Total No. of printed pages = 5

Et-503/PE/5th Sem/2018/M

POWER ELECTRONICS

Full Marks –70

Time – Three hours

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

PART – A

Marks – 25

1. Multiple choice questions : 1×5=5

(i) TRIAC can not be turned on

(a) By applying a positive signal at the gate

(b) By applying a negative signal at the gate

(c) By applying either positive gate or negative signal at the gate

(d) None of the above

(ii) Power MOSFETs find application in

(a) High power high frequency applications

(b) Low power high frequency applications

[Turn over

(c) High power low frequency applications

(d) Low power low frequency applications

(iii) 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

(iv) UPS is never used in

(a) Street lighting

(b) Computers

(c) Communication link

(d) Instrumentation

(v) Free wheeling diode is useful when the load is

(a) Inductive

(b) Capacitive

(c) Registive

(d) None of the above

2. State whether the following statements are true or false : $1 \times 10 = 10$

(a) To turn off SCR it is necessary to reduce holding current.

(b) A GTO can be turned off by a positive gate pulse.

(c) A TRIAC has two terminals.

(d) A single phase half bridge inverter uses two thyristors.

(e) In a controlled rectifier allows variations of output voltage by variation of firing angle of thyristors.

(f) The use of free wheeling diodes improves the wave shape of the load current.

(g) An UPS is invariably needed for critical loads.

(h) A switching regulator is a dc-dc converter.

(i) The speed of a DC motor can be controlled by varying either the armature voltage or the field current.

(j) A SMPS is a multistage power supply.

3. Fill in the blanks : $1 \times 10 = 10$

(a) An IGBT is a ..... controlled device.

(b) CMOS stands for ..... .

(c) A SCR is two ..... analogy.

(d) A TRIAC is a ..... thyristor.

(e) An AC regulator is an ..... converter.

(f) A 3-phase inverter can operate in ..... mode or ..... mode.

(g) A snubber circuit is a ..... circuit.

(h) The conversion of ac to dc is known as ..... .

(i) An inverter is a ..... to ..... conversion.

(j) A switching regulator converts an ..... dc voltage to ..... dc voltage.

PART – B

Marks – 45

1. Explain the construction and principle of operation of a thyristor with a proper diagram. 4

2. Discuss the operation of a TRIAC. 4

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

4. What is an inverter ? Classify inverter. 4

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

6. Explain buck and boost regulator in brief. 2+2=4

7. What is an UPS ? Classify UPS. Explain the working of online UPS. 2+2+2=6

8. What is SMPS ? What is its utility ? 4

9. What is an AC regulator ? Give some of its applications. 2+3=5

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