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Question Paper Code: 31553

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

Fifth Semester

Electronics and Instrumentation Engineering

01UEI503 – INDUSTRIAL ELECTRONICS

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Define power diode.
2. List the advantages of SCR.
3. Define firing angle.
4. Differentiate between on-off control and phase angle control.
5. Describe the reason for connecting diodes in antiparallel with the thyristors in inverter circuits.
6. Classify the inverter circuit based on commutation circuitry.
7. Give few applications of electric drives.
8. Write the expression for average output voltage of full converter fed DC drives.
9. List out the characteristics of high frequency Induction heating.
10. What type of UPS is preferred for sensitive loads? Analyze the reason?

PART - B (5 x 16 = 80 Marks)

11. (a) Discuss the construction and working principle of SCR. (16)

Or

(b) Discuss the construction and VI characteristics of IGBT. (16)

12. (a) Discuss the operation of 3 phase full bridge rectifier with R Load. Compare its quadrant of operation with R and RL load. (16)

Or

(b) A 200V, 1450 RPM, 100 A separately excited DC machine has an armature resistance 0.04Ω . The machine is driven by a three phase half controlled converter operating from three phase 220V, 50Hz supply. The motor operates at the rated speed and rated load torque. Assuming continuous conduction Calculate (i) the firing angle of the converter (ii) RMS fundamental component of the input current (iii) Input current displacement factor and distortion factor. (16)

13. (a) Explain the operation of sinusoidal PWM technique. (16)

Or

(b) Discuss the operation of series and parallel inverter circuits with necessary circuit diagrams and waveforms. (16)

14. (a) Design a stator voltage controller for induction motor application. (16)

Or

(b) With a neat diagram explain the operation of self-controlled synchronous motor. (16)

15. (a) Describe the principle of operation of SMPS with neat diagram. List out its advantages and disadvantages. (16)

Or

(b) Analyze the operation of online and offline UPS with neat sketch. (16)