Total No. of Printed Pages:2

SUBJECT CODE NO:- P-237
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Power Electronics
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Solve any two questions from remaining in each section
iii) Assume suitable data it required
iv) Draw appropriate waveforms it required .

Section A

Q.1 Solve any five 10

a) Which PNPN device is describe the following statement
   i) Can be turned "on" or "off" at either gate
   ii) Can be turned "on" by negative pulse
   iii) A unilateral device turned "off" by a negative gate signal
   iv) Can be turned "off" by reducing current by I_H.
b) Draw the output characteristics of n channel enhancement MOSFET
c) What is difference between non-punch through. $IGBT_s$ and punch through $IGBT_s$
d) Draw the switching characters of GTO
e) Define the term gate recovery time
f) Compare IGBT and MUSFET
g) What is the lowest harmonic frequency present in dc output of six pulse converter
h) What is circuit turn off" time?

Q.2 a) What is freewheeling diode? What are its functions? 07
b) Explain with near circuit & wave form the operation of single phase full controlled rectifier with inductive load 08

Q.3 a) A three phase half wave controlled rectifier supplying a constant load current of 30A, operated from three phase 400V (line) supply. Find the average load voltage at firing angle 45^0. What value of current & peak reverse voltage rating will the thyristor require 08
b) Explain the operation of 3-ph half controlled converter with RL load 07

Q.4 a) Draw V-I characteristics of SCR & explain the effect of gate current variation on the V-I characteristics 08
b) A single phase full controlled bridge converter supplies an inductive load supply voltage is 230v/50Hz firing angle is $\pi/3$. As some that the output current is continuous & ripple free and is equal of 15amp Determine 07
   (i) Average output voltage
   (ii) Input PF
   (iii) Fundamental PF
   (iv) Average & rms values of SCR current

Q.5 a) What is dual converter? Explain the basic principle of operation of ideal dual converter 08
b) A simple phase semi converter? Operating from a simple phase 220V, 50Hz, supply. The RLE load with 07

R= 5Ω, L = 10MH , & E = 100V is connected to the output of converter. Find the average value of load current for a firing angle of 45^0 for continuous conduction. Draw the output voltage waveforms and indicate the conducting periods of devices

Section B

Q.6 Solve any five 10

a) What is chopper? Draw the circuit diagram of step up chopper
b) A chopper operating on TRC at a frequency of 5KHz on a 200V dc supply If low voltage is 40% of supply voltage, find conduction & blocking period of SCR in each cycle
c) What is inverter? What are the different types of investors?
d) What is different between 180^0 and 120^0mode of operation of 3 phase inverters?
e) What are the specifications of power supplies used in industrial applications?
f) What is SMPs?
g) What is the difference between fly back and forward converter?
h) What is duty ratio of chopper?

Q.7 a) Prove that the average output voltage of step up chopper is given by 07

$$V_0 = \frac{Vdc}{1-\alpha}$$

Where Vdc – supply (dc) voltage

- α- duty ratio

b) A chopper circuit supplied from 80v dc battery, supplies a R-L load with L = 40MH and R = 6Ω. The load has a freewheeling diode across it. It is required to very to load current between 10A & 12A. Calculate the time ratio of chopper? 08

Q.8 a) What are the draw backs of square wave inverter? What are the techniques used to overcome the draw backs of square wave inverter? 07

b) Explain with neat circuit diagram & wave form the operation of single phase half bridge VSI with R-L load 08

Q.9 a) Explain with neat circuit & waveform the operating modes of buck converter. 07

b) What is cyclo converter? Explain the basic principle of operating of a cyclo converter 08

Q.10 a) A single phase half ware AC- AC voltage controller supplying a resistive load. Prove that the average load voltage is given by 07

$$V_{0av} = \frac{Vm}{\propto\pi}(cos \propto -1)$$

b) A single phase full bridge inverter is operated from a 24 v battery and is supplying a resistive load of 5 ohm Determine 08

i) Fundamental output volt
ii) fundamental output power
iii) switch rating's