# Industrial Electronics and Control of Drives

## Previous Year Questions, Sorted by Marks and Unit

Diploma in Electrical Engineering (NSQF Level 5), HSBTE, Industrial Electronics and Control of Drives. Exams covered: Feb 2022, July 2022, Feb 2023, July 2023, Jan 2024, July 2024, Dec 2024, May 2025, May 2026.

Removed From Syllabus: topic is not in the new syllabus (battery and CVT topics).

Repeated questions are listed once with all exams, most frequently asked first. Where wording differed between years, versions are merged with "/".

### 1 Mark Questions

#### Unit I: Introduction to Thyristors

- Define commutation. / What is commutation? *(Unit I, Exam July 2022, Feb 2023, July 2023, July 2024, May 2025)*
- An SCR is a ___ layer, ___ junction device. / SCR has ___ p-n junctions: (a) Two (b) Three (c) Four (d) Five *(Unit I, Exam Feb 2022, July 2022, Jan 2024, May 2026)*
- A UJT has ___ pn junction(s): (a) One (b) Two (c) Three (d) None of the above *(Unit I, Exam Feb 2022, July 2023, July 2024, May 2025)*
- A TRIAC is a ___ switch: (a) Unidirectional (b) Mechanical (c) Bidirectional (d) Omnidirectional/Four directional *(Unit I, Exam July 2022, May 2025, May 2026)*
- If the firing angle in an SCR rectifier is decreased, the output is: (a) Increased (b) Decreased (c) Maximum (d) Remains unaffected *(Unit I, Exam Feb 2023, July 2023, May 2025)*
- Name any one/two members of the thyristor family. *(Unit I, Exam Feb 2023, Jan 2024, May 2025)*
- The value of latching current is more than the holding current. (True/False) *(Unit I, Exam Jan 2024, Dec 2024, May 2026)*
- A UJT is a ___ terminal device: (a) Two (b) Three (c) Four (d) Five *(Unit I, Exam July 2022, Dec 2024)*
- Draw the symbol of DIAC (and list one application). *(Unit I, Exam July 2022, Feb 2023)*
- An SCR is a ___ switch: (a) Unidirectional (b) Bidirectional (c) Three directional (d) Four directional *(Unit I, Exam Feb 2023, Dec 2024)*
- The most suitable method to turn on an SCR is: (a) Gate triggering (b) Forward voltage triggering (c) Temperature triggering (d) dv/dt triggering *(Unit I, Exam Feb 2023, July 2024)*
- The SCR is turned off when the anode current falls below: (a) Break over voltage (b) Forward current rating (c) Latching current (d) Holding current *(Unit I, Exam July 2023, May 2025)*
- Material used for making heat sinks: (a) Zinc (b) Aluminium (c) Nickel (d) All of these *(Unit I, Exam July 2023, July 2024)*
- Define/State latching current. *(Unit I, Exam July 2023, July 2024)*
- List/State any one application of DIAC. *(Unit I, Exam July 2023, July 2024)*
- A DIAC is a ___ device: (a) Self heating (b) Bidirectional (c) Tri-directional (d) None of these *(Unit I, Exam July 2024, May 2026)*
- A DIAC is used as triggering agent for TRIAC. (True/False) *(Unit I, Exam July 2024, Dec 2024)*

