INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	Power Electronic control of dc Drives
Course Code	:	BPE005
Class	:	I - M. Tech II Sem
Branch	:	PEED
Year	:	2016– 2017
Course Faculty	:	Mr. P.SHIVAKUMAR

S.No	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOME
Group – I QUESTION BANK ON SHORT ANSWER QUESTION UNIT I PWM INVERTERS(SINGLE PHASE AND THREE PHASE)			
1	What is mean by PWM control?	Evaluate	1
2	What are the advantages of PWM control?	Remember	1
3	What are the methods of reduction of harmonic content?	Remember	1
4	Compare VSI and CSI	Remember	1
5	What are the disadvantages of PWM control?	Remember	1
6	What are the applications of 1-φ Inverters	Remember	1
7	What are the applications of 3-φ Inverters	Understand	1
8	Explain the working operation of 1-φ bridge Inverter	Remember	2
9	Explain the working operation of 3-φ bridge Inverter	Remember	1
10	Compare PWM technique and space vector modulation	Remember	1
11	Compare PWM technique and harmonic reduction current source inverter	Remember	1
12	List the disadvantages of the harmonics present in the inverter system.	Understand	1
13	Draw the circuit diagram of single phase full bridge inverter	Understand	1
14	Draw the circuit diagram of three phase full bridge inverter	Understand	1
Group – II QUESTION BANK ON LONG ANSWER QUESTIONS			
1	Explain the principal of operation of single phase inverter with resistive load with the help of circuit diagram and wave forms	Analyze	1

2	Discuss the following performance parameters of 1-φ inverter a) Harmonic factor b) Total harmonic distortion c) Distortion factor 3M d) Lowest order harmonic	Understand	1
3	The single phase half bridge inverter has a resistive load of R=2.4Ω and the DC input voltage Vs=48V Determine a) RMS out put voltage at fundamental frequency b) out put power c) average and peak current of each transistor d) THD	Analyze	1
4	Explain the working operation of 1-φ bridge Inverter with circuit diagram and wave forms	Remember	1
5	The bridge inverter has an RLC load with R=10Ω, L=30.5mH and C=0.2μF. Inverter frequency is f0= 60Hz and DC input voltage is 220V calculate a) RMS load current b) THD c) power absorbed by the load	Remember	1
6	Briefly discuss about the voltage control of single phase inverter of a) Single pulse PWM control b) Multi pulse PWM control c) Sinusoidal PWM control	Understa nd	1
7	Write short notes on a) Modified PWM control b) Phase displacement Control	Evaluate	1
8	Explain the following advanced modulation techniques a) Trapezoidal b) Stair case	Understand	1
9	Discuss about a) Stepped harmonic Injection b) Delta modulation	Evaluate	1
10	10. a) List out the advantages of 1-φ inverters b) What are the applications of 1-φ Inverters	Remember	1
11	Explain the operation of 3-φ PWM inverter of 180 degree Conduction of out put voltage with resistive load	Evaluate	1
12	Explain the operation of 3-φ PWM inverter of 120 degree Conduction of out put voltage with resistive load	understand	1
13	A 3-φ inverter has a star connected load of R=5Ω and L=20mH. The inverter frequency of fo=60hz and a dc input voltage of Vs=220V determine a) RMS line voltage b) RMS phase voltage c) THD d) HF	Evaluate	1
14	Explain the following voltage control technique of 3-Φ inverter a) Sinusoidal PWM control b) Third harmonic PWM control	Evaluate	1
15	Write short notes on a) 60 degree PWM control b) Space vector modulation	understand	1
16	Write short notes on a) Variable dc link inverter b) Boost inverter	understand	1

17	a) Explain the operation of Buck and Boost inverter with suitable diagrams b) What are the steps taken for designing inverter circuit	understand	1
18	a) List out advantages and disadvantages of 3-Φ PWM inverter b) What are the applications of 3-Φ PWM inverters	understand	1
Group – I QUESTION BANK ON SHORT ANSWER QUESTION UNIT II RESONANT PULSE INVERTERS			
1	Write short notes on series resonance inverters	Analyze	2
2	Draw the diagram of half bridge resonant inverter	Understand	2
3	Compare half bridge and full bridge resonant inverters	Remember	2
4	Discuss about parallel resonant inverter	Analyze	2
5	Discuss about frequency response of series resonant inverter	understand	2
6	Compare L type ZCS and M type ZCS resonant converters	Understand	2
7	Write short notes on ZCS resonant converter	understad	2
8	Write short notes on ZVS resonant converter	Analyze	2
9	What are the applications of resonant DC link inverters	understand	2
10	What are the advantages of bidirectional switches in inverters	Analyze	2
Group – II QUESTION BANK ON LONG ANSWER QUESTIONS			
1	Describe working of series resonant inverters with unidirectional switches	Evaluate	2
2	Explain operation of full bridge resonant inverters and draw the waveforms	Analyze	2
3	Write short notes on the following: i) Parallel resonant inverters ii) Class E inverter and rectifier	Evaluate	2
4	Evaluate inductance and capacitance for a zero current switching inverter	understand	2
5	Describe working of series resonant inverters with bidirectional switches	Analyze	2
6	Explain operation of half bridge resonant inverters and draw the waveforms	understand	2

