Total No. of Questions : 6]

SEAT No. :

P23

[Total No. of Pages : 2

APR - 18/TE/Insem. - 25

T.E. (E&TC)

POWER ELECTRONICS

(2012 Revised Course) (Semester - II)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer any three questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***All questions carry equal marks.***
5) ***You are advised to attempt not more than 3 questions.***
6) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables in allowed.***
7) ***Assume suitable data, if necessary.***

Q1) a) What is two transistor analogy? Explain. Derive an expression for its Anode current I_A. **[6]**

b) Draw construction diagram of n-channel enhancement type MOSFET with its steady state characteristics. **[4]**

OR

Q2) a) What is IGBT? Explain its characteristics. **[4]**

b) What is the need of triggering Circuits in Power Circuits? Explain with circuit diagram & waveforms working of UJT based SCR firing circuit. **[6]**

Q3) a) What are phase controlled converters? Explain with circuit diagram & waveforms working of 1ϕ Half controlled converter with RL load. Comment on pf & its improvement technique. **[6]**

b) A single phase semiconverter is operated from 120V, 50Hz AC supply. The load resistance is 10Ω. If the average o/p voltage is 25% of the maximum possible average output voltage. **[4]**

Determine i) firing angle α

ii) Rms & Average ouptput current

OR

P.T.O.

Q4) a) Draw & explain with circuit diagram & waveforms working of single phase fully controlled converter with RL load. Comment on p.f. **[6]**

b) A single phase fully controlled converter supplies an inductive load. Assume o/p current is constant & is equal to Idc. Determine the following performance parameters if the supply voltage is 230V & firing angle is $\frac{\pi}{6}$. **[4]**

i) Average o/p voltage

ii) Fundamental p.f.

iii) Supply p.f.

Q5) a) What are DC to AC Converters? Explain with circuit diagram & waveforms working of 1ϕ full bridge MOSFET based VSI with R load. **[6]**

b) Compare 120º & 180º modes of conduction of 3ϕ Voltage Source Inverter(VSI). **[4]**

OR

Q6) a) What is the need of 3ϕ VSI in industry? Explain with circuit diagram & waveforms working of 3ϕ VSI with R-load. **[6]**

b) Explain working of 1ϕ Half bridge Inverter with RL load. **[4]**

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