- A thyristor (SCR) is a: (a) Current controlled device (b) Bilateral device (c) Voltage controlled device (d) None of the above *(Unit I, Exam Dec 2024, May 2026)*
- The output voltage of a controlled rectifier is maximum when firing angle is ___: (a) 120° (b) 60° (c) 0° (d) 90° *(Unit I, Exam Dec 2024, May 2026)*
- A TRIAC can pass a portion of ___ half cycle through the load: (a) only positive (b) only negative (c) both positive and negative (d) None of the above *(Unit I, Exam Feb 2022)*
- A UJT exhibits negative resistance characteristics when: (a) current is less than valley current (b) current is less than peak current (c) current is more than peak but less than valley current (d) None of the above *(Unit I, Exam Feb 2022)*
- In normal operation, the anode of an SCR is kept ___ w.r.t. cathode: (a) Negative (b) Positive (c) At zero potential (d) At infinite potential *(Unit I, Exam Feb 2022)*
- A DIAC is simply a ___ device: (a) single junction (b) three junction (c) triac without a gate terminal (d) none of the above *(Unit I, Exam Feb 2022)*
- The value of firing angle cannot be more than ___: (a) 90° (b) 120° (c) 180° (d) 270° *(Unit I, Exam Feb 2022)*
- What is the full form of SCR? *(Unit I, Exam Feb 2022)*
- What is the need to connect SCRs in series and parallel? *(Unit I, Exam Feb 2022)*
- What is TRIAC? *(Unit I, Exam Feb 2022)*
- Define the term firing angle. *(Unit I, Exam Feb 2022)*
- A UJT is mainly used as: (a) controlled rectifier (b) uncontrolled rectifier (c) timing circuit for triggering of SCRs (d) controlled rectifier and triggering of SCRs *(Unit I, Exam July 2022)*
- What is the full form of UJT? *(Unit I, Exam July 2022)*
- What do you mean by heat sink? *(Unit I, Exam July 2022)*
- Define the term string efficiency. *(Unit I, Exam July 2022)*
- Give the advantages of TRIAC. *(Unit I, Exam July 2022)*
- SCRs are connected in parallel to fulfil the ___ demand: (a) High voltage (b) High current (c) Size (d) Efficiency *(Unit I, Exam Feb 2023)*
- A DIAC is turned on by: (a) Breakover voltage (b) Gate current (c) Gate voltage (d) None of the above *(Unit I, Exam Feb 2023)*
- List any one application of TRIAC. *(Unit I, Exam Feb 2023)*
- In the SCR structure the gate terminal is located: (a) Near the anode (b) Near the cathode (c) In between anode and cathode (d) None of the above *(Unit I, Exam July 2023)*
- Draw the symbol of SCR. *(Unit I, Exam July 2023)*
- Define UJT. *(Unit I, Exam July 2023)*
- Intrinsic stand-off ratio (η) of UJT is given by η = (a) VB/VBB (b) VBB/VB (c) VBB – VB (d) VB – VBB *(Unit I, Exam Jan 2024)*
- A DIAC can be fired: (a) only by negative half cycle (b) only by positive half cycle (c) by both positive and negative half cycle (d) without any biasing voltage *(Unit I, Exam Jan 2024)*
- The value of ON state voltage of an SCR is approximately: (a) 100 V (b) 500 V (c) 50 V (d) 4 C (as printed) *(Unit I, Exam Jan 2024)*
- Draw the symbol of TRIAC. *(Unit I, Exam Jan 2024)*
- Define di/dt rating of SCR. *(Unit I, Exam Jan 2024)*
- The turn ON time of an SCR is about ___ sec. *(Unit I, Exam Jan 2024)*

- Holding current is ___ than latching current: (a) More (b) Less (c) Equal to (d) None of these *(Unit I, Exam July 2024)*
- A DIAC has ___ pn junctions: (a) Four (b) Two (c) Three (d) None of the above *(Unit I, Exam Dec 2024)*
- Which of the following is not a characteristic of UJT? (a) Intrinsic stand-off ratio (b) Negative resistance (c) Peak-point voltage (d) Bilateral conduction *(Unit I, Exam Dec 2024)*
- The value of the holding current of an SCR is: (a) one fourth of its latching current (b) slightly less than its latching current (c) slightly more than its latching current (d) equal to its latching current *(Unit I, Exam Dec 2024)*
- SCR is a unidirectional switch. (True/False) *(Unit I, Exam Dec 2024)*
- The value of latching current is less than holding current. (True/False) *(Unit I, Exam Dec 2024)*
- Draw the symbol of UJT. *(Unit I, Exam Dec 2024)*
- Class D commutation is also known as ___ commutation. *(Unit I, Exam Dec 2024)*
- What is the purpose of snubber circuit? *(Unit I, Exam Dec 2024)*
- The number of gates in a silicon controlled switch (SCS) is: (a) One (b) Two (c) Three (d) Four *(Unit I, Exam May 2025)*
- A TRIAC can be triggered by gate pulse of ___ polarity. *(Unit I, Exam May 2025)*
- The process of turning OFF a thyristor is called ___. *(Unit I, Exam May 2025)*
- A UJT is a: (a) Current controlled device (b) A relaxation oscillator (c) Voltage controlled device (d) None of the above *(Unit I, Exam May 2026)*
- ___ can be used as a dc static switch: (a) GTO (b) Transistor (c) Both GTO & Transistor (d) TRIAC *(Unit I, Exam May 2026)*
- While conducting, the resistance of SCR is ___. *(Unit I, Exam May 2026)*
- Latching current is related to: (a) Turn-on process of SCR (b) Turn-off process of SCR (c) Both (a) and (b) (d) None of the above *(Unit I, Exam May 2026)*

