BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – M.Tech.-RA-2023
Course Name – Embedded System Application for Robotics
Course Code - PEC-MIRA101B
(Semester I)

Full Marks : 60   **Time : 2:30 Hours**
[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question)   1 x 15=15

1.   *Choose the correct alternative from the following :*

(i)   Which is an incorrect rule of binary subtraction from the following?
      a) $0 - 0 = 0$ b) $0 - 1 = -1$
      c) $1 - 0 = 1$ d) $0 - 1 = 1$ with borrow '1'

(ii) Storage of 1KB means the following number of bytes
      a) 1000   b) 964
      c) 1024   d) 1064

(iii) Choose most of the digital computers do not have floating point hardware because
      a) floating point hardware is costly   b) It is slower than software
      c) It is not possible to perform floating point   d)
         addition by hardware   No specific reason

(iv) Select what is the function of the TMOD register
      a) TMOD register is used to set different   b)
         timer's or counter's to their appropriate   TMOD register is used to load the count of
         modes   the timer
      c) Is the destination or the final register where   d)
         the result is obtained after the operation of   Is used to interrupt the timer
         the time

(v)   Identify, which of the following offers external chips for memory and peripheral
      interface circuits
      a) Microcontroller   b) Microprocessor
      c) Peripheral system   d) Embedded system

(vi) VME bus stands for
      a) Versa module Europa bus   b) Versa module embedded bus
      c) Vertical module embedded bus   d) Vertical module Europa bus

(vii) Identify the primary purpose of DMA in computer systems?

a) To manage CPU registers

b) To transfer data between devices and memory without CPU intervention

c) To provide additional memory storage

d) To handle keyboard input

(viii) A microcontroller at-least should consist of:

a) RAM, ROM, I/O devices, serial and parallel ports and timers

b) CPU, RAM, I/O devices, serial and parallel ports and timers

c) CPU, RAM, ROM, I/O devices, serial and parallel ports and timers

d) CPU, ROM, I/O devices and timers

(ix) Justify microprocessors, microcontrollers make use of batteries because they have:

a) high power dissipation

b) low power consumption

c) low voltage consumption

d) low current consumption

(x) Select what is the order decided by a processor or the CPU of a controller to execute an instruction?

a) adecode,fetch,execute

b) execute,fetch,decode

c) fetch,execute,decode

d) fetch,decode,execute

(xi) Identify what is the file extension that is loaded in a microcontroller for executing any instruction?

a) .in

b) .hex

c) .r

d) .c

(xii) Identify the size of the address bus in 80286

a) 20

b) 24

c) 16

d) 32

(xiii) Value of temaparature coefficient of Strain gauge is

a) low

b) High

c) zero

d) infinite

(xiv) Choose Strain gauge works on the principle of

a) piezo-electric effect

b) piezo- resistive effect

c) barkhausen criterion

d) feedback element effect

(xv) Select why most of the DSPs use Harvard architecture?

a) they provide greater bandwidth

b) they provide more predictable bandwidth

c) they provide greater bandwidth & also more predictable bandwidth

d) none of the mentioned

Group-B
(Short Answer Type Questions)
3 x 5=15

2. Explain the purpose of embedded memory. (3)
3. Break down the components of an embedded system. (3)
4. Define real-time programming language with example. (3)
5. Discover the role of a scheduler in a real-time operating system. (3)
6. Appraise and anticipate the challenges associated with testing and debugging embedded systems and devise strategies to overcome them. (3)

OR

Categorize the different types of embedded memories and infer their functions in an embedded system. (3)

Group-C
(Long Answer Type Questions)
5 x 6=30

7. Discuss the evaluation of microprocessor in brief. (5)
8. Explain Programmable Peripheral Interfacing. (5)
9. Examine memory Interfacing in Microcontroller. (5)

10. Explain virtual memory. (5)
11. Evaluate different types of scheduling algorithm. (5)

12. Write about the ARM architectures. (5)

OR

Write about the features of an ARM processor. (5)

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