Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala

Computer Science & Engineering Department

BE-Computer Engineering (VII semester), MST
27 September 2022, 10:30 AM
Time: 02 Hours, MM: 25

UCS704: Embedded Systems Design
Name of Faculty: Dr. Anju, Dr. Deepshikha, Dr. Anil, Dr. Ankit, Dr. Ranjeet

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Note: Attempt all five questions serially.

Q.1 a) Compute following expression: **(3)**
i. A-B where A= $(12AB)_{16}$ and B = $(AF23)_{16}$
ii. Find the base value of x if $(211)_x=(152)_8$ in number system?

b) An internal circuit of 8051 provides clock source to the timers that are $1/12^{th}$ of the frequency of crystal which is 16MHZ. Calculate the time period of one machine cycle. **(2)**

Q.2 a) Explain the working of the following pins of 8051 microcontrollers: **(3)**
i. P1.0 to P1.7
ii. RXD and TXD
iii. INT0 and INT1

b) "Microcontroller Units (MCUs) are single chip computers (SoC)", Justify. Which architecture is generally followed by MCUs? **(2)**

Q.3 a) Low power design is a key feature of any embedded system. Discuss any six measures that you need to take into consideration when you design a power limited embedded system. **(2)**

b) Explain the Power on Reset circuit used in a Microcontroller using diagram. Why we need a manual push button in the circuit? **(3)**

Q.4 a) Analog to Digital Converter (ADC) uses both single ended and differential pair to transmit the data. According to your opinion, which one is more preferable in serial ADCs and why? **(2)**

b) How the Proximity/Range Sensor is used to find the distance in vehicles? Explain the principle using which the range is being calculated by a sharp range sensor. **(3)**

Q.5 a) Light Emitting Diode (LED) is a light generating device. LED cannot act directly as sensor. However, the detection of light emit by LED can be used as sensor value. Using the LED and photo detection device design an intrusion detection system. **(3)**

b) Differentiate the working of EFI mechanism and carburetor mechanism in automobile. **(2)**

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