17638

21819

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

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

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

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(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) State the meaning of holding current and latching current. Label them on the VI characteristics of SCR.

(ii) Draw circuit diagram of single phase full bridge inverter. Draw waveform of load voltage and load current for RL load.

(iii) State the necessity of converter and give the classifications of controlled converter.

(iv) Draw a schematic of step up chopper and explain it.

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

(i) Discuss the method of overcoming the intermittent power flow in a basic series inverter. Illustrate your answer with relevant circuit and waveform.

Marks

(ii) For a single phase full controlled half wave converter system and sketch waveforms for load voltage and load current for:

1) RL load

2) RL load with free wheeling diode from a comparison of these waveforms. Discuss the advantages of using a free wheeling diode.

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

a) Describe thyriostorised induction heating.

b) Draw symbol and V-I characteristics for:

(i) TRIAC

(ii) IGBT

c) Draw circuit diagram of 3ϕ series inverter and describe its operation.

d) With a neat circuit diagram, explain the working principle of Jones Chopper.

e) Explain the operation of cyclo converter with a neat diagram.

f) State differences between MOSFET and thyristor inverter.

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

a) Draw schematic circuit diagram of thyristorized battery charges.

b) Draw construction of SCR using two transistor model. Explain its operation.

c) State the application of chopper and list the various control techniques of Chopper.

d) What is converter? List the types of converter. State the function of free wheeling diode in converters.

e) Describe the working of resistance welding method with diagram.

f) Sketch output voltage output current source current and thyristor current waveform for type C chopper indicate the conduction of various devices.

Marks

4. a) **Attempt any <u>THREE</u> of the following:** **12**

i) Describe the principle of dielectric heating. Give any two applications.

ii) State different methods to control the output voltage of inverter. Explain PWM method.

iii) Differentiate between single and three phase controlled converter on the basis of efficiency, ripple factor RMS values and average values.

iv) Draw the circuit diagram and explain the variable frequency control of induction motor.

b) **Attempt any <u>ONE</u> of the following:** **6**

i) Describe operation of 3ϕ full controlled bridge converter with R load using neat circuit diagram. Sketch different i/p, o/p waveform.

ii) Sketch circuit diagram of auxiliary commutated chopper. Explain its operation using related waveform.

5. **Attempt any <u>FOUR</u> of the following:** **16**

a) What are different turn-on methods of SCR? Explain any one method.

b) State the criteria for selection of single phase and three-phase inverter for required application.

c) Describe the circuit diagram and operation of DC static circuit breaker.

d) Describe use of thyristor in static VAR compensation.

e) Explain the SCR turn off process with waveforms of voltage and current.

f) Draw symbol and characteristics of GTO, LASCR, power semiconductor and its application.

Marks

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

a) Describe the working of close loop speed contral method for A.C. series motor and D.C series motor.

b) Write the specifications/rating of SCR:

(i) Voltage.

(ii) Current

(iii) Power

(iv) Temperature.

c) Draw circuit for single phase full wave converter with RL load and draw its load voltage and current waveform.

d) Draw and describe the operation of parallel inverter.

e) State the meaning of commutation. Explain class B method of commutation.

f) Discuss the working of a load commutated chopper with relevant voltage and current waveforms.