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Question Paper Code : 61729

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Second Semester

Power Electronics and Drives

PE 9224/235208/PE 924 — MICROCONTROLLER AND DSP BASED SYSTEM DESIGN

(Common to M.E. Electrical Drives and Embedded Control)

(Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw the bit assignments of status register of PIC16C7X series.

2. List four bit oriented instruction of PIC16C7X.

3. What is SSP in PIC16C7X series?

4. Draw the block diagram representation of timer 0 of PIC16C7X series.

5. Which block of on-chip DARAM of TMS320LF2407 can be used both as program and data memory? Name the bit that controls memory configuration.

6. How does watch-dog timer (WD) ensure system integrity?

7. Classify I/O control registers of TMS320LF2407 and state the purpose of each category.

8. Which register of TMS320LF2407 is used to identify the pending interrupts at CPU level and where is this register placed?

9. What are the two main objectives while designing a controller for DC-DC converter?

10. What is state vector PWM? State its advantage over direct sinusoidal modulation technique.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the architecture of PIC16C7X microcontroller with necessary block diagram.

Or

(b) A set of numbers is available in 8 consecutive memory locations. Write the PIC programs for the following tasks :

(i) Get the sum of numbers (4)

(ii) Get the sum of all even numbers (4)

(iii) Count the number of numbers greater than 5 (4)

(iv) Count the numbers divisible by 4. (4)

12. (a) Write short notes on :

(i) Interrupt service in PIC16C7X series (4)

(ii) Interrupt prioritizing (4)

(iii) Servicing of interrupts (4)

(iv) Interrupt response time. (4)

Or

(b) Explain CCP module of PIC16C7X series along with its different modes of operation.

13. (a) Draw the function block diagram of TMS320LF2407 DSP controller and explain the components of C2xx DSP core.

Or

(b) Using indirect addressing and looping routine, write a TMS320LF2407 program which writes #0h to 300h, #1h to 301h, #2h to 302h.....until 30Fh. Also write a routine to check the memory 300h though 30Fh for proper data 0h to Fh. If all the registers contain proper data write Ah in memory location 310h. Else write "DEADh" in 310h.

14. (a) With suitable block diagram, explain TMS320LF2407 ADC in

(i) Cascaded sequencer mode

(ii) Dual sequencer mode.

Or

(b) (i) Draw the block diagram of event manager module. (4)

(ii) Explain general purpose timer with neat configuration diagram. (12)

15. (a) (i) Explain Clarke's transformation and Park s transformation. (8)

(ii) Explain the implementation of Clarke's transformation on LF240x controller. (8)

Or

(b) Explain microcontroller based control of PMSM with neat flowchart.
