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APR-MAY

B. E. (Eighth Semester) Examination, 2020

(New Scheme)

(EI Branch)

INDUSTRIAL ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory. Attempt any* ***two*** *parts from (b), (c) and (d). Sketch neat and clear diagram and waveform wherever necessary.*

Unit-I

1. (a) What do you mean by controlled rectifiers? 2

(b) Explain the principle of operation of single phase, half-wave controlled converted with R-load. Draw the waveforms for (a) output average voltage across the load (b) average current (c) voltage across SCR. 7

(c) A half-wave controlled rectifier circuit is connected to a purely resistive load. Findout the maximum value of the resistance to be connected as a load when $\alpha_{min} = 10^{\circ}$. The latcling and holding current for thyristor are 10 mA and 5 mA respectively. The circuit is operated from $V = 100 \sin 314\, t$. Find out the angle of thyrister. 7

(d) Write a short note on ideal and practical dual converters. 7

Unit-II

2. (a) What is Cycloconverter? 2

(b) An AC voltage controller has a resistive load of $R = 10\,\Omega$ and RMS input voltage is $V_s = 230$ V, 50 Hz. The SCRs are switched on for $n = 25$ cycles and off for $m = 75$ cycles.

Determine :

(i) RMS output voltage

(ii) Input power factor

(iii) Average and RMS rating of SCRs 7

(c) Describe the operation of single phase to single phase cycloconverter for an inductive load. 7

(d) Write the single phase voltage controller working principle with proper circuit diagram. 7

Unit-III

3. (a) List a few industrial application in inverters. 2

(b) Explain the various methods of reduction of harmonics from output voltage of inverter. 7

(c) Describe the working of a single phase parallel inverter with relevent circuit and waveforms. 7

(d) Write a short notes on series inverters. 7

Unit-IV

4. (a) What is SMPS? 2

(b) What is an UPS? Give its industrial application. Describe rotating-type UPS configuration. 7

(c) What is a static switch? List the merits of static switch over mechanical switches. 7

(d) What are solid state relays? How is electrical isolation obtained in these relays? 7

Unit-V

5. (a) What is thermal times? 2

(b) Explain principle of induction heating. Enlist merits of induction heating over conventional method. 7

(c) Explain the basic principle of high-frequency diclectric heating. Give two applications. 7

(d) Classify timers according to the functions and techiques. 7