KUMARAGURU
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Register Number:……….….

M.E DEGREE EXAMINATIONS: JUNE 2016

(Regulation 2015)

Second Semester

EMBEDDED SYSTEM TECHNOLOGIES

P15ESTE12**:** Embedded Networking

COURSE OUTCOMES

CO1:   To explain about CAN controller and its features.

CO2:   To study about CAN development tools and implementation methods.

CO3:   To describe the implementation issues in CAN.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1.   The message triggering methods of CAN open are   CO2   [K_1]

   a)   Boot-up and Heartbeat Message   b)   Service Data

   c)   Process Data   d)   All of the above

2.   The maximum number of nodes in a CAN open network   CO2   [K_2]

   a)   127   b)   1270

   c)   1200   d)   254

3.   How does a CAN controller get connected to the bus?   CO2   [K_2]

   a)   Through a differential transceiver   b)   Through cables

   c)   Through connectors   d)   All of the above

4.   Match the following   CO1   [K_2]

A. Field buses, Serial Buses	1. From and to the application
B. Arbitration	2.Used for data transmission
C. Input, Output	3. To avoid collision

   a)   A-2, B-3, C-1   b)   A-3, B-1, C-2

   c)   A-2, B-1, C-3   d)   A-3, B-2, C-1

5. Match the following   CO2   [K$_2$]

    A. Bit Rate/Bit Timing   1. the lowest significant byte coming first.

    B. Node ID   2. All network nodes start up with the same
                                   CAN bus bit rate

    C. Byte Ordering   3. 1, 2, 3 or 4 bytes in length

    D. Process Variables   4. range of 1 to 127

    a) A-2, B-4 C-1,D-3   b) A-1, B-2 C-3,D-4

    c) A-2, B-3 C-4,D-1   d) A-4 B-3 C-2,D-1

6. Match the following   COL   [K$_L$]

    A. Boot-up and Heartbeat Message   1. Inhibit Timer

    B. Service Data   2. Initial internalization

    C. Process Data   3. In response to a request

    a) A-2,B-3,C-1   b) A-1, B-2,C-3

    c) A-2,B-1,C-3   d) A-1,B-3,C-2

7. **Assertion (A):** Emergency message is generated when internal error on the   CO2   [K$_3$]
    device occurs

    Reason (R): When error condition is gone, another EMCY message is
    produced

    a) Both A and R are correct and R is   b) A is correct but R is wrong
        correct explanation of A

    c) Both A and R correct but R is not   d) A is wrong but R is correct
        correct explanation of A

8. **Assertion (A):** Basic CAN controllers have primarily one message buffer each to   CO2   [K$_3$]
            transmit and receive messages.

    Reason (R): But the microprocessor or microcontroller operating a Basic CAN
    interface needs to deal with many high-priority interrupts, since it gets an interrupt
    for every message received in the receive buffer.

    a) Both A and R are correct and R is   b) A is correct but R is wrong
        correct explanation of A

    c) Both A and R correct but R is not   d) A is wrong but R is correct
        correct explanation of A

9. A producer is one who   CO1 [K$_2$]
   a) Transmits the data   b) Receives the data
   c) Manipulates the data   d) Does all

10. In order to be CAN open compliant, every CAN open slave node must implement   CO1 [K$_2$] either the Heartbeat or the Node Guarding services. But node guarding is not recommended since
    a) Heartbeat consumes less bandwidth, is more flexible and is safer.
    b) With the heartbeat method, each slave node by itself transmits a heartbeat, consisting of a 1-byte CAN message containing the current NMT state a node is in.
    c) The heartbeat producer time is configurable
    d) All of the above

PART B (10 x 2 = 20 Marks)

11. What is embedded networking?   CO1 [K$_2$]
12. What are the methods of accessing an object dictionary?   CO1 [K$_1$]
13. What is the purpose of an electronic data sheet?   CO1 [K$_2$]
14. What are the tools used for configuring a CANOPEN network?   CO1 [K$_2$]
15. Draw the physical layout of a CAN open network.   CO1 [K$_2$]
16. What are the different connectors available for the implementation of CAN?   CO2 [K$_1$]
17. What are the error detection mechanisms available in CAN?   CO2 [K$_1$]
18. List out the various operating modes while using the CAN open modules or chips to develop a CAN open node.   CO2 [K$_2$]
19. What is the difference between "Basic CAN" and "Full CAN"?   CO2 [K$_1$]
20. Give a description of what may be transmitted for each state which is one of the implementation issues.   CO3 [K$_1$]

PART C (6 x 5 = 30 Marks)

21. What are electronic data sheets and write about the ways of accessing them?   CO1 [K$_1$]

22. How to choose the devices and tools made for evaluating the system requirements?   CO1 [K$_2$]

23. Write about the error detection mechanisms of CAN.   CO2 [K$_1$]

24. Enumerate the type communication layout requirements needed to develop and build a CAN Open node.   CO2   [K$_1$]

25. Explain the signal states and signal levels used in CAN.   CO2   [K$_1$]

26. Illustrate the basic data types defined in can open.   CO3   [K$_1$]

Answer any FOUR Questions

PART D (4 x 10 = 40 Marks)

27. Give a brief introduction to CAN from the application level, complete with device profiles and EDS.   CO1   [K$_2$]

28. Give a detailed overview of the CAN network.   CO1   [K$_2$]

29. List out the different parameters based on which the CAN controller is selected and also explain the different CAN implementations available.   CO2   [K$_2$]

30. Compare the major CAN open implementation options available and compare them with each other in regards to their individual benefits and drawbacks. Explain the implementation of a simple Micro CAN open   CO2   [K$_2$]

31. Explain the steps involved in the entire design cycle of CAN.   CO2   [K$_1$]

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