| PRN: | | Course Code : | PPD302 |
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Second Year **M. Tech** End Semester Examination Winter 2024

# Modeling of Power Converters 000942

Day and Date: 2 DEC 2024 Max Marks: **100**

Time : 10:30AM To 01:30PM Duration: **03** hrs

Instructions: All questions are compulsory.

| | | Marks | Bloom's Level | CO |
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| Q.1 | **Attempt the following** | | | |
| a) | Draw the white box model of buck converter and construct the equivalent circuit of the buck converter during Turn – on and Turn off Time. | 08 | $L_4$ | CO1 |
| b) | Derive the matrix form of equation which describe the characteristics of buck converter during Turn -on and Turn-off time? | 08 | $L_4$ | CO1 |
| | OR | | | |
| b) | Design the isolated capacitance of buck converter with the help of converter during Turn-On and Turn-Off time? | 08 | $L_4$ | CO1 |
| Q.2 | **Attempt the following** | | | |
| a) | Draw the equivalent circuit of synchronous boost converter during Turn on and Turn off Time? | 08 | $L_3$ | CO2 |
| b) | Design the output capacitor of boost converter with suitable evaluation of performance? | 08 | $L_3$ | CO2 |
| | OR | | | |
| b) | Drive the model equation of synchronous boost converter in matrix form? | 08 | $L_3$ | CO2 |
| Q.3 | **Attempt any two from the following** | | | |
| a) | Draw the equivalent circuit of six pulse diode bridge rectifier during ON and OFF time of diodes? | 08 | $L_4$ | CO2 |
| b) | Derive the model equation of six pulse diode bridge rectifier? | 08 | $L_4$ | CO2 |
| c) | Derive the filter capacitance of six pulse diode bridge rectifier from the modeling equation? | 08 | $L_4$ | CO2 |
| Q.4 | **Attempt any two from the following** | | | |
| a) | Draw the flowchart of parameter estimation methodology based on Nonlinear least square algorithm? | 08 | $L_5$ | CO3 |



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| | b) | Detail the concept of Trust region reflective least square method for modeling? | 08 | $L_5$ | CO3 |
| | c) | Design the power supply filter for various applications? | 08 | $L_5$ | CO3 |
| Q.5 | | **Attempt any Two of the following** | | | |
| | a) | Detail the concept of Non-Linear Autoregressive Exogenous Neural Network? | 09 | $L_5$ | CO4 |
| | b) | Construct the flowchart for Levenberg-Marquardt algorithm to estimate weights of the neural network? | 09 | $L_5$ | CO4 |
| | c) | Detail the operation of training algorithm? | 09 | $L_5$ | CO4 |
| Q.6 | | **Attempt any Two of the following** | | | |
| | a) | Draw the date acquisition setup of analyzing buck converter and detail the operation? | 09 | $L_6$ | CO4 |
| | b) | Write the principle of discrete wavelet transform and explain the concept? | 09 | $L_6$ | CO4 |
| | c) | What is Bayesian optimization and how will it helpful to model the power converters? | 09 | $L_6$ | CO4 |

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