7	Write short notes on the following: i) L type ZCS resonant converter **ii)** M type ZCS resonant converter	Understand	2
8	Explain the operation of two quadrant ZVS resonant converter	Analyze	2
9	Explain the operation of half bridge and full bridge resonant inverters with bidirectional switches	Understand	2
10	Explain the operation of following: a) Zero current switching resonant converters b) Zero voltage switching resonant converters	Understand	2
11	List the comparisons between ZCS and ZVS resonant converters	understand	2
12	Describe the operation of the following: a) parallel resonant inverter b) series resonant inverter	understand	2
Group – I QUESTION BANK ON SHORT ANSWER QUESTION UNIT III MULTI LEVEL INVERTERS			
1	Define inverter.	understand	3
2	List the main classifications of inverters.	Understand	3
3	Specify the reasons why thyristors are not preferred for inverters?	Remember	3
4	Discuss the applications of an inverter.	Analyze	3
5	Discuss why diodes should be connected in anti parallel with the thyristors in inverter circuits?	understand	3
6	What is the function of flying capacitors?	understand	3
7	List the classifications of multi level inverter	Analyze	3
8	Write the features of multi level inverters	understand	3
9	What is the function of diode clamped inverter?	understand	3
10	What are the applications of multi level inverter?	Analyze	3
Group – II QUESTION BANK ON LONG ANSWER QUESTIONS			
1	Describe the concept of multilevel inverters with neat diagram and waveforms	Evaluate	3

2	Explain the function of capacitors used in multilevel inverters and how these capacitor values are selected for proper operation	Remember	3
3	Categorize the effects of multilevel inverters on switch stress and how these effects are eliminated with conventional elements	Understand	3
4	Explain the process for selection of conventional elements to reduce the effects	Evaluate	3
5	Explain the effect of multilevel inverters on AC motors with neat diagram and waveforms	Understand	3
6	Describe which multilevel inverter is most suitable for the proper operation of synchronous motor speed control?	Analyze	3
7	Distinguish sinusoidal pulse width modulation and space vector pulse	Understand	3
8	Explain the principle ,features and applications of multilevel inverters	Evaluate	3
9	Explain the methods of reactive power compensation in multilevel inverters	Understand	3
10	Discuss about principle ,operation and features of flying capacitor and multilevel inverter.	Understand	3
11	List the features and applications of multilevel inverters and converters	Analyze	3
12	Briefly discuss about classifications of cascaded multilevel inverters	Remember	3
Group – I QUESTION BANK ON SHORT ANSWER QUESTION UNIT IV DCPOWER SUPPLIES			
1	What are the applications of DC power supplies	Analyze	4
2	What is the function of fly back converter	Understand	4
3	What is the function of forward converter	Analyze	4
4	What is the function of push pull converter	Remember	4
5	What are the classifications of DC power supplies	Understand	4
6	Draw the diagram of Half bridge converter	Understand	4
7	Draw the diagram of full bridge converter	Understand	4
8	What are the applications of bidirectional power supplies?	Understand	4
9	List the advantages of switched mode power supplies	Understand	4
10	Write short notes on resonant DC power supply	Understand	4

Group – II QUESTION BANK ON LONG ANSWER QUESTIONS			
1	Explain the following: i) fly back converter ii) forward converter iii) push pull converter	Remember	4
2	Describe the classifications of DC power supplies ,features and applications	Remember	4
3	Describe the operation of half bridge and full bridge converters and write the advantages	Remember	4
4	Explain the operation of bidirectional power supplies and applications	Understand	4
5	Explain the following: i) Half bridge converter ii) Full bridge converter	Analyze	4
6	Explain the operation of fly back converters , push pull converter and list the advantages	Analyze	4
7	Explain the operation of forward converter and resonant dc power supply	Understand	4
8	Write short notes on the following: i) switched mode power supply ii) bidirectional power supply	Analyze	4
9	Compare the advantages and disadvantages of half bridge and full bridge converter	Understand	4
10	Explain the operation of switched mode power supplies and applications	Analyze	4
Group – I QUESTION BANK ON SHORT ANSWER QUESTION **UNIT V** **AC POWER SUPPLIES**			
1	What is the function of Control circuits	Evaluate	5
2	What are the applications of Bidirectional ac power supplies	Evaluate	5
3	What are the advantages of Multistage conversions	Remember	5
4	What are the causes of power line disturbances	Evaluate	5
5	What is the function of power conditioner	Evaluate	5
6	List the methods to produce uninterruptible power supplies	Understand	5
7	Compare switched mode ac power supplies and resonant ac power supplies	Understand	5
8	List the classifications of AC power supplies	Understand	5

9	What is the necessity of AC power supplies	Understand	5
10	What are the advantages of AC power supplies	Understand	5
Group – II QUESTION BANK ON LONG ANSWER QUESTIONS			
1	Explain the following: i) Bidirectional ac power supplies ii) Control circuits iii) Multistage conversions	Remember	5
2	Explain about switched mode ac power supplies and uninterrupted power supplies supplies and applications	Remember	5
3	Explain about power line disturbances , power conditioner and resonant AC power supplies	Remember	5
4	Describe the classifications of AC power supplies features and applications	Remember	5
5	Describe about uninterruptible power supplies and applications	Analyze	5
6	Explain the following: i) power line disturbances ii) power conditioner	Understand	5
7	Explain about switched mode ac power supplies and resonant ac power supplies	Analyze	5
8	Describe the classifications of AC power supplies ,features and applications	Understand	5
9	Describe the classifications of Multistage conversions features and applications	Analyze	5
10	Describe the classifications of bidirectional ac power supplies features and applications	Analyze	5