C20-EE-504

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BOARD DIPLOMA EXAMINATION, (C-20)

DECEMBER—2022

DEEE - FIFTH SEMESTER EXAMINATION

POWER ELECTRONICS, PLC AND SCADA

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 the symbols of *(a)* SBS, *(b)* SCS and *(c)* SUS.

2. Compare GTO SCR with SCR in any three aspects.

3. Classify the converters in any three aspects.

4. State the need of free wheeling diode in converters.

5. List any three applications of cyclo-converters.

6. Draw the circuit diagram of series inverter.

7. List the factors affecting the speed of DC motors.

8. Draw the illumination control circuit using TRIAC and DIAC.

9. State any three advantages of automation.

10. List any three SCADA softwares used with PLCs.

PART—B

8×5=40

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

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

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Explain the operation of SCR using two-transistor analogy.

(OR)

(b) Explain the *V-I* characteristics of TRIAC under forward and reverse bias.

12. *(a)* Explain the working of single-phase full-wave AC voltage controller under resistive load with neat waveforms.

(OR)

(b) Explain the working of three-phase half wave controlled converter under resistive load with neat waveforms.

13. *(a)* Explain the operation of 3-phase bridge inverter at 120 degrees conducting duration with neat waveforms.

(OR)

(b) Explain the working of single-phase centre-tapped cyclo-converter with neat diagram.

14. *(a)* Explain the speed control of induction motor by using voltage-frequency control with the help of neat circuit diagram.

(OR)

(b) Explain the operation of on-line UPS with neat block diagram.

15. *(a)* Draw the ladder diagram for star/delta starter and explain the operation with neat diagram.

(OR)

(b) Explain the following PLC instructions :

(i) MCR, *(ii)* JMP, *(iii)* LBL and *(iv)* RET.

PART—C 10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. Explain the operation of step-up chopper with neat circuit diagram and also explain the methods of controlling the output voltage of chopper.

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