Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **M.Tech**
PSPE101

1st Semester Back Examination 2019-20
ADVANCED POWER ELECTRONICS
BRANCH : ELECTRICAL ENGG., POWER AND ENERGY ENGG, POWER ENGG AND ENERGY SYSTEMS
Max Marks : 70
Time : 3 Hours
Q.CODE : HB871

Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** **(2 x 10)**

a) Why we go for SMPS instead of phase-controlled rectifier for controlled DC supply?

b) Why electrical isolation is required in switch mode DC power supply ?

c) What is the input output voltage relationship of cuk converter ?

d) What are the merits of three level inverter over two level inverter ?

e) How sinusoidal-pulse modulation techniques work ?

f) What is zero crossing detector and why is it utilized in a triggering circuit ?

g) What is the role of energy storage components in the grid connected renewable energy generation system ?

h) What is the advantage of High voltage DC Transmission ?

i) Draw the V-I characteristics for switched mode converter versus zero-voltage/zero-current switching.

j) What is the maximum line voltage you will get at the output of 3 phase Voltage Source Inverter controlled by Sin PWM technique, if its input DC link voltage is 400 V ?

Q2 **a)** Explain current mode controlled flyback regulator. **(5)**

b) Explain resonant AC power supply. **(5)**

Q3 **a)** What are the elements of SMPS ? Discuss its advantages and disadvantages. **(5)**

b) Discuss the operation of switch mode DC power supplies. **(5)**

Q4 **a)** Draw and explain the control circuit block diagram for a cycloconverter with non-circulating current mode. **(5)**

b) The 2cs resonant converter deliner maximum power of w/P_L= 400mw at $_{Vo}$=4v the supply voltage V_s =12v. The rnaximum operating frequency 50Hz. Determine the value of L and C assume t_1 and t_3 are very small and x =1.5. **(5)**

Q5 **a)** What is the conditioning of power factor? Discuss multistage converter used for conditioning of power factor. **(5)**

b) A single phase 220V, 1KW electric room heater is connected across 220V power supply through a TRIAC. For a delay angle of 90^o, calculate the power dissipated by the heater element. **(5)**

Q6 With the help of neat circuitry and waveform, explain the operation of forward converter with tertiary winding. Also test the advantage and disadvantage of the same. **(10)**

Q7 Explain the three phase full wave controller with star connected resistive load also draw wave forms. **(10)**

Q8 **Write short answer on any TWO :** **(5 x 2)**

a) Bi-directional AC power supply

b) Full bridge converter

c) M type ZCS resonant.