## Unit II: Controlled Rectifiers

- Define controlled rectifier. / What is a controlled rectifier? *(Unit II, Exam July 2024, May 2025, May 2026)*
- A three phase full wave half controlled bridge uses: (a) 2 SCRs (b) 3 SCRs (c) 4 SCRs (d) 6 SCRs *(Unit II, Exam Jan 2024, Dec 2024)*
- A fully controlled converter uses: (a) Diodes only (b) Thyristors only (c) Both diodes and thyristors (d) None of these *(Unit II, Exam July 2024, May 2025)*
- In a three phase full wave fully controlled bridge rectifier, the number of SCRs used is: (a) 3 (b) 4 (c) 5 (d) 6 *(Unit II, Exam Feb 2022)*
- Why a fully controlled converter is called so? *(Unit II, Exam Feb 2022)*
- List any two advantages of three phase converters. *(Unit II, Exam July 2022)*
- Write the purpose of freewheeling diode. *(Unit II, Exam Feb 2023)*
- A freewheeling diode is used in a controlled rectifier circuit in case of: (a) Capacitive load (b) Inductive load (c) Resistive load (d) All types of load *(Unit II, Exam Dec 2024)*
- List two applications of controlled rectifier. *(Unit II, Exam Dec 2024)*
- In a three-phase half wave 6-pulse mid-point type diode rectifier, each diode conducts for: (a) 120° (b) 90° (c) 60° (d) 180° *(Unit II, Exam May 2025)*

- In half wave rectifiers one switching device is used. (True/False) *(Unit II, Exam May 2025)*
- Full wave rectifiers allow power flow in both directions. (True/False) *(Unit II, Exam May 2026)*
- In a single phase half-wave circuit with RL load and a freewheeling diode, the load voltage during the freewheeling period will be: (a) Zero (b) Positive (c) Negative (d) Positive then negative *(Unit II, Exam May 2026)*
- A single phase full controlled bridge converter uses: (a) 4 SCRs and 2 diodes (b) 4 SCRs (c) 6 SCRs (d) 4 SCRs and 2 diodes *(Unit II, Exam May 2026)*

