



R17 Regulation

Subjectcode: 1E7BE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech IV Year I Semester Supplementary Examinations, January 2023
ADVANCED POWER ELECTRONICS

(EEE)

Maximum Marks: 70

18-01-2023

Duration: 3 hours

- Note: 1. This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 List out few applications of the high power switching devices.
- 2 What are Causes of dynamic Voltage Unbalance in power devices?
- 3 How many number of dc sources are required for 15 level single phase cascaded H-Bridge multilevel inverter?
- 4 What is meant by over modulation?
- 5 How to overcome the problem of multiple blocking voltages of the Clamping diodes in diode-clamped multilevel inverter?
- 6 Mention the Causes of Neutral-Point Voltage Deviation in NPC inverters.
- 7 Write the output voltage equation for boost converter?
- 8 Distinguish between a cuk and buck converters.
- 9 Name few power conditioners.
- 10 Distinguish between on load UPS and off load UPS.

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 a). What is Gate turn -off (GTO) SCR? Discuss its operation with switching characteristics. (5M)
b). With neat sketches discuss switching characteristics of SCR and give your interference. (5M)

OR

- 12 a) Compare the features of IGBT and SCR. Mention advantages and limitations of each device. (5M)
b) Explain the procedure for Dynamic Voltage Equalization in GCTs. (5M)
- 13 Explain the principle of operation of cascaded multilevel inverter with uni polar PWM and discuss the features.

OR

- 14 a) Discuss Third Harmonic Injection PWM technique with suitable example. (5M)
b) Write short notes on Even-Order Harmonic Elimination method in inverters. (5M)

- 15 a) Explain the principle of operation of three levels Diode-Clamped Multilevel Inverter with the help of switching table. (6M)
b) Mention the applications of multilevel inverter. (4M)

OR

- 16 a) How multilevel inverters are used as Regenerative operation of drives explain in detail. (7M)
b) Briefly discuss how to overcome the drawbacks of basic two level inverter with Multilevel inverters? (3M)
- 17 a) Discuss about Protection used in Power supplies. (5M)
b) Explain the operation of Full bridge DC-DC converter with the help of voltage and Current waveforms. (5M)

OR

- 18 a) Briefly explain about electrical isolation in the feedback loop. (4M)
b) Explain the operation of Buck- boost converter, derive the duty cycle and obtain voltage and current waveforms. (6M)
- 19 a) Explain the operation of two quadrant ZVS resonant converter with relevant waveforms. (5M)
b) Summarize the operation of resonant DC-link Inverter with relevant waveforms. (5M)

OR

- 20 a) What are the reasons for power line disturbances? (4M)
b) What is the general arrangement of UPS systems? .Mention different rectifier configurations in the UPS. (6M)