NPTEL Online Certification Course
<Design of Power Electronics converter>
<Assignment Number 2>: Detailed Solution
Indian Institute of Technology Guwahati

For Problems 1 to 9, note the following important instructions for entering answer:

- Enter values exactly as given in the datasheet.
- Do not apply rounding off.
- Do not enter the unit.

For problems 1 to 9 to you need to read the datasheet of MOSFET IRFP90N20DPbF. After studying the datasheet, enter the following values:

1. Voltage rating ... (V)

   Ans: 200

2. Continuous current rating at $100^\circ C$ ... (A)

   Ans: 66

3. Pulsed current rating ... (A)

   Ans: 380

4. ON state resistance ... (Ω)

   Ans: 0.023

5. Maximum gate to source threshold voltage ... (V)

   Ans: 5.0

6. Typical value of total gate charge ... (nC)

   Ans: 180

7. Typical turn ON time ... (ns)

   Ans: 183

8. Input capacitance ... (pF)

   Ans: 6040

9. Maximum reverse recovery time of the body diode ... (ns)

Ans: 340

10. For designing a buck converter, MOSFET and diode need to be chosen such that the voltage rating is above 40 V and continuous current rating is above 10 A. Which of the following MOSFET and diode you 'll choose for the design?

    (a) MOSFET: IRF540NPBF and diode: PMEG2010ER
    (b) MOSFET: NVE4153NT1G and diode: STPS20SM60D
    (c) MOSFET: IRF540NPBF and diode: STPS20SM60D
    (d) MOSFET: IRF540NPBF and diode: VS-26MT10

Ans: c

To answer this question, you may google and obtain the datasheets of the above-mentioned part numbers of MOSFETs and diodes.