## Unit III: Inverters, Choppers, Dual Converters and Cyclo-Convertors

- Define inverter. / What is the function of an inverter? *(Unit III, Exam July 2022, July 2023, July 2024, Dec 2024, May 2026)*
- An inverter converts: (a) AC to DC (b) DC to AC (c) DC to DC (d) AC to AC *(Unit III, Exam Feb 2022, Feb 2023, May 2025, May 2026)*
- A cycloconverter is a: (a) One stage power converter (b) One stage voltage converter (c) One stage frequency converter (d) None of the above *(Unit III, Exam Feb 2023, July 2023, July 2024, May 2025)*
- A chopper circuit converts: (a) DC to DC (b) AC to DC (c) DC to AC (d) AC to AC *(Unit III, Exam July 2022, Dec 2024, May 2025)*
- The duty cycle of a chopper is expressed as ___: (a) Ton/(Ton + Toff) (b) Ton/Toff (c) Ton × (Ton + Toff) (d) Ton × Toff *(Unit III, Exam July 2022, May 2025, May 2026)*
- A DC chopper controls the average (load) voltage by varying the: (a) Duty cycle / duration of Ton and Toff (b) Firing angle (c) Reactor position (d) Extinction angle *(Unit III, Exam Feb 2023, July 2023, Dec 2024)*
- Dual converter can be operated in ___ quadrants: (a) One (b) Two (c) Three (d) Four *(Unit III, Exam July 2022, July 2024)*
- Write two applications of cycloconverter. / The main application of cycloconverter circuits is found in ___. *(Unit III, Exam Feb 2023, May 2026)*
- Class B chopper operates in ___ quadrant. *(Unit III, Exam July 2024, Dec 2024)*
- Explain the term cycloconverter. / What is a cycloconverter? *(Unit III, Exam July 2024, May 2026)*
- A cycloconverter can be: (a) Step down (b) Step up (c) Step down or step up (d) Neither of the above *(Unit III, Exam Dec 2024, May 2025)*
- Define chopper. / What is a chopper? *(Unit III, Exam May 2025, May 2026)*
- Give applications of chopper circuit. *(Unit III, Exam Feb 2022)*
- The voltage source inverter allows a variable frequency supply to be obtained from a ___ source: (a) ac (b) dc (c) both ac and dc (d) only positive ac *(Unit III, Exam July 2022)*
- In which quadrant class D chopper operates? *(Unit III, Exam Feb 2023)*
- Which device can be used in a chopper circuit? (a) BJT (b) MOSFET (c) GTO (d) All of the above *(Unit III, Exam July 2023)*
- The single phase bridge type cycloconverter uses ___ number of SCRs: (a) Four (b) Eight (c) Six (d) None of the above *(Unit III, Exam July 2023)*
- Define duty cycle. *(Unit III, Exam July 2023)*
- A cycloconverter is a: (a) AC-DC converter (b) DC-AC converter (c) DC-DC converter (d) AC-AC converter *(Unit III, Exam Jan 2024)*

- A Class-E chopper can operate in: (a) 1st and 2nd quadrant (b) 2nd and 3rd quadrant (c) 1st and 4th quadrant (d) All the four quadrants *(Unit III, Exam Jan 2024)*
- In a dual converter if one bridge operates in ___ mode then the other bridge operates in ___ mode. *(Unit III, Exam Jan 2024)*
- Harmonics in the output wave can be reduced by adjusting ___ of thyristors. *(Unit III, Exam Jan 2024)*
- A three phase to single phase bridge cycloconverter requires ___ thyristors. *(Unit III, Exam Jan 2024)*
- The main disadvantage of cycloconverter drives is that the output frequency is ___ of input frequency. *(Unit III, Exam Jan 2024)*
- In which quadrant class C chopper operates? *(Unit III, Exam July 2024)*
- What is series inverter? *(Unit III, Exam July 2024)*
- The average output of a d.c. chopper is given by: *(Unit III, Exam Dec 2024)*
- The output frequency of a cycloconverter can be varied by varying the ___ of thyristors. *(Unit III, Exam Dec 2024)*
- Write two applications of dual converter. *(Unit III, Exam Dec 2024)*
- The series inverter uses ___ type of commutation. *(Unit III, Exam May 2025)*
- Cycloconverters are used for generating high frequencies. (True/False) *(Unit III, Exam May 2025)*
- Find the output voltage of a step up chopper at duty cycle of 50% and Vs = 240 V: (a) 240 V (b) 480 V (c) 560 V (d) 120 V *(Unit III, Exam May 2026)*
- The commutation method in an inverter is: (a) Line commutation (b) Forced commutation (c) Either (a) or (b) (d) None of the above *(Unit III, Exam May 2026)*
- A step down chopper can be used in: (a) Electric traction (b) Electric vehicles (c) Machine tools (d) All of these *(Unit III, Exam May 2026)*

## Unit IV: Thyristor Control of Electric Drives

- Which method is used to control the speed of DC shunt motor above normal speed? (a) Armature voltage control (b) Flux control (c) Both (a) and (b) (d) None of the above *(Unit IV, Exam Feb 2023, July 2023, May 2025)*
- Define electric drive. / What is an electric drive? *(Unit IV, Exam Feb 2023, July 2024, May 2025)*
- Field control method is used in DC motors to get: (a) Speed above normal speed (b) Speed below normal speed (c) Both (a) and (b) (d) None of the above *(Unit IV, Exam Jan 2024, Dec 2024, May 2026)*
- Define AC drive. / What is an AC drive? *(Unit IV, Exam July 2022, May 2026)*
- DC motors provide ___ starting torque. *(Unit IV, Exam May 2025, May 2026)*
- Armature control method is used in d.c. motors to get: (a) Constant speed (b) Speeds above normal (c) Speeds below normal (d) Both (b) and (c) / ... speed below ___. *(Unit IV, Exam May 2025)*
- Speed of a motor ___ with increase in firing angle. *(Unit IV, Exam May 2026)*

