Code No: 155CU

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, August - 2022
POWER ELECTRONICS
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks
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1.a) Elucidate UJT as trigger source.
 b) Explain protection for thyristors. [7+8]

2. Explain working of power MOSFET and power BJT with neat sketches. [15]

3. A Full converter with RLE load is connected to a 240-V, 50-Hz supply. The load current Ia is continuous and its ripple content is negligible. The turns ratio of the transformer is unity.
 a) Express the input current in a Fourier series; determine the input power factor.
 b) If the delay angle is $\alpha = \pi/3$, calculate Vdc, Vn, $Vrms$ and PF. [7+8]

4.a) The single-phase full converter has a *RLE load* having $L = 6.5$ mH, $R = 0.5$ Ω, and $E = 10$ V. The input voltage is $Vs = 240$ V at (rms) 50 Hz. Determine
 i) The average thyristor current I_A,
 ii) The rms thyristor current I_R.
 b) Explain the working of 3 phase dual converter with a schematic diagram and relevant wave forms. [6+9]

5. Explain buck converter power circuit, analysis, waveforms at steady state conditions. [15]

6. Explain boost converter power circuit, analysis, waveforms under steady state conditions. Also obtain the relation between duty ratio and average output voltage. [15]

7. With a neat circuit diagram, explain working of three phase bridge inverter with 120 degrees mode of operation. [15]

8. Explain principle of operation of single phase A. C voltage controller with R-L load and give its applications. [15]

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