Physics Specialization)

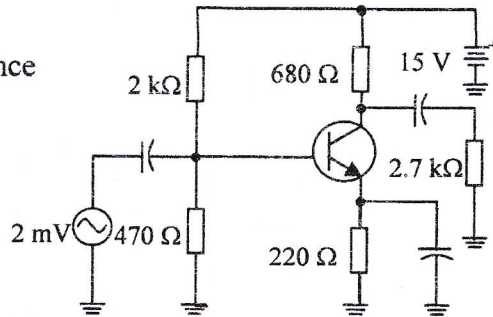
Phys 3102
Electronics
Time Allowed: (3) Hours

Answer any Six questions.

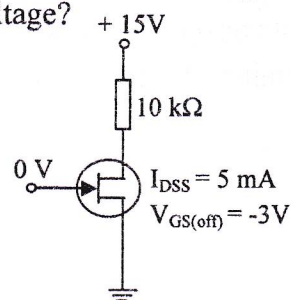
- 1 (a) Sketch bypass capacitor and explain.
 (b) In figure, the ac generator has an internal resistance of 600Ω . What is the output voltage in figure if $\beta = 300$?



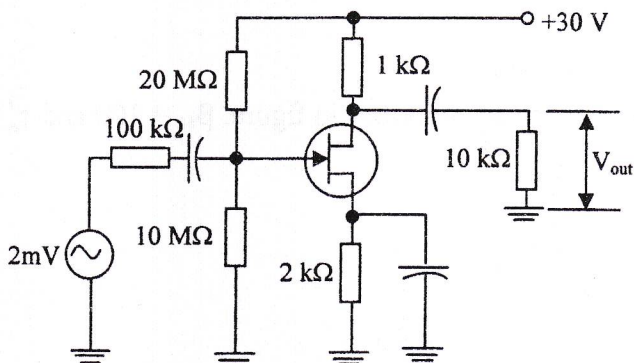
- 2 (a) Draw T model and show that the input impedance of the base is equals to the ac current gain times the ac resistance of the emitter diode.
 (b) If the emitter resistance is doubled in figure, what is the input impedance of the base with $\beta = 250$?



- 3 (a) Sketch voltage-divider bias and explain.
 (b) What is the drain saturation current in figure? The drain voltage?

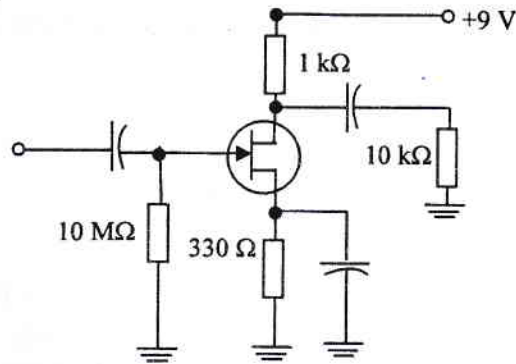


- 4 (a) Discuss the biasing in ohmic region of E-MOSFETs.
 (b) The JFET amplifier of figure has $I_{DSS} = 12 \text{ mA}$, $V_{GS(off)} = -4 \text{ V}$. What is the ac output voltage?

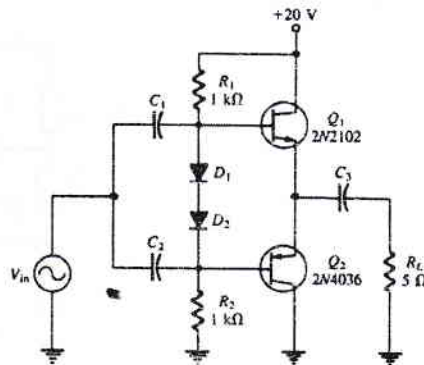


- 5 (a) Draw common-drain amplifier and derive its voltage gain.

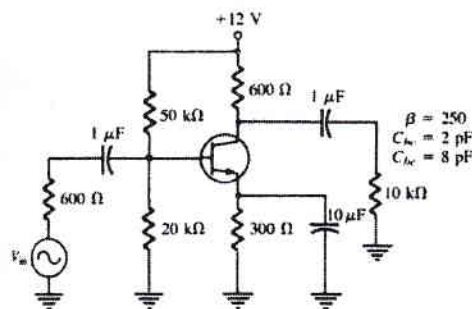
- (b) For the common-source amplifier in figure, determine I_D , V_{GS} , and V_{DS} for a centered Q-point. $I_{DSS} = 9 \text{ mA}$, $V_{GS(off)} = -3 \text{ V}$.



- 6 (a) Define efficiency and show that 25 percent is the highest possible efficiency available from a class A amplifier.
 (b) Determine the dc voltages at the bases and emitters of Q_1 and Q_2 in figure. Also determine V_{CEQ} for each transistor.



- 7 (a) Show that a critical point in the amplifier's response is generally accepted to occur when the output voltage is 70.7 percent of the input and also derive lower critical frequency.
 (b) Determine a high-frequency equivalent circuit for the given amplifier.



- 8 (a) Sketch the development of the bypass RC circuit.
 (b) Determine the total low-frequency response of the amplifier in figure. $\beta_{ac} = 100$ and $r'_e = 13.9 \Omega$.