## Unit V: Power Converter Applications

- Expand UPS. / UPS stands for ___. *(Unit V, Exam July 2022, Jan 2024, Dec 2024, May 2025, May 2026)*

- Expand SMPS. *(Unit V, Exam July 2022, Feb 2023, July 2024, Dec 2024, May 2025)*
- SMPS is used for: (a) Obtaining controlled ac power supply (b) Obtaining controlled dc power supply (c) Storage of dc power (d) Switching from one source to another *(Unit V, Exam July 2023, Dec 2024, May 2025)*
- The transfer time of an on-line UPS is: (a) zero (b) 5 sec (c) 10 msec (d) 50 msec *(Unit V, Exam Feb 2022)*
- The ___ UPS is also called back-up UPS: (a) Online (b) Offline (c) Line interactive (d) None of the above *(Unit V, Exam Feb 2022)*
- What is the source of power in a UPS? *(Unit V, Exam Feb 2022)*
- A static UPS requires: (a) Only rectifier (b) Only inverter (c) Both rectifier and inverter (d) None of the above *(Unit V, Exam Feb 2023)*
- SMPS is essentially a ___ converter with control of the output voltage magnitude: (a) DC to DC (b) DC to AC (c) AC to DC (d) AC to AC *(Unit V, Exam Jan 2024)*
- Write one application of SMPS. *(Unit V, Exam Jan 2024)*
- Usually ___ batteries are used in the UPS system: (a) NC (b) Li-ion (c) Lead acid (d) All of the mentioned *(Unit V, Exam Dec 2024)*
- In an on-line UPS, the inverter is ___ all the time. *(Unit V, Exam Dec 2024)*
- UPS is never used in: (a) Street lighting (b) Communication link (c) Computer (d) All of the above *(Unit V, Exam May 2026)*
- A switching mode power supply is a multistage ___ supply. *(Unit V, Exam May 2026)*

### Removed From Syllabus

- What material is used as positive plate of a lead acid cell? / In a lead acid battery, active material for positive plate is: (a) lead (b) lead dioxide (c) lithium (d) sulphuric acid *(Removed From Syllabus, Exam Feb 2022, July 2022)*
- What is the full form of CVT? *(Removed From Syllabus, Exam Feb 2022, July 2023)*
- Define trickle charging. *(Removed From Syllabus, Exam Feb 2023)*
- SMF batteries are costlier than lead-acid batteries. (True/False) *(Removed From Syllabus, Exam May 2026)*

## 2 Mark Questions

*No 2-mark questions appear in any of the 12 papers.*

## Short Answer Questions

### Unit I: Introduction to Thyristors

- Define triggering and explain the different (any two) methods of triggering of an SCR. *(Unit I, Exam July 2022, July 2023, July 2024, Dec 2024, May 2025, May 2026)*
- Explain the need (importance) and selection (criterion) of heat sink for thyristors. *(Unit I, Exam Feb 2022, Feb 2023, Jan 2024, Dec 2024)*
- Explain the operation of UJT as a relaxation oscillator. *(Unit I, Exam July 2023, July 2024, Dec 2024, May 2025)*
- Explain the two transistor analogy of SCR. *(Unit I, Exam July 2022, Feb 2023, Jan 2024)*

