BE1-R3: EMBEDDED SYSTEMS

NOTE:

1.	Answer question 1 and any FOUR questions from 2 to 7.
2.	Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours   **Total Marks: 100**

1.

a) Define a system in general and embedded system in particular. How does a general purpose computer differ from embedded system?

b) What are the advantages in Harvard architecture? Why is the ease of accessing stack and data table at program memory less in Harvard memory architecture compared to Princeton memory architecture?

c) How does DSP Processor differ from conventional processors?

d) How does is break point interrupt important for debugging embedded software?

e) Memory allocation and management are the most important functions of kernel. What are the reasons for this?

f) Explain the use of each control bit of I2C bus.

g) Explain the importance of the following declarations: Static, Volatile and Interrupt in embedded C.

(7x4)

2.

a) RTOS is one of the operating system in embedded system. Explain its need taking with suitable example?

b) Differentiate CISC and RISC Architecture.

c) What is an emulator? What are the various components of an emulator? What are the advantages of In Circuit-Emulator (ICE)?

(3+6+9)

3.

a) Explain briefly wireless protocol namely IrDA, Bluetooth and IEEE802.11 as used in embedded communication systems.

b) List the features of P and V semaphores and how are these used as a
   i) resource key
   ii) counting semaphore
   iii) mutex

(9+9)

4.

a) What should be the OS Security Policy? Why are the mobile OS becoming popular in embedded systems for telephones and PocketPCs?

b) Explain the use of the following in development of embedded systems:
   i) Assembler
   ii) Compiler
   iii) Linker

c) Explain, how do the following data structures stored at the memory:
   Stack, Array, Circular Queue, List and Look-up-table

(9+3+6)

5.

a) What are the advantage and disadvantage of (i) a processor with only fixed-point arithmetic unit and (ii) a processor with additional floating-point arithmetic processing unit?

b) Explain the processes for implementation, testing, debugging and validation of the developed software.

c) Briefly explain the waterfall development model.

(4+10+4)

6.

a) Write a program to send one character to the serial port and read one character from same port in C.

b) ARM processor is a family of RISC architectures and integrated into a larger system. What are the salient features of ARM Family Processors?

(9+9)

7. Write short notes on:

a) CAN Bus

b) SHARC Processor, Features and Operations

c) Architecture of Jini and J2ME

(6+6+6)