

Total No. of printed pages = 5

Et-503/PE/5th Sem/2017/N

POWER ELECTRONICS

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

PART – A

Marks – 25

- I. Multiple choice questions : 1×5=5
1. TRIAC cannot be used as
 - (a) AC voltage regulator
 - (b) Cycloconverters
 - (c) Solid state type of switch
 - (d) Inverter

 2. In half wave controlled rectifier
 - (a) One diode and one thyristor is required
 - (b) Only one thyristor is required

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- (c) Either a diode or a thyristor may be used
(d) None of the above
3. In a 3 phase full wave rectifier
(a) Each diode conducts for 120°
(b) Each diode conducts for 60°
(c) Each thyristor conducts for 120°
(d) None of the above is correct
4. An inverter is a
(a) DC to AC converter
(b) DC to DC converter
(c) Fixed DC to variable DC converter
(d) None of the above
5. A DC circuit breaker must use
(a) Natural commutation
(b) Forced commutation
(c) Both natural and forced commutation
(d) Either natural or forced commutation.

- II. State whether the following statements are true or false : $1 \times 10 = 10$
- (a) A diac has two terminals, anode and cathode
(b) A GTO can be turned off by a positive gate pulse
(c) A TRIAC has two modes of operation
(d) A snubber circuit provides protection against high $\frac{dv}{dt}$
(e) In a controlled rectifier most of the loads are purely resistive
(f) The use of freewheeling diodes improves the wave shape of the load current
(g) A chopper is a DC -- DC converter
(h) A switching regulator uses PWM
(i) The speed of a DC motor can be controlled by varying either the armature voltage or the field current
(j) A large size induction motor should be started at a reduced voltage.

III. Fill in the blanks : $1 \times 5 = 5$

- (a) An IGBT is a _____ controlled device.
- (b) A thyristor is _____ layer PNPN semi conductor device.
- (c) A SCR is two _____ analogy.
- (d) RLE load means a load consisting of a _____, _____ and battery.
- (e) An AC regulator is an _____ convertor.

IV. Answer in one sentence each : $1 \times 5 = 5$

- (a) What is power diode ?
- (b) What is SMPS ?
- (c) What is an inverter ?
- (d) What is UPS ?
- (e) Name one protecting circuit.

PART - B

Marks - 45

1. Draw the two transistor analogy of a SCR and write down the equation for anode current. 4
2. Differentiate between power MOSFET and power BJT. 4

3. Explain the working of a 1 phase half wave controlled rectifier with proper circuit diagram. 4

4. Discuss the classification of inverters. 4

5. Explain the working of a voltage source inverter with proper circuit diagram. 5

6. What is a switching regulator ? Name its types. $2+2=4$

7. Classify UPS. Explain the working of online UPS. $2+4=6$

8. Name the different configurations of SMPS. 4

9. What is an AC regulator ? Name some applications of AC regulators. $2+3=5$

10. State the various methods of speed control of DC motors. 5