- Explain the fan speed control (fan regulator) circuit using TRIAC-DIAC pair. *(Unit I, Exam Feb 2023, May 2025, May 2026)*
- Write a short note on protection of SCR (thyristor), including snubber circuit protection. *(Unit I, Exam Feb 2023, Jan 2024, July 2024)*
- Explain the series operation of SCRs (thyristors). *(Unit I, Exam July 2023, Jan 2024, July 2024)*
- Draw and explain the illumination (light intensity) control circuit using SCR/TRIAC. *(Unit I, Exam July 2023, May 2025, May 2026)*
- Draw the V-I characteristics of an SCR and explain its working. *(Unit I, Exam Feb 2022, May 2026)*
- Explain the working of SCR (using its layer diagram). *(Unit I, Exam Feb 2022, Dec 2024)*
- Draw the symbol and V-I characteristics of TRIAC. *(Unit I, Exam Feb 2022, Dec 2024)*
- Show and explain the basic construction of a UJT. What is its intrinsic stand-off ratio? *(Unit I, Exam July 2022, May 2025)*
- Draw the symbol and V-I characteristics of DIAC and explain its working. *(Unit I, Exam July 2023, May 2025)*
- Name the different types of commutation and explain any one of them. *(Unit I, Exam Jan 2024, May 2026)*
- Define intrinsic stand-off ratio of a UJT. *(Unit I, Exam Feb 2022)*
- Explain break over voltage of a DIAC. *(Unit I, Exam Feb 2022)*
- Give the applications of TRIAC. *(Unit I, Exam July 2022)*
- Draw the V-I characteristics of UJT and explain its working. *(Unit I, Exam Feb 2023)*
- Define commutation. Explain natural commutation. *(Unit I, Exam Feb 2023)*
- Differentiate between latching current and holding current. *(Unit I, Exam July 2023)*
- Explain speed control of a universal motor with a neat circuit diagram. *(Unit I, Exam Jan 2024)*
- Define the following terms related to SCR: (a) Breakover voltage (b) Peak reverse voltage (c) Holding current (d) String efficiency. *(Unit I, Exam Dec 2024)*
- What do you mean by triggering? Explain the resistance triggering method of SCR. *(Unit I, Exam Dec 2024)*
- Draw and explain the circuit of automatic speed control of a d.c. shunt motor. *(Unit I, Exam Dec 2024)*
- Explain the parallel operation of SCRs. *(Unit I, Exam Dec 2024)*
- Differentiate between SCR and TRIAC. *(Unit I, Exam May 2026)*
- Draw and explain the circuit diagram of an automatic battery charger. *(Unit I, Exam May 2026)*

## Unit II: Controlled Rectifiers

- Explain the single phase half controlled (semi controlled) full wave rectifier with circuit diagram and waveforms. *(Unit II, Exam July 2022, Feb 2023, Jan 2024, July 2024, Dec 2024, May 2025)*
- Explain the function (significance, importance) of freewheeling diode. *(Unit II, Exam Feb 2022, July 2022, July 2024)*

- Explain the working of single phase half wave (half controlled) rectifier with resistive load, with circuit diagram and waveforms. *(Unit II, Exam July 2023, Dec 2024, May 2026)*
- Draw and explain the three phase full wave half controlled bridge rectifier. *(Unit II, Exam Feb 2022, May 2026)*
- Explain the single phase full controlled full wave rectifier (resistive load, circuit diagram and waveforms). *(Unit II, Exam May 2025, May 2026)*
- Explain the working principle of three phase full wave controlled rectifier. *(Unit II, Exam Dec 2024)*
- Differentiate between controlled and uncontrolled rectifiers. *(Unit II, Exam May 2025)*
- Write any five applications of thyristor converters. *(Unit II, Exam May 2025)*
- Explain the working of single phase half wave controlled rectifier with resistive-inductive (R-L) load, with circuit diagram and waveforms. *(Unit II, Exam May 2025)*
- Why is bridge circuit preferred over the centre tapped transformer circuit? *(Unit II, Exam May 2026)*

