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Register Number:……..…..

M.E. DEGREE EXAMINATIONS: DEC 2015

(Regulation 2014)

Third Semester.

POWER ELECTRONICS AND DRIVES

P14PETE11**:** PWM Converters and Applications

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Which is the correct sequence of converters starting from highest switching speed CO1 [K_2]

   [A. DC-AC Inverter B. AC-DC converter C. DC-DC chopper D. Step up Cycloconverter]

   a) A-B-C-D b) A-C-D-B

   c) B-D-C-A d) D-C-B-A

2. Line commutation is used in CO1 [K_2]

   [A] Phase controlled rectifier [B] MOSFET chopper

   [C] IGBT Inverter [D] TRIAC voltage controller

   a) A and B b) B and C

   c) B and D d) A and D

3. Reference for space vector PWM technique is CO2 [K_2]

   a) Direct voltage b) Single phase alternating voltage

   c) Three phase alternating voltage d) Two phase alternating voltage

4. A: Resonant converters have reduced losses; CO2 [K_2]

   R: ZCS and ZVS have minimized switching losses

   a) A and R are true and related b) A is true and R is not true

   c) A is not true and R is true d) A and R are not true

5. Match the following CO1 [K_2]

   [A. CSI, B. VSI, C. MLI],

[1. Improved voltage quality, 2. High power, 3. V/f control]

a) A-1, B-2, C-3 b) A-3, B-2, C-1

c) A-3, B-1, C-2 d) A-2, B-3, C-1

6. A: Output of Multi level inverters (MLI) have reduced Harmonics; CO2 [K_2]

R: MLI voltage profile approaches the fundamental voltage.

a) A and R are true and related b) A is true and R is not true

c) A is not true and R is true d) A and R are not true

7. 5^{th} harmonic components produce _____ in induction motor CO3 [K_3]

[A] Positive torque [B] Negative torque [C] Pulsating torque

a) A and B b) B and C

c) A and C d) A , B and C

8. Current ripple can create the following in sequence CO3 [K_2]

A. Torque ripple B. Heat C. Torque pulsation D. Fault

a) A-B-C-D b) A-C-B-D

c) C-B-D-C d) D-C-B-A

9. 11^{th} harmonic current is a CO3 [K_2]

a) Square wave b) Distorted wave

c) Sine wave d) Transient current

10. Match the following CO3 [K_2]

[A. Series filter, B. Shunt filter, C. TSC];

[1. Voltage, 2. Current, 3. Reactive power]

a) A-1, B-2, C-3 b) A-3, B-2, C-1

c) A-3, B-1, C-2 d) A-2, B-3, C-1

PART B (10 x 2 = 20 Marks)

11. State the merits of PWM converters CO1 [K_2]

12. List the applications of VSI CO1 [K_1]

13. What are the losses in power converters? CO2 [K_1]

14. List the advanced PWM techniques CO2 [K_1]

15. What is meant by DC side voltage regulation of an inverter? CO2 [K_2]

16. List the merits of multilevel inverters CO3 [K_2]

17.	State the effects of current ripples in inverter fed drives	CO2	[K_2]
18.	List the power factor correction techniques used for line side converters	CO3	[K_2]
19.	Identify the negative sequence harmonic components	CO3	[K_3]
20.	State the advantages of active filtering technique	CO3	[K_2]

PART C (6 x 5 = 30 Marks)

21.	Draw and Explain the operation of bridge inverter.	CO1	[K_2]
22.	Distinguish between VSI f and CSI	CO1	[K_3]
23.	Draw and explain the sine PWM technique.	CO2	[K_2]
24.	Describe the conduction and switching losses in PWM converters	CO2	[K_2]
25.	With block diagram, explain V/f control of induction motor drive	CO2	[K_2]
26.	How is the power factor improved in line side of converter? Describe a method.	CO3	[K_2]

PART D (4 x 10 = 40 Marks)

27.	With switching strategy, explain the space vector PWM technique	CO2	[K_2]
28.	Derive a dynamic model of PWM converter.	CO2	[K_3]
29.	Describe the estimation of current ripple and torque ripple in inverter fed drive.	CO2	[K_2]
30.	Draw and explain the principle of various types of active power filtering	CO3	[K_2]

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