BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: V**
BRANCH: EEE **SESSION : MO/2019**

SUBJECT : EE5205 POWER ELECTRONICS

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 Elucidate with suitable figure the following terms: Virtual Open, $V_{DRM,}$ Delay Time, Power Electronics and Holding Current. [5]

Q2 In order give application of UJT triggering circuit, draw a neat block diagram of synchronized UJT triggering circuit. Convert the block diagram into circuit diagram. Draw output voltage of rectifier, zenner diode., capacitor and UJT pulses with respect to input voltage on graph paper. Develop expression for frequency of oscillations. [5]

Q3 An SCR is operating from a peak supply of 400V. It has following specifications; Repetetive peak current , Ip=200A ; $(di/dt)_{max}$=60A/μs; $(dv/dt)_{max}$=200V/μs; Take factor of safety 2 for the three specification mentioned above . Take damping ratio ξ=0.6. Draw power circuit. Design a suitable Snubber circuit if the load resistance is40Ω. [5]

Q4 (a) What are the problems in series operations of an SCR and how they are taken care? [2]
(b) It is required to operate 250 A SCR in parallel with 350 A SCR with their respective on-state voltage amp of 1.6V and 1.2V. Calculate the value of resistance to be inserted in series with each SCR so that they share the total load of 600A in proportion to their current ratings. [3]

Q5 (a) What is freewheeling action of power diode? Discuss with one pulse converter. [2]
(b) Evaluate importance of inversion mode of single phase rectifier with power circuit and waveforms. [3]

Q6 A single phase semi converter connected to a separately excited and unsaturated dc motor. It runs at a speed of 2000 rpm when ac supply is 200V,50 Hz and counter emf is140V. Armature resistance is 1ohm.
(a) Draw block diagram and convert it into power circuit. Draw load voltage and load current and input current wrt supply voltage. [2]
(b) The firing angle $\alpha = 60^0$. Estimate average value of armature current. [3]

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