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Question Paper Code	12255
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023**  
Sixth Semester  
**Electronics and Instrumentation Engineering**  
**20EIPC603 - POWER ELECTRONICS, DRIVES AND CONTROL**  
(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**  
Answer ALL Questions

- |   | <i>Marks,</i><br><i>K-Level, CO</i> |
|---|-------------------------------------|
| 1. List out the various force dc commutation techniques used to turn off SCR. | 2,K2,CO1                            |
| 2. Discuss the merits and demerits of MOSFET.                                 | 2,K1,CO1                            |
| 3. Why power factor of semi converter is better than full converter?          | 2,K2,CO2                            |
| 4. Summarize the roles of freewheeling diode in a Full converter.             | 2,K2,CO2                            |
| 5. Name any two applications of SMPS.   | 2,K1,CO3                            |
| 6. Differentiate voltage and current commutated choppers.                     | 2,K2,CO3                            |
| 7. Deduce the reasons for diodes connected in anti-parallel.                  | 2,K2,CO4                            |
| 8. Why thyristors are not preferred for Inverter?                             | 2,K2,CO4                            |
| 9. Discuss about static Ward-Leonard drive.                                   | 2,K1,CO5                            |
| 10. What is meant by v/f control?   | 2,K2,CO5                            |

**PART - B (5 × 13 = 65 Marks)**  
Answer ALL Questions

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|--|-----------|
| 11. a) (i) Discuss the different modes of operation of thyristor with the help of its static V-I characteristics.                        | 7,K2,CO1  |
| (ii) Discuss why TRIAC is rarely operated in first quadrant with negative gate current and in third quadrant with positive gate current. | 6,K2,CO1  |
| <b>OR</b>  |           |
| b) Compare and contrast the performance characteristics of SCR and MOSFET.   | 13,K2,CO2 |
| 12. a) Discuss the operation of Dual Converter with complete circuit diagram and waveforms.  | 13,K2,CO2 |
| <b>OR</b>  |           |
| b) Summarize the operation of single phase two pulse Midpoint converter with relevant voltage and current waveforms.                     | 13,K2,CO2 |

13. a) With a neat power circuit diagram, explain the operation of boost converter. Draw the load voltage, load current waveforms, and derive the expression for the output voltage. *13,K2,CO3*

**OR**

- b) Explain the principle of operation of different classes of choppers. *13,K2,CO3*

14. a) Explain in detail about any two types of PWM Generation techniques. *13,K2,CO4*

**OR**

- b) Demonstrate the working of a single-phase full bridge inverter supplying R, RL loads with relevant circuit and waveforms. *13,K2,CO4*

15. a) Explain the method of speed control of three phase induction motor by  
(i) Stator voltage control. *6,K2,CO5*  
(ii) Frequency control. *7,K2,CO5*

**OR**

- b) Discuss in detail about Rectifier based Electric Braking. *13,K2,CO5*

**PART - C (1 × 15 = 15 Marks)**

16. a) Explain the working of step down chopper with a neat diagram. *15,K2,CO4*

**OR**

- b) Explain the closed loop control of AC drives with neat diagrams. *15,K2,CO5*