Code No: RR322202 **Set No. 1**

III B.Tech II Semester Regular Examinations, Apr/May 2006
ROBOTICS AND EMBEDDED SYSTEMS
(Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. With the help of line diagram explain basic components of a Robot system. [16]
2. (a) With the help of neat sketch, explain the pneumatic manipulator control circuit in Industrial Robots.
   (b) Explain the operation of Linear Position measuring transducers used in robots. [8+8]
3. (a) What is machine vision? Explain the techniques of image processing.
   (b) What are the advantages of task level languages over robot-oriented languages? [10+6]
4. (a) What are different categories of embedded systems?
   (b) List and explain briefly about each category application. [8+8]
5. (a) Draw and explain the CPU architecture of ARM processor?
   (b) Give the overview of the memory organization in ARM processors? [8+8]
6. (a) Calculate the total execution time of given 'c' code.
   for(i =0; f=0; i<N ;i++)
   f = f+c[i]+x[i];
   (b) What are the ways of improving CPU performance? Explain? What are the difficulties involved in those methods? [8+8]
7. (a) Compare standard dataflow graph and CDFG with an example?
   (b) Write a CDFG for a "for" loop? [8+8]
8. (a) Draw the state diagram of process states and explain?
   (b) Illustrate with an example shared memory concept of inter process communication system. [8+8]

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Code No: RR322202 **Set No. 2**

III B.Tech II Semester Regular Examinations, Apr/May 2006
ROBOTICS AND EMBEDDED SYSTEMS
(Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain the four major components of a Robot system, and describe each of them in detail. [16]

2. (a) Explain the characteristics of various pneumatic drives used for the robots.
   (b) Discuss the advantages and disadvantages of different types of actuators. [8+8]

3. What is robot vision? What are the types of vision sensors used to take the image of an object? Explain them briefly. Enumerate their advantages and limitations. [16]

4. (a) What is an embedded system? list applications?
   (b) List out different functional/non functional requirements in the design of embedded system? Explain them briefly? [8+8]

5. (a) Explain the program flow control instructions in ARM with examples?
   (b) Write SHARC assembly code for the following loop.
   for(i=0;i<20;i++)
   z[i]=a[i]+b[i]; [8+8]

6. (a) Calculate the total execution time of given 'c' code.
   for(i =0; f=0; i<N ;i++)
   f = f+c[i]+x[i];
   (b) What are the ways of improving CPU performance? Explain? What are the difficulties involved in those methods? [8+8]

7. (a) Compare standard dataflow graph and CDFG with an example?
   (b) Write a CDFG for a "for" loop? [8+8]

8. (a) Draw the state diagram of process states and explain?
   (b) Illustrate with an example shared memory concept of inter process communication system. [8+8]

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Code No: RR322202 **Set No. 3**

III B.Tech II Semester Regular Examinations, Apr/May 2006
ROBOTICS AND EMBEDDED SYSTEMS
(Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the terms Resolution, Accuracy, Repeatability and work volume of an industrial robot.
   (b) Discuss robot application for assembly and inspection. [8+8]
2. Explain with the help of neat diagram the working principle of a.c. servomotor. State the advantages of a.c. servomotors over d.c. servomotors. [16]
3. (a) What is the principle involved in machine vision? Explain the various functions of machine vision.
   (b) Enumerate the advantages and limitations of various robot languages. [8+8]
4. (a) Briefly describe the distinction between requirements and specifications in the design of embedded systems.
   (b) Take one example and explain the above differences clearly. [8+8]
5. (a) Draw and explain the CPU architecture of ARM processor?
   (b) Give the overview of the memory organization in ARM processors? [8+8]
6. (a) Calculate the total execution time of given 'c' code.
   for(i =0; f=0; i<N ;i++)
   f = f+c[i]+x[i];
   (b) What are the ways of improving CPU performance? Explain? What are the difficulties involved in those methods? [8+8]
7. (a) Compare standard dataflow graph and CDFG with an example?
   (b) Write a CDFG for a "for" loop? [8+8]
8. Write short notes on inter process communication by the following services
   (a) Shared memory
   (b) Message queue
   (c) Mailboxes [6+6+4]

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Code No: RR322202 **Set No. 4**

III B.Tech II Semester Regular Examinations, Apr/May 2006
ROBOTICS AND EMBEDDED SYSTEMS
(Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Discuss various generations of Robot indicating their modifications at each stage. [16]

2. (a) Discuss operation of DC Servo motor with a block diagram.
   (b) With a neat sketch explain the principle and working of a pneumatic actuator. [8+8]

3. (a) With a block diagram describe the elements and their functions of a machine vision system for robotic applications.
   (b) Explain the basic elements and functions of robot language. [8+8]

4. What are the problems that must be considered in the design of embedded system? Explain in detail? [16]

5. Design and explain the programming model of SHARC processor with ALU operations? [16]

6. (a) Explain the functionality of memory management unit (MMU)?
   (b) List different types of memories? Write briefly about each type? [8+8]

7. (a) Describe software pipelining in SH architecture?
   (b) Explain the concept of code compression? [8+8]

8. (a) Explain the concept of preemptive and non-preemptive scheduling algorithm with examples?
   (b) Write short notes on cooperative multi tasking? [8+8]

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