

Total No. of Questions : 10]

SEAT No. :

**P3593**

**[5560]-547**

[Total No. of Pages : 2

**T.E.(Electronics Engineering)**

**EMBEDDED PROCESSORS**

**(2015 Course) (Semester - II) (304207)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Figures to the right indicate full marks.

**Q1) a)** Draw and explain Data Flow model of ARM7. **[6]**

b) Draw format of status register of MSP430 Microcontroller and explain the function of each bit. **[4]**

OR

**Q2) a)** Draw and explain architecture of MSP430 Microcontroller. **[6]**

b) Explain Watchdog timer of MSP430 Microcontroller. **[4]**

**Q3) a)** Explain different GPIO registers of MSP430 Microcontroller. **[6]**

b) Draw format of CPSR of ARM7 and explain the function of each bit. **[4]**

OR

**Q4) a)** Explain the following instructions of ARM7. **[6]**

i) MOV R7, R5, LSL # 2

ii) SUB R0, R1, R2

iii) MLA R0, R1, R2, R3

b) Explain modes of operation of Timer A of MSP430. **[4]**

**Q5) a)** Explain with neat diagram the relation between CCLK and PCLK with the help of VPB/APB divider. Configure VPB divider to achieve CCLK = 30 MHz for fosc = 12MHz. **[8]**

b) Interface LED's to P1.24 to P1.31 port pins of LPC2148. Write an embedded C program to blink LED's. **[8]**

OR

**P.T.O.**

- Q6)** a) State features of LPC214X Microcontroller and explain the function of IO<sub>x</sub>SET and IO<sub>x</sub>CLR registers of LPC2148. [8]
- b) Interface LCD to LPC2148 and write a program to display string 'SPPU'. [8]

- Q7)** a) List features of UART0 of LPC2148. Write an embedded C program to transmit character 'A' to PC. [8]
- b) Draw and explain interfacing of SD card with LPC2148 using SPI protocol. [8]

OR

- Q8)** a) Draw and explain interfacing of EEPROM using I2C communication to LPC2148. Draw flowchart to read and write data in EEPROM. [8]
- b) List the features of on chip ADC of LPC2148. Write an embedded C program to convert analog input into digital. [8]

**Q9)** Describe in brief. [18]

- a) CMSIS structure of ARM cortex series
- b) Need of operating systems in Embedded system
- c) ARM CORTEX M3

OR

- Q10)** a) Compare ARM cortex A, M, R series. [6]
- b) Explain bit banding technique used in cortex. [6]
- c) Compare ARM cortex M3 with ARM7 TDMI. [6]

