Scheme - I

Sample Question Paper

Program Name : **Electrical Engineering Program Group**
Program Code : **EE/EP/EU**
Semester : **Fifth**
Course Title : **Power Electronic Applications (Elective)**
Max. Marks : **70** **Time: 3 Hrs.**

22527

Instructions:
(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1) Attempt any Five of the following. **10 Marks**

a) Draw labeled transfer characteristics of Power MOSFET.

b) Define forward break over voltage of SCR.

c) List any two applications of IGBT.

d) Write the different types of inverter.

e) List four switching components used in inverters.

f) Write any two applications of dual converters.

g) List the types of high frequency heating.

Q.2) Attempt any Three of the following. **12 Marks**

a) Explain with a neat labeled sketch the working principle of the single phase parallel inverter.

b) Explain with circuit diagram the working principle of type B chopper.

c) Explain with circuit diagram the working principle of the circulatory current mode dual converter.

d) Compare step up and step down chopper on any four points of difference.

Q.3) Attempt any Three of the following. **12 Marks**

a) Draw circuit diagram of four quadrant chopper and its labeled quadrant diagram.

b) Describe the operation of McMurray Bedford inverter with circuit diagram.

c) Draw the circuit diagram of single phase to single phase cyclo converter and sketch the input/output waveforms .

d) Describe the principle of induction heating with suitable diagram .

Q.4) Attempt any Three of the following. 12 Marks

a) Identify a suitable chopper for producing the output in first and fourth quadrant and explain its operation.

b) Identify the role of the saturable reactor in Morgan chopper. Explain with its circuit diagram.

c) The applied dc voltage of a type A chopper is 230 V and a load resistance of 10 Ω. Calculate the average output voltage if duty cycle is 0.4.

d) Draw input and output waveforms of cycloconverter to produce $1/4^{th}$ of input frequency. Show the firing sequence of thyristors in the relevant waveform.

e) Describe the operation of dual converter with labelled quadrant diagram..

Q.5) Attempt any Two of the following. 12 Marks

a) Explain with neat labeled sketch the speed control of DC servo motor.

b) Identify a suitable Ac voltage stabilizer that uses relays. Describe its operation with diagram.

c) Identify a suitable type of heating method to heat nonconducting material. Explain its operation with diagram.

Q.6) Attempt any Two of the following. 12 Marks

a) Justify FCT as a voltage controlled device with characteristics.

b) Identify a suitable inverter in which load is connected in series with commutating components. Explain its operation with circuit diagram.

c) Explain the operation of Mcmurray full bridge inverter with circuit diagram.

Scheme - I

Sample Test Paper - I

Program Name : **Electrical Engineering Program Group**

Program Code : **EE/EP/EU**

Semester : **Fifth**

22527

Course Title : **Power Electronic Applications (Elective)**

Max. Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a. Define latching current and holding current of SCR.

b. Draw the symbol of SIT and FCT.

c. Write the types of chopper.

d. State the relation between average output voltage and duty cycle of a step up chopper.

e. Draw a neat circuit diagram of single phase bridge inverter.

f. List two applications of inverters.

Q.2 Attempt any THREE. **12 Marks**

a. Explain the operation of IGBT with constructional diagram.

b. Describe the working principle of MCT with equivalent circuit.

c. Draw a neat circuit diagram of Type C chopper and explain its working.

d. Explain the operation of Jones chopper with circuit diagram.

e. Describe the operation of three phase bridge inverter with circuit diagram.

Scheme - I

Sample Test Paper - II

Program Name : **Electrical Engineering Program Group**

Program Code : **EE/EP/EU**

Semester : **Fifth**

22527

Course Title : **Power Electronic Applications (Elective)**

Max. Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a. State the effect of reactor in circulating current mode dual converter.
b. State the effect of firing angle in dual converter.
c. Write any two applications of cycloconverter.
d. State the need of AC voltage stabilizer.
e. Write any two advantages of each of the following: i) induction heating and ii) dielectric heating.
f. Draw a neat circuit diagram of AC circuit breaker.

Q.2 Attempt any THREE. **12 Marks**

a. Describe the operation of three phase to single phase cycle converter with neat circuit diagram.
b. Explain the operation of McMurray half bridge inverter with circuit diagram .
c. Explain the operation of closed loop control method for AC servo motor with neat circuit diagram.
d. Explain with neat sketches the operation of electric welding control.
e. Compare induction heating and dielectric heating on any four points.
