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16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory*.

(2) Answer each next main Question on a new page.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any THREE of the following:** **12**

(i) List turn on methods of thyristor and explain any two of them.

(ii) Draw circuit diagram of single phase full wave half controlled converter using RL load. Sketch waveform of output voltage and output current.

(iii) Define inverter. Draw circuit diagram of basic series inverter.

(iv) Define chopper. List various types of chopper and state basic principle of chopper.

b) **Attempt any ONE of the following:** **6**

(i) State the principle of cycloconverter. Draw and describe single phase midpoint cycloconverter with R load.

(ii) Compare uncontrolled rectifier and controlled rectifier (any six points).

Marks

2. Attempt any FOUR of the following: **16**

a) How SCR commutates in class A method? Explain with diagram.

b) With neat circuit diagram, explain working principle of single phase halfwave controlled rectifier with resistive load. Draw waveforms across load for firing angle 90°.

c) Define firing angle and conduction angle. Draw the output voltage waveform for full wave controlled rectifier with R load and RL load.

d) Draw circuit diagram of Jones chopper.

e) Describe the working principle of dielectric heating with block diagram.

f) Describe step-up chopper with neat diagram.

3. Attempt any FOUR of the following: **16**

a) Explain two transistor analogy of SCR with a neat diagram.

b) Describe with neat diagram three phase fully controlled bridge converter with RL load.

c) Draw VI characteristic of TRIAC. Give two application of TRIAC.

d) Explain the operation of four quadrant chopper with quadrant diagram.

e) Draw circuit diagram of battery charger circuit using SCR. Explain its working.

4. a) Attempt any THREE of the following: **12**

(i) Describe speed control of 3ϕ induction motor with variable frequency square wave inverter method.

(ii) Draw construction of IGBT. Give any two advantages of IGBT.

(iii) Describe the speed control of dc motor using step down chopper.

(iv) Describe automatic street light circuit using SCR.

Marks

b) **Attempt any ONE of the following:** **6**

(i) Explain operation of basic parallel inverter with waveform.

(ii) With neat diagram explain single phase full bridge converter with RL load. Draw input, output waveform.

5. Attempt any FOUR of the following: **16**

a) State and describe principle of resistance welding with a neat diagram.

b) State the function of free wheeling diode in converter with a neat diagram.

c) Draw circuit diagram of three phase inverter.

d) Draw block diagram of induction heating and explain any one application of it.

e) Compare MOSFET inverter with thyristor base inverter (any four points).

f) Describe half bridge inverter with circuit diagram.

6. Attempt any FOUR of the following: **16**

a) Draw circuit diagram of UJT triggering of SCR. Draw waveform to show firing angle control.

b) With neat diagram describe the working of static AC breaker.

c) Compare induction heating and dielectric heating on following points:

(i) principle

(ii) frequency of generation

(iii) area of heat generation

(iv) applications

d) Explain current commutated chopper with the help of diagram.

e) List advantages and disadvantages of resistance welding.