## Unit III: Inverters, Choppers, Dual Converters and Cyclo-Convertors

- Explain the working principle of series inverter with the help of circuit diagram (and mention its applications). *(Unit III, Exam Feb 2022, July 2023, July 2024, May 2026)*
- Explain the working principle of dual converter. *(Unit III, Exam July 2022, July 2023, July 2024, Dec 2024)*
- Explain the working of step up chopper with the help of circuit diagram. *(Unit III, Exam July 2022, July 2023, Jan 2024)*
- Explain the working of step down chopper with circuit diagram (and voltage-current waveforms). *(Unit III, Exam Feb 2023, May 2025, May 2026)*
- Define cycloconverter. Explain its basic principle of operation and applications. *(Unit III, Exam Feb 2023, Dec 2024, May 2025)*
- Draw and explain the block diagram of dual converter (and state its applications). *(Unit III, Exam Feb 2023, Jan 2024)*
- What is a cycloconverter? Explain the single phase to single phase step up cycloconverter. *(Unit III, Exam July 2024, May 2026)*
- Explain the working of parallel inverter. *(Unit III, Exam May 2025, May 2026)*
- Explain the working principle of chopper circuit (and write two applications of choppers). *(Unit III, Exam May 2025, May 2026)*
- Compare the two modes of dual converter. *(Unit III, Exam May 2025, May 2026)*
- Explain why cycloconverter is suitable for low frequencies. *(Unit III, Exam Feb 2022)*
- What is the working principle of voltage driven inverters? *(Unit III, Exam Feb 2022)*
- Discuss the applications of cycloconverter. *(Unit III, Exam July 2022)*
- Write down the merits and demerits of series inverter. *(Unit III, Exam July 2022)*
- List five applications of dual converters. *(Unit III, Exam July 2023)*
- Explain the operation of single phase bridge type cycloconverter. *(Unit III, Exam Jan 2024)*
- What do you mean by class B chopper? Explain. *(Unit III, Exam July 2024)*
- Explain the working of class D chopper with neat diagram. *(Unit III, Exam Dec 2024)*
- Write down the advantages and disadvantages of cycloconverter. *(Unit III, Exam Dec 2024)*
- Differentiate between series and parallel inverter. *(Unit III, Exam Dec 2024)*

- What do you mean by inverter? What are its different applications? *(Unit III, Exam May 2025)*

## Unit IV: Thyristor Control of Electric Drives

- Describe the working of cycloconverter controlled ac drive (speed control of induction motor). *(Unit IV, Exam Jan 2024, July 2024, Dec 2024, May 2026)*
- List four/five advantages of AC drive over DC drive. *(Unit IV, Exam July 2023, Dec 2024)*
- List four/five advantages of electric drive. *(Unit IV, Exam July 2024, Dec 2024)*
- Write a note on variable frequency drive system. / Explain variable voltage variable frequency method for speed control of 3-phase induction motor. *(Unit IV, Exam Dec 2024, May 2025)*
- What do you mean by an electric drive? Differentiate/compare AC drives and DC drives. *(Unit IV, Exam May 2025, May 2026)*
- Explain with circuit diagram the scheme for control of 3-phase induction motor using dual converter. *(Unit IV, Exam Feb 2022)*
- How is speed reversal of a dc motor achieved using dual converter? *(Unit IV, Exam July 2022)*
- Explain how constant current inverter drives work. *(Unit IV, Exam July 2022)*
- Describe briefly the slip control of AC drive. *(Unit IV, Exam Feb 2023)*
- Write a short note on AC drive. *(Unit IV, Exam Jan 2024)*
- Explain the operation of single phase half wave converter drive. *(Unit IV, Exam Jan 2024)*
- Explain the principle of operation of DC drives. *(Unit IV, Exam July 2024)*
- Draw and explain the block diagram of an electric drive. *(Unit IV, Exam May 2025)*
- Draw the block diagram of fixed frequency variable voltage control of a single phase induction motor. *(Unit IV, Exam May 2026)*

## Unit V: Power Converter Applications

- Differentiate between on-line and off-line UPS. *(Unit V, Exam Feb 2022, July 2023, Jan 2024, July 2024, May 2025, May 2026)*
- Write a short note on working principle of SMPS. *(Unit V, Exam Feb 2022, Dec 2024, May 2026)*
- Define UPS. Explain the working of an on-line UPS with circuit diagram. *(Unit V, Exam Feb 2023, July 2023, Dec 2024)*
- List five advantages of SMPS (printed as SCR in one paper) over conventional power supply. *(Unit V, Exam Feb 2023, July 2024)*
- Give comparison between on-line, off-line and line interactive UPS. *(Unit V, Exam July 2022)*
- What is UPS? What are the applications of UPS system? *(Unit V, Exam May 2025)*
- Draw the block diagram of SMPS. *(Unit V, Exam May 2025)*
- Explain the working of power converter for EV charging. *(Unit V, Exam May 2026)*

