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C16-EE–504

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BOARD DIPLOMA EXAMINATION, (C-16)

AUGUST/SEPTEMBER—2021

DEEE - FIFTH SEMESTER EXAMINATION

POWER ELECTRONICS AND PLC

Time : 3 hours] [*Total Marks* : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Draw ISI symbols for the following thyristor family devices :

(a) GTO SCR

(b) SUS

(c) SBS

2. Define turn-on time and turn-off time of SCR.

3. What is the need of freewheeling diode in converters?

4. State any six applications of cycloconverters.

5. Classify inverters based on the type of connection and the type of output voltage.

6. Define uninterrupted power supply.

7. List any three devices used to suppress spikes in power supply system.

8. State any six advantages of automation.

9. Draw the block diagram of PLC and label its parts.

10. Draw ladder diagram for logic NAND gate.

PART—B

Instructions : (1) Answer *any* **five** questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. Explain the construction and working of SCR with neat diagrams. 10

12. *(a)* Explain complementary commutation of SCR with the help of a neat circuit diagram. 5

(b) Explain crowbar circuit used to protect the power devices against overvoltages. 5

13. Explain the working of single phase half wave controlled converter with resistance load using neat circuit diagram and waveforms. 10

14. *(a)* Explain the working principle of chopper with neat circuit diagram and waveforms. 5

(b) Explain the basic operating principle of cycloconverter. 5

15. *(a)* Explain the speed control of 3-phase induction motor by using voltage-frequency (V/F) control. 5

(b) Explain the operation of burglar alarm circuit using SCR. 5

16. Explain the closed loop system of water level controller with a neat diagram. 10

17. *(a)* Compare open loop and closed loop control systems in five aspects. 5

(b) Explain count up instruction (CTU) of counters used in ladder diagrams. 5

18. Draw and explain ladder diagram of the following :

(a) DOL starter 5

(b) Staircase lighting 5

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