(REVISED COURSE)   **QP Code : 15723**

(2½ hours)

Total Marks: 60

N. B.: (1) All questions are compulsory.
     (2) Make suitable assumptions wherever necessary and state the assumptions made.
     (3) Answers to the same question must be written together.
     (4) Numbers to the right indicate marks.
     (5) Draw neat labeled diagrams wherever necessary.
     (6) Use of Non-programmable calculators is allowed.

1. **Attempt _any two_ of the following:**   12
a. What is Artificial Intelligence? Explain the characteristics of Artificial Intelligence.
b. Give the outline of A* algorithm.
c. What is temporal logic? Discuss the types of temporal logic.
d. Explain the syntax and semantics of First Order Logic.

2. **Attempt _any two_ of the following:**   12
a. Give the outline MinMax algorithm.
b. What is case based reasoning? Explain the components of case based reasoning.
c. Write the script for student starting from hostel to main road, then to classroom and finally back to hostel.
d. Explain in brief the knowledge representation using semantic nets.

3. **Attempt _any two_ of the following:**   12
a. Explain Dempster-Shafer theory of evidence with an example.
b. Explain the theory of explanation based learning.
c. What is confidence factor? What are the different strategies for implementing confidence factor?
d. Explain any two knowledge acquisition tools.

4. **Attempt _any two_ of the following:**   12
a. What is planning? Explain different types of planning.
b. Write a note on backtracking.
c. Explain the constraint satisfaction problem.
d. Give the outline of Generate and Test planning.

5. **Attempt _any two_ of the following:**   12
a. Explain syntactically the List and Structures.
b. Discuss the structure of an expert system.
c. Give the comparative view of different expert system shell.
d. Discuss any two web based expert systems.

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MG-Con. 6852-15.

QP Code : **15717**

(2½ Hours)

[Total Marks : 60

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(2) Figures to the right indicate full marks.
(3) Assume additional data if necessary but state the same clearly.
(4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.
(5) Use of calculators and statistical tables are allowed.

Q.1 Attempt **any two** of the following (12)

a) Justify the following statement 'Brightness discrimination is poor at low levels of illumination'. 6
b) Write and explain the expression for DFT applied to 2-D signal. 6
c) What is imaging in the ultraviolet band. Explain. 6
d) Define and explain the following : i) Types of connectivity ii) FFT 6

Q.2 Attempt **any two** of the following (12)

a) State and explain the procedure to convert a non uniform histogram to uniform histogram. 6
b) With an example explain the properties of first and second order derivative. 6
c) Discuss the low pass frequency domain filters in image enhancement. 6
d) Write the advantage of piecewise linear function. Hence explain any one method in this. 6

Q.3 Attempt **any two** of the following (12)

a) State and explain any two application of grey scale morphology. 6
b) Explain the procedure to construct the image pyramids. 6
c) How region filling algorithm works. Explain with an example. 6
d) How HIT-or-MISS transformation is used for finding the local patterns in image. Explain. 6

Q.4 Attempt **any two** of the following (12)

a) How does Huffman coding achieve compression. Explain. 6
b) Describe briefly LoG operator. 6
c) Discuss the thinning algorithm for finding skeleton of region. 6
d) Define psychovisual redundancy. Explain an approach to remove/reduce it. 6

Q.5 Attempt **any two** of the following (12)

a) What are spatial and grey level resolution. Explain. 6
b) What is relation between illumination-reflectance model and image. Explain. 6
c) What do you mean by wavelet function. Explain. 6
d) Explain the following : i) Global thresholding ii) Chain number. 6

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MG-Con. 6850-15.

(2½ hours)

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     (6) Use of **Non-programmable** calculators is **allowed**.

1. **Attempt _any two_ of the following:**   12
   a. What are RISC and CISC processors? How can we distinguish between 8-bit and 16 bit microcontrollers?
   b. Discuss the criteria for selecting a microcontroller device.
   c. With the help of a block diagram explain the Amtel 89C51 microcontroller.
   d. With the help of the circuit diagram, explain the test circuit for 89C2051.

2. **Attempt _any two_ of the following:**   12
   a. Give an overview and features of peripheral interface controllers.
   b. With the help of a block diagram the PIC 16C61.
   c. Explain status registers and power control registers in PIC 16F8XX.
   d. Explain capture, compare and PWM modules in PIC16F877.

3. **Attempt _any two_ of the following:**   12
   a. How does ARM instruction set differ from pure RISC definition that make it suitable for embedded applications?
   b. With the help of an example, explain the hardware of an ARM based embedded device.
   c. What are banked registers? Explain.
   d. Explain the three hardware extensions, ARM wraps around the core.

4. **Attempt _any two_ of the following:**   12
   a. With the help of an example, explain the addressing modes for load –store multiple instructions.
   b. Explain the two pseudoinstructions to move a 32-bit value into a register with examples. How can we count leading zeroes?
   c. What is thumb instruction set? Explain thumb register usage and ARM-thumb interworking with examples.
   d. Explain the stack instructions and software interrupt instruction with examples.

5. **Attempt _any two_ of the following:**   12
   a. Enumerate the rules of cycle timings for common instruction on the ARM9TDMI. What operations are performed in parallel by the ARM9TDMI processor?
   b. Why should register numbers be allocated variables? List the cases where physical number of register is important.
   c. Explain the different looping constructs of ARM.
   d. Explain fixed-width bit field packing and unpacking and variable-width bitstream packing.

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MG-Con. 6850-15.

(2½ hours)

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