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RN-7385

B. E. - IV (Sem. - VII) (ECC) Examination

May / June – 2010

Electronics System Design

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 4 (SEM. - 7) (ECC)**

Name of the Subject :

☛ **ELECTRONICS SYSTEM DESIGN**

☛ Subject Code No. : **7 3 8 5** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figures to the right indicate full marks.

(4) Assume suitable data whenever necessary and specify your assumptions clearly.

(5) Use of scientific non-programmable calculator CASIO FX 82, 83, 100 or equivalent of other makes is allowed.

SECTION - I

1 **Do as directed, Attempt questions of total 14 marks.**

1.1 Value of capacitor as a filter will be more if ripple factor needed is more. True of false? Justify. 2

1.2 Explain unit associated with K_I (integral mode controller constant) and it's significance? 2

1.3 A controller outputs 4 to 20mA signal to control motor from 300 to 500 rpm with linear dependence. Find current corresponding to 400 rpm. 2

1.4 Justify: Curve of output voltage versus output current is not perfect parallel to current axis, for voltage supply. 2

1.5 Define following in context of process and control characteristics. 6

1) Self regulation
2) Process Load
3) offset error

1.6 What are limitations of series pass voltage regulators? 2

1.7 Integral mode controller is natural extensions of Floating type controllers; True or false? Justify. 2

2 A Describe technique of designing function (arbitrary waveform) using Microcontroller. Draw connection/block diagram and flow chart of program for generating triangular waveform. 6

2 B Give steps of designing buck type switching regulator. Determine the filter circuit parameters for buck type SMPS for the following specifications; Input voltage V_{in} varies form 30V to 40V , Output volts V_o =10V; Output current I_o=10A, Output voltage ripple =80mV, Switching frequency =50KHz. 8

2 C List and explain criteria for switching frequency selection in case of switch mode power supply. 4

OR

2 A Describe design steps for Linear voltage regulators. 4

2 B With the help of waveforms and diagram explain operation of boost type switching regulators; derive design equations, and subsequently give design steps for filter circuit. 8

2 C What is significance of PWM waveforms in regulators? Explain techniques to generate PWM waveforms. 6

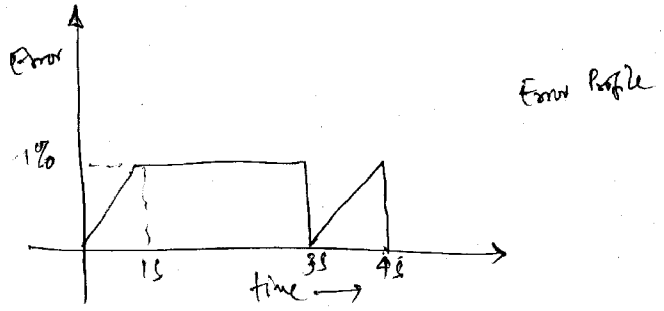
3 A Explain basic principle of proportional mode controller. Describe steps for design. 4

3 B Design two level controller for following specifications 6

For upper value of voltage:
Switch off relay at 40 V and switch on 25V
For Lower value of voltage:
Switch off relay at 15 V and switch on 20V
Assume suitable scale factor for sensing voltage. Explain each design steps and derive expressions you use.

3 C Derive controller output for following error profile, if controller is of PI type and having parameters K_I=0.2 s^{-1}, K_p=1 and Po=21%. Draw graph of controller output based on values of controller output. 8

Design and draw circuit for above controller.



Error Profile 1

SECTION - II

4. (a) Answer the followings: **12**

(i) The minimum number of machine cycle required to execute an 8051 instruction is_____ and maximum number of machine cycles required are_____.

(ii) The ACALL target address is limited to _____ bytes from the present PC and LCALL target address is limited to _____bytes from the present PC.

(iii) The instruction ADD A,#255H is _____ and instruction DIV A,R1 is _____ . (Legal/ Illegal).

(iv) ADC 0809 is ___bit ADC with ___ analog input channels.

(v) ____ Interrupt has highest priority and _____ interrupt has lowest priority in 8051 upon reset.

(vi) _____ and _____ registers are used to control and program the timer operations.

(b) State criteria for selecting a micro-controller for any task. **04**

(c) Explain stack addressing modes in 8051 w.r.t. PUSH and POP instructions. **04**

5. (a) Write a program to see whether D0 and D1 bits of register R1 are high. If so then divide register R1 by 4. **05**

(b) Write a program to get the 'x' value in the range 0 to 15 from P1 and send x^2 to P2 continuously. Use look up table stored in ROM at location named SQR_TABLE. **06**

(c) Explain following 8051 instructions with suitable example. **04**

(i) SWAP A (ii) MUL AB

OR

5. (a) Find the time delay produced by following 8051 delay routine if clock frequency is 16MHz. **05**

```
DELAY:  MOV R5,#100
 BACK:  MOV R2, #200
AGAIN:  MOV R3, #250
HERE:   NOP
        NOP
        DJNZ R3, HERE
        DJNZ R2, AGAIN
        DJNZ R5, BACK
        RET
```

(b) Explain in brief the difference in reading of input port pins Vs. port latch in 8051. **06**

(c) With the help of block diagram show how to connect PC serial port with 8051. Also indicate standard baud rates supported by IBM PC. **04**

6. Attempt any three. **15**

(a) Write a program to generate a 2kHz square wave using timer 0. Take 11.0592MHz crystal frequency and neglect instruction overhead. Output square wave on pin P1.5.

(b) Write a program to receive data serially on 8051 and put them in P1. Set the baud rate at 4800, 8bit data and 1 stop bit.

(c) Explain role of IP and IE register in 8051 interrupt programming?

(d) Give the interfacing of DAC 0808 with microcontroller 8051. Also write a program to generate a saw-tooth waveform using this scheme.

(e) Explain interfacing of LCD display unit with 8051 considering data and control signals of LCD.
