U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: VII**
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**
Course Code: 16EC7DCPEL **Max Marks: 100**
Course: Power Electronics **Date: 14.09.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Distinguish between(i) Latching current and Holding current, (ii)Device turn off time and Circuit turn off time, (iii) Inverter grade SCR and converter grade SCR. **06**

b) A thyristor has a forward break over voltage of 175 V when a gate pulse of 3mA is applied. Find the conduction angle, if a sinusoidal voltage of 250 V peak is applied. Draw the waveforms to show delay angle α and conduction angle θ. **06**

c) List and explain the various types of power electronics circuits? **08**

UNIT - II

2 a) Explain RC triggering circuit with suitable wave forms. **06**

b) Explain how an SCR can be protected against di/dt and dv/dt. **07**

c) Identify and analyse a suitable triggering circuit in which the trigger angle can be varied only up to 90^0. **07**

OR

3 a) Design a UJT relaxation oscillator for the given specification η=0.51, Ip = 10μA, Iv = 10mA, Vv = 3.5 V, V_S = 30 V. The frequency of oscillations f = 50 Hz and width of triggering pulse is t_g= 60μsec. Assume V_D = 0.5 V and C = 0.5 μF **06**

b) How a small gate current will turn on the SCR? Analyse using two transistor model. **08**

c) List and explain the different turn on methods of SCR. **06**

UNIT - III

4 a) List and explain the applications of Controlled rectifiers. **05**

b) Analyze a suitable control rectifier circuit which exhibits four quadrant operations. **09**

c) The half wave controlled rectifier has a purely resistive load of R and the delay angle is $\pi/2$, determine **06**

i) Rectification efficiency
ii) Form Factor FF
iii) Ripple Factor RF

UNIT - IV

5 a) Explain with neat diagram and relevant expressions & waveforms of DC chopper its output is always greater than input and also show that its principle can be applied to transfer energy from one voltage source to another. **10**

b) Identify and analyze the working principle of a regulated DC – DC converter if its output is always less than input voltage. **10**

OR

6 a) Define Chopper? Explain with neat diagram and relevant expressions & waveforms step down chopper? **08**

b) Identify and analyze the working principle of a regulated DC – DC converter if its output is either less than or greater than input voltage and the output voltage polarity is opposite to the input voltage polarity. **12**

UNIT - V

7 a) Explain the principle of operation of single phase half bridge and full bridge inverter with neat diagrams, waveforms and expressions. **14**

b) Explain Variable DC link inverter with neat diagram and waveform. **06**

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