

**GUJARAT TECHNOLOGICAL UNIVERSITY****B.E. Sem-V<sup>th</sup> Examination December 2010****Subject code: 150203****Subject Name: Power electronics & control Engineering****Date: 16 /12 /2010****Time: 03.00 pm - 05.30 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Define following **07**  
 (i) Holding current in SCR  
 (ii) Latching current in SCR  
 (iii) Machine instruction  
 (iv) Stack pointer  
 (v) Intrinsic stand off ration in UJT  
 (vi) Strain gauge  
 (vii) Analog and Digital signal
- (b)** (i) Explain with the help of diagram the construction of UJT **07**  
 (ii) Justify: "Once an SCR starts conducting, the gate loses control over it"
- Q.2 (a)** A slab of insulating material  $0.015 \text{ m}^2$  in area and 0.01 m in thickness has **07**  
 relative permittivity of 5 and power factor of 0.05 and is to be heated by dielectric heating. The power required is 400 W at 30 MHz. Determine the voltage required and the resulting current that will flow through the material. If the voltage were to be limited to 650 V, what would be the value of the frequency for the same power requirement?
- (b)** Explain the basic principle of operation of induction heating and list the **07**  
 advantages of induction heating.
- OR**
- (b)** Explain the basic principle of operation of dielectric heating and also explain **07**  
 its frequency range and mention some of its application.
- Q.3 (a)** Explain following instruction with example **07**  
 (i) LDA (ii) JNZ (iii) CMP (iv) LXI (v) STAX (vi) RRC  
 (vii) LHLD
- (b)** Explain sequence timer and leading-trailing tube circuit in welding control **07**
- OR**
- Q.3 (a)** Draw timing diagram for the MVI A, 7Fh and explain demultiplexing the **07**  
 address/data bus in 8085 microprocessor.
- (b)** (i) Explain speed control of Dc motor using SCRs **07**  
 (ii) Explain the Read Only Memory.
- Q.4 (a)** Explain successive-approximation type A/D converter and Dual slope A/D **07**  
 converter.
- (b)** Sixteen bytes of data are stored in memory location at 2050h to 205Fh. Write a **07**  
 program to transfer the block of data to new memory location at 2070h.

**OR**

- Q.4 (a)** Explain programmable logic controller **07**  
**(b)** Write a program to add five data bytes stored in memory location starting at 2060h and display the sum at output port if the sum does not generate a carry. If a result generates a carry stop addition and display 01h at the output port. **07**
- Q.5 (a)** Explain the following pins in 8085 **07**  
(i) INTR(ii) IO/M(iii) RESET(iv) HLDA(v) RST (vi)READY(vii) TRAP  
**(b)** Explain principle and operation of thyristor in detail. **07**
- OR**
- Q.5 (a)** Explain ladder diagram and ignitron contactors. **07**  
**(b)** Explain the construction and characteristics of the TRIAC. **07**

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