BRAC UNIVERSITY
Department of Computer Science and Engineering

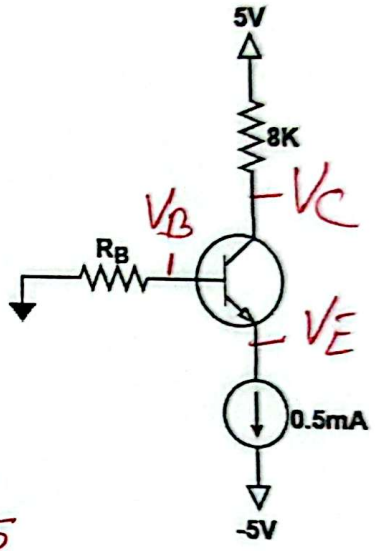
Quiz 04 | **Time: 15 min**
Semester: Summer 2025 | **Full Marks: 14**

Name:	ID:	Section:

CSE 251: Electronic Devices and Circuits

1. [CO1] 4
Show the I-V characteristics graph of BJT (I_c vs V_{CE}) . **Identify** the operating regions in the graph.

2. [CO2] 10
For the transistor in the following circuit , $\beta = 75$, $V_{BE,active} = V_{BE,Sat} = 0.7$ V.
Determine the value of R_B that results in transistor operating in active mode with $V_{CE} = 2$ V



2) $I_E = 0.5mA$

$I_E = (1+\beta) I_B$

$\therefore I_B = \frac{0.5}{1+75} = 0.0066mA$

$I_c = \beta I_B = 75 \times 0.0066 = 0.495$

$I_c = \frac{5 - V_c}{8}$

$\therefore V_c = 5 - 8I_c = 5 - (8 \times 0.495)$
$= 1.04V$

$V_{CE} = 2V$
$\Rightarrow V_c - V_E = 2V$
$\therefore V_E = -0.96$

$V_{BE} = 0.7$
$\Rightarrow V_B - V_E = 0.7$
$\therefore V_B = -0.26$

$I_B = \frac{0 - V_B}{R_B}$
$\Rightarrow R_B = \frac{0 + 0.26}{0.0066}$
$= 39.39K$