24001280

QP CODE: 24001280

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, MARCH 2024

Sixth Semester

B.Sc Electronics Model III

CHOICE BASED CORE COURSE - EL6CBT02 - POWER ELECTRONICS

2017 Admission Onwards

19C2692D

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. What is a thyristor? Sketch its schematic diagram and circuit symbol.
2. Sketch a general layout of the firing circuit scheme for SCRs.
3. Explain the need to have series or parallel connection of SCRs.
4. Differentiate between an SCR and a TRIAC.
5. What are controlled rectifiers? Give any four applications of phase controlled rectifiers.
6. Differentiate between a step-up and step-down cycloconverter?
7. Explain the need for commutation in thyristor circuits. List the different methods of commutation schemes.
8. What are the two main types of inverters? Distinguish between them explicitly.
9. Enumerate the merits and demerits of an AC voltage controller.
10. What is meant by step-up chopper?
11. What is Boost regulator? Mention its advantages.
12. What is the principle of electric arc welding? Mention the typical values of current and voltage rating of a welding equipment.

(10×2=20)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. What are the advantages of GTO over an SCR?
14. Draw the circuit diagram of an n-channel Power MOSFET and explain its typical transfer characteristics.
15. Explain the working of a single phase semi-converter with RLE Load with necessary circuit diagram and waveforms.
16. Explain the operation of single phase series converter.
17. Describe the operation of single phase full bridge inverter with necessary diagrams.
18. Discuss briefly with necessay block diagram, the external control of DC input voltage to the inverter.
19. Discuss briefly the control strategies used in DC choppers. How does current limit control differ from TRC? Which of these strategies are preferred over the other and why?
20. Explain the working of Buck regulator with necessary sketches. Mention its advantages.
21. With the help of suitable diagrams explain illumination control using TRIAC.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. With necessary sketches explain how thyristor and gate circuit is protected against over voltages and overcurrents.
23. What do you mean by thyristor commutation techniques? With neat circuit diagram, explain load commutation, line commutation and Class E commutation for thyristors.
24. Explain the principle of phase control in a single-phase AC voltage controller. Describe the working of a single-phase voltage controller feeding resistive load with waveforms of input and output voltages, currents and gating signals
25. Discuss Buck regulator and Boost regulator wih necessary circuit diagras and waveforms. Mention the advntages and disadvantages of these regulators.

(2×15=30)