## Removed From Syllabus

- Write a short note on CVT. *(Removed From Syllabus, Exam July 2022, Feb 2023)*
- Why are SMF batteries preferred over lead acid batteries? *(Removed From Syllabus, Exam July 2022, Jan 2024)*

- List five instructions for maintenance and care of lead acid batteries. *(Removed From Syllabus, Exam Feb 2023, May 2025)*
- What are the applications of lead-acid batteries? *(Removed From Syllabus, Exam Feb 2022)*
- Write a short note on maintenance of storage devices. *(Removed From Syllabus, Exam July 2023)*
- Explain selection of battery size for UPS system. *(Removed From Syllabus, Exam Dec 2024)*

## Long Answer Questions

### Unit I: Introduction to Thyristors

- Explain the construction, working principle and V-I characteristics of SCR (with neat diagram and waveforms). *(Unit I, Exam July 2022, Feb 2023, July 2024, May 2025, May 2026)*
- Explain the construction, working and V-I characteristics of UJT. Also explain how it is used as a relaxation oscillator. *(Unit I, Exam Feb 2022, Jan 2024, Dec 2024, May 2026)*
- Explain the construction, working and V-I characteristics of TRIAC. *(Unit I, Exam July 2023, Dec 2024)*
- (a) Draw the block diagram of SMPS. (b) Draw the battery charger circuit using SCR. *(Unit I & V, Exam July 2024)*
- Write short notes on any two: (a) Snubber circuit (b) Function of freewheeling diode (c) CVT. *(Unit I & II, Exam Dec 2024)*
- Write a short note on any two: (a) Concept of electric drive (b) Off line UPS (c) Classification of thyristors. *(Unit I & IV & V, Exam Dec 2024)*
- Write short technical notes on any two: (a) Construction of SCR (b) UJT as relaxation oscillator (c) TRIAC. *(Unit I, Exam May 2025)*
- Write a short note on any two: (a) Heat sink for thyristor (b) Power converter for electric vehicle charging (c) Concept of freewheeling diode. *(Unit I & II & V, Exam May 2025)*

### Unit II: Controlled Rectifiers

- Explain with waveforms the working of a single phase full wave fully controlled bridge rectifier. *(Unit II, Exam Feb 2022)*

### Unit III: Inverters, Choppers, Dual Converters and Cyclo-Convertors

- Define chopper. What are the different types of chopper? Explain any one in detail. *(Unit III, Exam Jan 2024, July 2024, Dec 2024)*
- Explain the working principle of single phase to single phase cycloconverter. Also write its advantages and disadvantages. *(Unit III, Exam July 2023, May 2025)*
- Draw and explain the circuit diagram of a single phase cycloconverter using centre-tapped transformer. *(Unit III, Exam Feb 2022)*
- What is cycloconverter? Explain single phase to single phase circuit step-up cycloconverter. *(Unit III, Exam July 2022)*
- What are the differences between voltage source inverter and current source inverter? *(Unit III, Exam July 2022)*
- Explain the working of a current source series inverter with the help of circuit diagram. Write the drawbacks of series inverter. *(Unit III, Exam Feb 2023)*
- Explain the working of three phase bridge inverter with the help of circuit diagram. *(Unit III, Exam July 2023)*

- What is inversion process? Name different types of inverters. Explain any one with the help of circuit diagram and waveforms. *(Unit III, Exam May 2025)*
- Why a series inverter is called so? Which type of commutation is used in a basic series inverter? Explain its working principle with the aid of waveforms. *(Unit III, Exam May 2026)*
- What is dual converter? Explain its working principle and applications. *(Unit III, Exam May 2026)*

## Unit IV: Thyristor Control of Electric Drives

- Explain the speed control method for DC motor using dual converter with proper circuit diagram. *(Unit IV, Exam Feb 2023)*
- Draw and explain single phase full converter drives. *(Unit IV, Exam Jan 2024)*
- Explain the process of obtaining variable frequency using current source inverter drive. *(Unit IV, Exam Dec 2024)*
- What are the two main methods of speed control of d.c. separately excited motor? Explain any one in detail using circuit and block diagram. *(Unit IV, Exam May 2025)*
- Draw the circuit diagram of d.c. chopper scheme for speed control of a d.c. shunt motor and explain its working. *(Unit IV, Exam May 2026)*