**18EE503**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION** | | | |
| **January, 2022** | **Electrical & Electronics Engineering** | | |
| **Fifth Semester** | **Power Electronics** | | |
| **Time:** Three Hours | | **Maximum:** 50 Marks | |
| *Answer Question No.1 compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer ONE question from each unit.* | | | (4X10=40 Marks) |
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| 1. | a) | What is latching current of SCR? | CO1 |  |
|  | b) | State the different methods to turn-on the SCR | CO1 |  |
|  | c) | Draw the turn-on characteristics of SCR | CO1 |  |
|  | d) | When a fully controlled converter operates in inverting mode | CO2 |  |
|  | e) | Define the term total harmonic distortion. | CO2 |  |
|  | f) | State the functioning of dual converter. | CO2 |  |
|  | g) | List the advantages of multiple PWM over single PWM technique | CO3 |  |
|  | h) | Differentiate between VSI and CSI. | CO3 |  |
|  | i) | Define the term duty cycle in DC-DC converters. | CO4 |  |
|  | j) | List the applications of cyclo converter | CO4 |  |
| **Unit -I** | | | | |
| 2. | a) | Explain the switching characteristics of power MOSFET with neat diagram | CO1 | 5M |
|  | b) | Explain R and RC firing circuit of SCR. | CO1 | 5M |
| **(OR)** | | | | |
| 3. | a) | Write short notes on Snubber circuit. | CO1 | 5M |
|  | b) | Differentiate natural commutation and forced commutation and classify different forced commutation techniques | CO1 | 5M |
| **Unit -II** | | | | |
| 4. | a) | Derive the average output voltage equation of single phase half controlled rectifier with inductive load. | CO2 | 5M |
|  | b) | A single phase full bridge converter is connected to ‘R’ load. The source voltage is of 230V, 50Hz. The average load current is 10A. For R = 20 Ω,find the firing angle. | CO2 | 5M |
| **(OR)** | | | | |
| 5. |  | Explain the working of three phase full converter with ‘R’ load for the firing angles of 30o. | CO2 | 10M |
| **Unit -III** | | | | |
| 6. | a) | Describe the working of a 1 phase full bridge inverter with relevant circuit and waveforms. | CO3 | 5 M |
|  | b) | Classify the various PWM techniques and explain any one method clearly. | CO3 | 5 M |
| **(OR)** | | | | |
| 7. |  | Describe operation of 3-phase bridge inverter in 180 degree mode of conduction | CO3 | 10M |
| **Unit -IV** | | | | |
| 8. | a) | Discuss the principle of operation of DC-DC step down chopper with suitable waveforms. | CO4 | 5M |
|  | b) | A step down DC chopper has its input voltage of 230 V with 10 Ω load resistor connected, voltage drop across chopper is 2V when it is ON. For a duty cycle of 0.5, calculate.  (i) Average and rms value of output voltage.  (ii) Power delivered to the load. | CO4 | 5M |
| **(OR)** | | | | |
| 9. |  | Discuss the working of a single phase step down cyclo-converter with neat voltage and current waveform | CO4 | 10M |

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