Program: BSEE (2022-26) **Subject:** EE-411 Power Electronics
Examination: Review Assignment **Instructor:** Mr Tanveer Abbas
Marks: 100 **Due:** 10-01-2025

Assignment No. 01 (CLO 01)

Review Questions

1. Define power electronics.
2. What are advantages of power electronic converters as compared to other electrical power conversion methods?
3. Why LM7805 voltage regulator is not a power electronic converter?
4. Draw a generic block diagram of a power electronic converter and briefly describe its components.
5. List down the steps of a semiconductor switch design and realization.
6. Draw a diagram of gate drive circuit and give generic design of its components.
7. Suggest a suitable value of Vgs for IRF-540 MOSFET based switch to drive a load of 20A±5A using a power supply of 70V±5V. Attach piece of datasheet that you use to decide Vgs.
8. Design a gate drive circuit using HCPL-3120 optocoupler for the switch used in (7) if the switch is to be driven by an AT Tine 85 microcontroller. Specify your design considerations.
9. Compare the static and dynamic power losses in the switch designed in (7-8) for operating frequency of 1kHz and 15kHz considering the rise time of 1µs and fall time of 1.5µs.
10. What are reverse recovery characteristics? What factors determine peak reverse recovery current and reverse recovery time for a diode?