17444

21314

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.

(7) Preferably write the answer in sequential order.

Marks

1. a) **Answer any <u>SIX</u> of the following:** **12**

i) Draw the symbols of:

1) UJT

2) TRIAC

ii) State two advantages of IGBT.

iii) List two applications of TRIAC.

iv) Write classification of choppers.

v) What are the limitations of R triggering circuit?

vi) List applications of inverters. (Any four)

Marks

vii) State the need of polyphase rectifiers.

viii) Draw the block diagram of SMPS and label it.

b) **Answer any <u>TWO</u> of the following:** **08**

i) A single phase full controlled bridge rectifier is supplied with voltage v = 230 sin (314 t); and is delivering power to a resistive load. Find the average output voltage, if the firing angle $\alpha = 45°$.

ii) Define inverter. Give classification of inverters.

iii) Define the following terms with respect to inverters.

1) Harmonic factor of n^{th} harmonic

2) Total harmonic distortion

3) Distortion factor

4) Lowest order harmonics

2. Answer any <u>FOUR</u> of the following: **16**

a) Define firing angle and conduction angle. What is the effect of firing angle on average output voltage?

b) Draw the circuit diagram of step up chopper. State it's operating principle.

c) Draw the block diagram of UPS. State the function of each block.

d) Draw the constructional details of DIAC. Draw the VI characteristics of DIAC.

e) Draw the circuit diagram of full wave RC triggering circuit to turn ON the thyristor. Draw the waveforms of input voltage and output voltage.

f) Draw the circuit diagram of series inverter. Draw the input and output waveforms.

Marks

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

a) Differentiate between SCR and TRIAC on the basis of :

i) symbol

ii) layered diagram

iii) operating quadrant and

iv) applications

b) Draw the circuit diagram of single phase half wave controlled rectifier with R load. Draw the waveforms of input voltage, load voltage and voltage across SCR.

c) Draw the VI characteristics of SCR. State the effect of gate current on the breakover voltage.

d) Draw the VI characteristics of power transistor. Label different regions.

e) Draw the single phase full wave bridge type controlled rectifier. Draw the waveforms of input voltage, load voltage and voltage across SCR.

f) Differentiate between controlled and uncontrolled rectifiers. (Any four points)

4. Answer any FOUR of the following: **16**

a) Draw the circuit diagram of step down chopper. Draw the input output waveforms.

b) Draw the constructional diagram of GTO. State the operating principle.

c) Draw the circuit diagram of light dimmer using DIAC and TRIAC and sketch the i/p - o/p voltage waveforms.

d) Draw the circuit diagram of class C commutation circuit. Draw the waveforms.

Marks

e) Draw the circuit diagram of a battery charger. State it's operation.

f) Compare between step up and step down chopper with respect to:

i) Input and output waveforms

ii) Output voltage equation

iii) Switch position (connection)

iv) Applications

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

a) Draw the neat circuit diagram of Fan Speed Regulator using TRIAC. Describe it's working.

b) Draw the VI characteristics of LASCR. What is the effect of light intensity on forward breakover voltage?

c) Describe the effect of freewheeling diode with respect to single phase centre tap full controlled rectifier with RL load.

d) Describe the operation of pulse transformer used in triggering circuits.

e) Draw the labelled constructional diagram of N-channel IGBT.

f) Differentiate between single phase controlled half wave rectifier and single phase controlled full wave rectifier.

Marks

6. Answer any <u>FOUR</u> of the following: **16**

a) Draw the circuit diagram of DC low power flasher. Describe it's operation.

b) Draw the circuit diagram of three phase half wave controlled rectifier. Draw the waveforms of input voltage and output voltage.

c) What is forward voltage triggering method of turning on the thyristor?

d) State two applications each for :

i) SCR

ii) PUT

e) What is the second breakdown in power BJT? How is it avoided?

f) Draw the circuit diagram of synchronized UJT triggering and describe it's working.

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