

EECS 3420 Electronics II  
Special Problem Set Solutions

For each of the following BJT's (Q1-Q8), voltages with respect to circuit common are given. Determine which of the four modes of operation it is in.

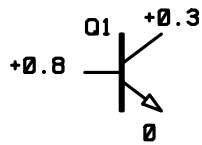
Q1

nnp

$$V_{BE}=+0.8$$

$$V_{CB}=-0.5$$

Saturation Mode



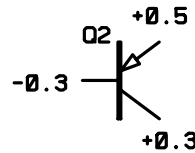
Q2

pnp

$$V_{EB}=+0.8$$

$$V_{BC}=-0.6$$

Saturation Mode



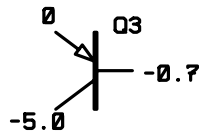
Q3

pnp

$$V_{EB}=+0.7$$

$$V_{BC}=+4.3$$

Forward Active Mode



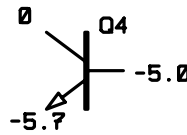
Q4

nnp

$$V_{BE}=+0.7$$

$$V_{CB}=+5$$

Forward Active Mode



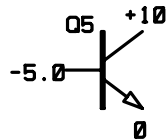
Q5

nnp

$$V_{BE}=-5$$

$$V_{CB}=+15$$

Cutoff Mode



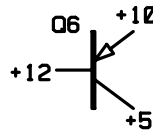
Q6

pnp

$$V_{EB}=-2$$

$$V_{BC}=+7$$

Cutoff Mode



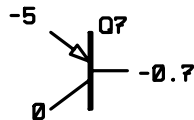
Q7

pnp

$$V_{EB}=-4.3$$

$$V_{BC}=-0.7$$

Reverse Active Mode (exchange E and C)



Q8

nnp

$$V_{BE}=-4.3$$

$$V_{CB}=-0.7$$

Reverse Active Mode (exchange E and C)

