Total No. of Questions :10]

SEAT No. :

**P2859**

[Total No. of Pages :3

# [4958]-1047
# T.E. (E & TC)
# EMBEDDED PROCESSORS
## (2012 Course) (304191) (End Semester ) (Semester - II)

*Time : 3 Hours]* *[Max. Marks :70*

***Instructions to the candidates:***

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8 and Q.9 or Q.10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

***Q1)*** a) Explain programmer's model of ARM processor. **[6]**

b) Draw interfacing diagram to interface LED bank to port pins P 0.12 to P 0.15 of LPC 2148. State algorithm to blink the LEDs. **[4]**

OR

***Q2)*** a) What is the need of Pin connect Block in LPC 2148? Explain the role of PIN SELX registers. **[6]**

b) Explain following ARM instructions (any two). **[4]**

i) ADDEQ $R_0$, $R_1$, $R_2$.

ii) MVN $R_2$, $R_3$, ASR # 2.

iii) STR $R_0$, [$R_1$, # 4]

iv) ANDS $R_0$, $R_1$, $R_2$.

***Q3)*** a) Explain SPI protocol with suitable diagram. **[6]**

b) What is meant by TDMI with respect to ARM 7 core. Compare THUMB and ARM instruction set. **[4]**

OR

***P.T.O.***

***Q4)*** a) Explain the following bits in ADOCR register. **[6]**

i) SEL.

ii) CLKDIV.

iii) CLKS.

b) Draw and explain the interfacing diagram of SD card with LPC 2148. **[4]**

***Q5)*** a) Compare Cortex - A, cortex - R, cortex - M series processor. **[8]**

b) Enlist need and desired features of operating systems in developing complex applications in Embedded system. **[8]**

OR

***Q6)*** a) Explain CMSIS standard for firm wave development in ARM cortex based system. **[6]**

b) Compare Cortex processors over ARM 7 for embedded system design. **[6]**

c) Why Nested vector Interrupt controller is necessary in ARM cortex? **[4]**

***Q7)*** a) Explain four reset sources under system control block of LPC 1768 in detail. **[8]**

b) Explain the following power saving modes. [Any three]. **[6]**

i) Sleep mode.

ii) Deep sleep mode.

iii) Power down mode.

iv) Deep power-down mode.

c) Explain significance of PLL0 and PLL1 in LPC 1768. **[4]**

OR

***Q8)*** a) Draw interfacing diagram of motor control using PWM with LPC 1768. & write down algorithm to control the speed of motor. **[8]**

b) Explain three clock sources (oscillators) for LPC 1768. **[6]**

c) Describe any two registers with reference to ARM M3 micro controllers (LPC 1768). **[4]**

i) FIOMASK.

ii) FIOPIN.

iii) FIOSET.

iv) FIODIR.

***Q9)*** a) Explain the CAN protocol and frame structure with reference to ARM M3 microcontroller. **[8]**

b) Explain the following with respect to USB controller in LPC 1768. **[8]**

i) Features of USB.

ii) USB frame structure.

OR

***Q10)***a) Explain the architecture and operation of Ethernet bus with reference to ARM M3 microcontroller. **[8]**

b) How in and out data transactions take place in USB? Give operational overview. **[8]**