Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S6 (PT) (S,FE) Examination May 2024 (2015 Scheme)

Course Code: EC308

Course Name: Embedded Systems

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks Marks

1 a) With a neat diagram explain ARM9 Architecture. (8)

b) Explain the Bus architecture of a high performance embedded system with necessary diagram. Explain the advantages of a split bus architecture. (7)

2 a) Explain the bus topology of an I2C bus with 1 master and 2 slaves. Also explain the frame structure of I2C with necessary diagram. How the start and stop conditions are signalled. (8)

b) Draw the frame structure of CAN protocol and explain how multi-master arbitration is done. Also explain how slave devices are addressed in CAN. (7)

3 a) List and explain atleast 5 hardware components and 3 software components of an Embedded System. (8)

b) Draw and explain the Phyiscal and Logical topology of a USB bus. What is the advantage/need to have separate Physical and Logical topology? (7)

PART B

Answer any two full questions, each carries 15 marks

4 a) What are device drivers? Why is it necessary to have device drivers for (8)

i. Memory

ii. On-board buses.

b) Draw and explain the memory hierarchy as seen by an embedded CPU. (7)

5 a) List and explain the various debugging techniques used for embedded software. (8)

b) Explain with necessary diagrams/pseudocode the task to be performed by a cellphone CPU while playing a video stored on SD card. Explain role of application, OS, drivers and Hardware in the process. (7)

6 a) Describe steps involved in hardware when a program tries to read a large block of data from SD card. (8)

b) List and explain the steps and tools involved in software implementation (7)

PART C

Answer any two full questions, each carries 20 marks

7 a) Differentiate between Process and thread, with the help of memory map diagrams. What is the need for synchronisation of processes? (10)

b) Briefly explain the following IPC techniques – Signals, Semaphore, Message Queue, Pipes, Sockets. (10)

8. a) What are Real Time Operating Systems. How are they different from a desktop Operating Systems. (10)

b) Describe the scheduling algorithm & associated datastructures in uC/OS-II RTOS. In a system with user tasks A and B how to specify/configure so that A operates as a realtime task and B as a background/best-effort task. (10)

9 a) What are remote procedure calls. How are they implemented. What are the advantages/disadvantages over plain messaging? (10)

b) Explain about device management under RTOS (10)

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