ID:	Name:

Brac University
Semester: Fall 2024
Course Code: CSE251
Electronic circuitry and devices
Section:09
Faculty: RMT

Set
A

Assessment: *Quiz 5*
Duration: 40 minutes
Date: January 12, 2025
Full Marks: 20

- ✓ **All questions** are compulsory. Marks allotted for each question are mentioned beside each question.
- ✓ Symbols have their usual meanings.

■ Question 1 of 1 *[CO1, CO2, CO3] [20 marks]*

The input voltage of a half-wave rectifier is a **Sine** wave with amplitude $V_M = 10\breve{V}$ and $40\breve{H}z$ frequency. The output load resistance is $R = 50\breve{k}O$. A silicon diode is used in this circuit whose forward voltage drop is $V_{D_0} = 0.6\breve{V}$.

(a) ***[8 marks]*** Briefly **explain** the purpose of a rectifier. **Draw** the input and output waveforms of the mentioned rectifier with proper labeling. **Draw** the Voltage Transfer Characteristic (VTC) curve of the rectifier.

(b) ***[2 marks]*** **Calculate** the DC value of the output voltage, V_{DC}.

(c) ***[6 marks]*** After connecting a capacitor parallel to the load, V_{DC} changes to $V_{\text{DC(Cap)}}$ and the new output voltage can be expressed as $V_{\text{out}} = V_{\text{DC(Cap)}} \pm 0.5\breve{V}$. **Calculate** the peak-to-peak ripple voltage $V_{r(p-p)}$, and **determine** the ripple frequency, f_{r}. Now, **calculate** the value of the capacitor, C.

(d) ***[2 marks]*** **Calculate** the DC value of the output voltage after connecting the capacitor, $V_{\text{DC(Cap)}}$.

(e) ***[2 marks]*** **Compare** $V_{\text{DC(Cap)}}$ with V_{DC} determined in part-(b) and briefly **explain** their difference.