

[80]

SEAT No. _____

No. of Printed Pages : 3

30

SARDAR PATEL UNIVERSITY
M.Sc. (ELECTRONICS) II SEMESTER EXAMINATION
Tuesday, 26th MARCH, 2019 TIME: 10:00 A.M. to 01:00 P.M.
PS02EELE21: INDUSTRIAL ELECTRONICS

TOTAL MARKS: 70

Q-1 Multiple choice questions.

8x1=8 [08]

- 1 IGBT is use for applications in
 - (a) Low power.
 - (b) Medium power.
 - (c) High power.
 - (d) None of the above.
- 2 In IGBT, P⁺ layer connected to the collector terminal is called as the
 - (a) Drift layer.
 - (b) Injection layer.
 - (c) Body layer.
 - (d) Collector layer.
- 3 The Turn-off time of an MCT is approximately
 - (a) 0.1 microsecond.
 - (b) 1.0 microsecond.
 - (c) 2-3 microsecond.
 - (d) 10-20 microsecond.
- 4 The efficiency of VR stepper motor is
 - (a) 95%
 - (b) 90%
 - (c) 75 to 85 %
 - (d) 60 to 75 %
- 5 A single-stack, 4-phase, 6-pole VR stepper motor will have a step angle
 - (a) 15⁰
 - (b) 30⁰
 - (c) 45⁰
 - (d) 90⁰
- 6 The operating frequencies of dielectric heating is in range of
 - (a) 1-10 KHz.
 - (b) 20-50 KHz.
 - (c) 100-500 KHz.
 - (d) 1MHz-50MHz.
- 7 In modern MOSFET, the material used for the gate is
 - (a) High purity silicon.
 - (b) High purity silica.
 - (c) Heavily doped polycrystalline silicon.
 - (d) Epitaxial grown silicon.
- 8 The forward blocking voltage of an IGBT is determined by
 - (a) Thickness of drift layer.
 - (b) Doping level of drift layer.
 - (c) Thickness & doping level of drift layer.
 - (d) Increase in size of the drift layer.

(1)

(P.T.O)

- Q-2 Short question. (Answer any seven) 7x2=14 [14]
- 1 Distinguish between Fly back, Buck and Boost converters.
 - 2 Draw the basic structure of MOS-controlled thyristor [MCT].
 - 3 Why the reverse voltage blocking capacity of a GTO is small?
 - 4 Enlist the factors to be considered in selecting PLC.
 - 5 Why Variable reluctance stepper motor rarely use in industrial applications?
 - 6 Define latching current and Holding current in thyristor.
 - 7 Why the step down cycloconverters more used than step up cycloconverter?
 - 8 Draw the logic circuit and ladder diagram for OR gate and XNOR gate.
 - 9 Draw connection of primary and secondary winding of three phases in Delta and Delta connection.

Q-3 [a] Discuss the construction of the Insulated gate bipolar transistor and explain [06] the principle operation of IGBT.

Q-3 [b] Draw the basic six layer structure of a Triac. Explain the principle operation [06] of four different modes of possibilities of triggering Triac operation.

OR

Q-3 [b] Draw the schematic diagram of anode shorted GTO structure. Explain the [06] mechanism of turn ON and turn OFF GTO device.

Q-4 [a] Discuss the basic method of producing variable frequency, high power, and [06] three-phase source for adjusting the speed of an industrial ac induction motor. Sketch the waveform from the three-phase inverter, condition during each of the six time intervals, Magnetic field components and net magnetic field during each of six time interval

Q-4 [b] Briefly describe the working of Permanent Magnet Stepper [PM] motor and [06] control circuit for PM stepper motor.

OR

Q-4 [b] Explain the working principle operation of switch mode power supply and [06] Buck-Boost converter.

(2)

Q-5 [a] Draw the basic logical circuitry for the control of weighing cycle in the [06] automatic weighing system. Describe the function for SLOW FEED, HOPPER EMPTY and STOP FEED settings.

Q-5 [b] Draw the physical layout system for maintaining relative humidity in a [06] warehouse system. Explain the control circuit which controls the relative humidity of the warehouse system.

OR

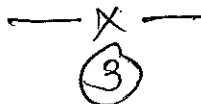
Q-5 [b] With suitable diagram explain principle of Dielectric heating also enlist the [06] effect of frequency and source voltage on Dielectric heating.

Q-6 [a] Draw the symbols and state the application of each switch in industrial [06] control system. [1] Push button switch [2] Temperature switch [3] Level switch [4] Pressure switch [5] Timer switch and [6] Limit switch.

Q-6 [b] What is PLC? Draw the block diagram of PLC. Consider a system in [06] which [i] when start button pressed first main contactor, two pump A and pump B will be ON. [ii] when any one pump A or B will fail, standby pump C will ON. [iii] When any two pump from A, B or C will fail than main contactor will be OFF and Alarm Bulb will blink. Draw the physical layout of the system and PLC ladder programming using Memory Bit.

OR

Q-6 [b] Draw the Ladder diagram and PLC diagram of 4x1 Multiplexer along with [06] Truth table.



- : BEST OF LUCK :-

