

**E 6249**



Reg. No.....

Name.....

**B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, SEPTEMBER 2024**

**Sixth Semester**

Choice Based Course—POWER ELECTRONICS

(For B.Sc. Electronics)

[Prior to 2013 Admissions]

Time : Three Hours

Maximum Weight : 25

**Part A**

*Answer all questions.*

*Each bunch of **four** questions carries a weight of 1.*

- I. 1 When anode is made positive with respect to cathode with gate circuit is open, thyristor is said to be :
- a) Forward biased.
  - b) Reverse biased.
  - c) Junctions J1 and J3 are reverse based and J2 reverse biased
  - d) Junctions J1 is reverse biased and j2 and j3 are forward biased
- 2 \_\_\_\_\_ is a bidirectional three terminal device.
- a) SCR.
  - b) DIAC.
  - c) TRIAC.
  - d) Both a) and c).
- 3 \_\_\_\_\_ is a bidirectional thyristor with three terminals which is used for the control of power in ac circuits.
- a) SCR.
  - b) DIAC.
  - c) TRIAC.
  - d) PUT.

**Turn over**





- 4 IGBT has the following characteristics :
- a) High input impedance and low on state power loss
  - b) Low input impedance and high output impedance
  - c) High input impedance and low output impedance
  - d) Low input impedance and high on state power loss

II. 5 \_\_\_\_\_ commutation is called current commutation.

- a) Class A.
- b) Class B.
- c) Class C.
- d) Class D.

6 Class D commutation is also known as \_\_\_\_\_.

- a) Auxiliary commutation.
- b) Parallel capacitor commutation.
- c) External pulse commutation.
- d) Both a) and b).

7 The Thyristors would be gated at regular intervals of \_\_\_\_\_ In proper sequence so that a 3 phase a.c. voltage is synthesized at the output terminals of a six step inverter.

- a) 30°.
- b) 45°.
- c) 60°.
- d) 90°.

8 Output voltage of a single-phase bridge inverter, fed from a fixed dc source, is varied by :

- a) Varying the switching frequency.
- b) Pulse-width modulation.
- c) Pulse amplitude modulation.
- d) All of the above.





III. 9 With increase in firing angle :

- a) Both harmonic distortion and quality of input current increases.
- b) Harmonic distortion increases and quality of input current decreases.
- c) Harmonic distortion decreases and quality of input current increases.
- d) Both harmonic distortion and quality of input current decreases.

10 In a load commutated DC - DC chopper, the capacitor has a :

- a) Symmetric triangular voltage across itself.
- b) Symmetric rectangular voltage across itself.
- c) Symmetric trapezoidal voltage across itself.
- d) Symmetric sinusoidal voltage across itself.

11 Choppers are \_\_\_\_\_ converter.

- a) A.C to D.C.
- b) D.C to A.C.
- c) D.C to D.C.
- d) A.C to A.C.

12. Cyclo converter is a \_\_\_\_\_.

- a) Frequency changer from higher to lower frequency with one state conversion.
- b) Frequency changer from higher to lower frequency with two stage conversion.
- c) Frequency changer from lower to high frequency with one state conversion.
- d) Either a) or c).

IV. 13 Ac regulators are widely used in :

- a) Traction drives.
- b) Fan drives.
- c) Synchronous motor drives.
- d) Slip power recovery scheme of slip-ring induction motor.

**Turn over**





E 6249

- 14 Which answer from the following list is a disadvantage of switched mode power supplies compared with series regulated supplies ?
- a) Switched mode supplies are less suitable for high power applications.
  - b) Switched mode supplies are more expensive to implement than series regulated supplies.
  - c) It is more difficult to prevent high frequency electrical interference in switched mode supplies.
  - d) Over voltage protection is not possible in switched mode power supplies.
- 15 \_\_\_\_\_ is used for critical loads where temporary power failure can cause a great deal of inconvenience.
- a) SMPS.
  - b) UPS.
  - c) MPS.
  - d) RCCB.
- 16 In dc choppers , the waveforms for input and output voltages are respectively.
- a) Discontinuous, continuous.
  - b) Both continuous.
  - c) Both discontinuous.
  - d) Continuous, discontinuous.

(4 × 1 = 4)

### Part B

*Answer any five questions.  
Each question carries a weight of 1*

- 17 What are the necessary conditions for turning on of an SCR ?
- 18 What do you meant by GTO ? List its applications.
- 19 Define controlled rectifiers.
- 20 What are the usages of feedback diodes in single phase bridge Inverter ?
- 21 What are the applications of single phase ac switches ?
- 22 List the applications of UPS.





E 6249

23 Differentiate buck and boost regulator.

24 Write notes on HVDC .

(5 × 1 = 5)

### Part C

*Answer any **four** questions.*

*Each question carries a weight of 2.*

25 What is IGBT? Explain its applications and characteristics.

26 With the help of suitable diagrams explain about the two transistor model of Thyristor.

27 What is the principle of operation of phase controlled rectifier ? With the help of suitable diagrams explain the working of half controlled rectifier.

28 With the suitable diagrams explain the working of full bridge inverters.

29 With the help of block diagram explain the working of SMPS.

30 Explain the working of dual converter.

(4 × 2 = 8)

### Part D

*Answer any **two** questions.*

*Each question carries a weight of 4.*

31 Explain the different modes of operation of a thyristor with the help of its static VI characteristics.

32 Write notes on :

a) Voltage and frequency control of single phase inverters.

b) Three phase a.c. switches.

c) d.c. switches.

33 With the help of suitable diagrams explain the working of boost regulator and buck boost regulator.

(2 × 4 = 8)

