17638

21718

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) Assume suitable data if necessary.

(6) 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) Draw and explain labelled characteristics of IGBT.

(ii) State the need of converters. Define firing angle.

(iii) Compare MOSFET inverter with thyristor based inverter.

(iv) Describe the working of speed control of 3ϕ induction motor by variable frequency control using cycloconverter.

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

(i) With the help of waveforms, explain the working of sinusoidal pulse width modulation.

(ii) Draw and explain 3ϕ fully controlled bridge converter with 'R' load.

Marks

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

a) With suitable circuit diagram, explain the VI characteristics of SCR.

b) Compare 3ϕ and 1ϕ converters, on the basis of efficiency, ripple factor, RMS values and average values.

c) State function of free wheeling diode. Also state effect of source impedance on converter.

d) Draw circuit of Jones Chopper and describe its working principle.

e) Explain working of speed control of DC series motor with 1 ϕ half control converter.

f) State necessity of chopper and give it's classification.

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

a) Draw and explain characteristics of SUS.

b) With suitable circuit diagram and waveforms, explain 1 ϕ fully controlled half wave converter with RL without free wheeling doide.

c) Enlist triggering methods of SCR. Explain dv/dt triggering in details.

d) Draw and explain Auxiliary commutation method.

e) Explain operation of speed control of 3 ϕ induction motor by voltage source inverter.

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

(i) Describe different control techniques of chopper.

(ii) What are the factors to be considered while selecting SCR. Enlist any four specification of SCR.

(iii) Draw circuit diagram of battery charger control and describe its operation.

(iv) Describe the working of step-up chopper with circuit diagram.

Marks

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

(i) Describe the working of single phase full bridge inverter with circuit diagram.

(ii) With the help of waveforms, explain operation of 1ϕ cycloconverters.

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

a) Describe the operation of DC static circuit breakers.

b) Describe the working of single phase fully controlled bridge converter with resistive load.

c) With suitable circuit diagram and waveforms, explain the working of parallel inverter.

d) Describe the operation of close loop speed control method for AC servo motor with the help of diagram.

e) Enlist methods used for output voltage control. Describe external control of dc voltage.

f) Describe the working of modified series inverter operation with the help of diagram.

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

a) Describe the working of load commutation of chopper.

b) Draw the diagram of electric welding control and describe its operation.

c) Describe the operation of induction heating with diagram.

d) Describe the operation of static VAR compensation system with the help of diagram.

e) Draw labelled characteristics of Triac. State it's two applications.

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