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QP CODE: 25021038

Reg No	:	
Name	:	

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE / MERCY CHANCE EXAMINATIONS, FEBRUARY 2025

Sixth Semester

B.Sc Electronics Model III

CHOICE BASED CORE COURSE - EL6CBT02 - POWER ELECTRONICS

2017 Admission Onwards

81B7123F

Time: 3 Hours

Max. Marks: 80

Part A

Answer any **ten** questions. Each question carries **2** marks.

- 1. Discuss the conditions that must be satisfied for turning ON an SCR with a gate signal.
- 2. Define the following terms relating to SCRs in a string (i) string efficiency (ii) derating factor (DRF).
- 3. Sketch the diagram showing the circuit components for thyristor protection.
- 4. Sketch and explain the V-I characteristics of a power diode.
- 5. Define the following terms: (i) Firing angle (ii)Conduction angle.
- 6. What are series converters? What are their advantanges?
- 7. Class C commutation is also called complimentary impulse commutation'. Explain.
- 8. What are line commuted inverters? How do they operate?
- 9. What is an AC Voltage-controller? List few of its industrial appliations.
- 10. What is switching mode regulator? What are its basic types?
- 11. What is Buck regulator? Mention its advantages.
- 12. Draw a circuit to control illumination using TRIAC.

(10×2=20)

Part B

Answer any **six** questions. Each question carries **5** marks.

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- 13. With a circuit diagram explain the trigger circuit for a TRIAC using a DIAC.
- 14. List the triggering methods of SCR. Explain any two methods in detail.
- 15. Describe the basic working principle of single-phase to single-phase step down cycloconverter with necssary diagrams.
- 16. Compare thyristor commutation techniques in terms of line, load and forced commutation.
- 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. What is Time Ratio Control (TRC) in relation to DC chopppers? What are the advantages and disadvantages of constant frequency system compared to variable frequency system?
- 20. With a circuit diagram discuss the operation of a boost regulator. Mention it advantages.
- 21. What is the principle of Electric Arc Welding. Discuss in detail switch mode welder configuration. What are its merits over other configuritors?

(6×5=30)

Part C

Answer any **two** questions. Each question carries **15** marks.

- 22. Explain the construction and operation of the follwing devices of thyristor family: (i) GTO, (ii)PUT, (iii)LASCR
- 23. Explain the opertion of a half wave rectifier with RL load with necessary circuit diagram and waveforms. Discuss the effect of using a free-wheeling diode in the circuit performance. Mention the applications of controlled rectifiers.
- 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. What is a DC Chopper? With neat circuit diagrams and waveforms describe the working of:(i) Type D Chopper (ii) Type E Chopper.

(2×15=30)

