SUBJECT CODE NO:- K-27
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Oct/Nov 2016
Power Electronics
(Revised)

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

Please check whether you have got the right question paper.

N.B   i) Question No.1 & 6 are compulsory.
             ii) Solve any two questions from remaining each section.
             iii) Draw neat waveforms where ever necessary.
             iv) Assume suitable data if required

Section A

Q.1   Solve any five   10
   a)   Compare MOSFET with BJT.
   b)   Why are IGB T_s becoming more popular in their applications to controlled converters?
   c)   Draw switching characteristics of SCR during turn off Process. Indicate clearly the various intervals in to which turn off time can be subdivided.
   d)   What are the types of TRC used in chopper control?
   e)   What is inversion mode of controlled rectifier?
   f)   A single phase half wave convertor is operated from 100v, 50 Hz supply & The load resistance is R=10 Ω
        The average output voltage is 25% of the maximum possible average output voltage calculate delay angle.
   g)   What is dual converter? Draw circuit diagram of single phase dual convertor.
   h)   Why the power factors of semi converter are better than that of full converters?

Q.2   a)   Draw the basic structure of Depletion type MOSFET & explain the principle & working.   08
       b)   Describe with sketch the effect of gate current on the forward break over voltage of an SCR.   07

Q.3   a)   Explain with neat circuit and wave form to operation of single phase fully controlled bridge rectifier   08
            whit RL Load. Derive the expression for average output voltage & Current.
       b)   A single phase full bridge rectifier supplying to RLE load. The source voltage is 220v, 50 Hz. The   07
            average load current of 10 A is constant over working range For. R= 0.5 Ω & $L = 2\ mH$ compute fire
            angle for E=100v & input power factor.

Q.4   a)   Explain the principle of step up chopper derive expression for average output voltage.   07
       b)   A step up chopper has input voltage of 200v and output voltage of 500v. if the conducting time of   08
            chopper is 100us. Determine to pulse width of output voltage in case output voltage Pulte width is
            halved for constant frequency operation find the average value of new output voltage.

Q.5   a)   Explain the operation of three phase semi converter with R load.   08
       b)   Write short note on Dual converter operating principle.   07

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Section-B

Q.6   Solve any five   10
   - a) Draw the different circuit configurations for single phase full wave ac voltage controller.
   - b) What will happen if delay angle α. is than the load angle θ for a c voltage controller.?
   - c) Draw the circuit diagram of four quadrant 3ph ac volt controller.
   - d) What is power conditioner? Give any one example.
   - e) Compare the buck & boost converter.
   - f) State the applications of PWM convertors.
   - g) What is mean by sinusoidal PWM?
   - h) State the performance parameters PWM invertor.

Q.7
   - a) Explain with neat circuit diagram & waveform the operation single phase bridge inverter with R-L load.   07 / 08
   - b) The single phase bridge invertor has a resistive load of R=5 Ω. & dc input voltage is v_s =48 v. Determine i) rms output voltage at fundamental frequency vol.
     ii) The output power Po
     iii) Average peak current of each thyristor.

Q.8
   - a) What are the purposes of feedback diodes in inventors? What are the main differences between VSI & CSI.   07
   - b) Explain with neat circuit & waveforms the principle of non simultaneous control of single phase cyclo convertor   08

Q.9
   - a) Explain with neat ckt & waveform the operation of 3 phase AC voltage control for firing delay of $0 \leq \alpha \leq 60°$.   10
   - b) Explain with neat circuit & waveform the principle of boost converter.   05

Q.10
   - a) A boost regulator has an input voltage of V_s=5v. The average output voltage V_a=10v.& average load current I_a = 0.2A The switching frequency is 25 KH2. if L=150 μ H & c =220 μF. determine i) Duty ratio k ii) Ripple current of inductor ΔI 07
   - b) Compare buck, boost & buck-boost converter on the basis of performance parameters.   08

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