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Total Number of Pages : 02

B.Tech
PCEL4301

5th Semester Back Examination 2019-20
POWER ELECTRONICS
BRANCH : AEIE, EEE, EIE, ELECTRICAL, IEE
Time : 3 Hours
Max Marks : 70
Q.CODE : HB452

Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions : (2 x 10)

- Draw the static V-I characteristics of SCR.
- What are the various triggering methods of SCR?
- Define HF and TUF of rectifier.
- How dv/dt protection of SCR is achieved?
- How UJT triggering is better than R-C triggering ?
- What are the advantages of single-phase bridge converter over single-phase mid point converter ?
- What is time ratio control of dc-dc converter?
- What are the drawbacks of CSI over VSI ?
- What are the advantages of 120° conduction mode over 180° conduction mode?
- Write down various applications of cycloconverter.

Q2 a) Explain the principle of operation of single-phase full wave bridge controlled rectifier. (5)

- b) SCRs with peak forward voltage rating of 1000 V and average on-state current rating of 40A are used in single phase mid-point converter and single-phase bridge converter. Find the power that these two converters can handle. Use a factor of safety Of 2.5. (5)**

Q3 a) Explain the operation of three-phase full controlled converter with R-L load. (5)

- b) (i) A 3-phase full-converter charges a battery from a 3-phase supply of 230V, 50 Hz. The battery emf is 200V and its internal resistance is 0.5Ω . On account of inductance connected in series with battery, charging current is constant at 20A. Compute the firing angle delay and supply power factor. (ii) In case it is desired that power flows from dc source to ac load in part (i), find the firing angle delay for the same circuit. (5)**

Q4 a) Draw and explain the switching characteristics of SCR during turn-on. , Define each time. (5)

- b) Draw and explain the switching characteristics of SCR during turn-off. Define each time. (5)**

- Q5 a)** Discuss the operation of fourth quadrant dc to dc converter. **(5)**
- b)** Describe the operation of Cuk regulator. **(5)**

Q6 Describe with neat sketch diagram the operation of 120° mode of conduction of VSI. **(10)**

Q7 Discuss the operation of zero current switching resonant inverter and zero voltage switching resonant inverter. **(10)**

- Q8** Write short Notes on any TWO : **(5 x 2)**
- a)** UPS
 - b)** Push Pull converter
 - c)** Space vector modulation