(71)   BE- Sem-VII - CBSGS- Computers - DSP        22/11/17

**QP CODE : 22974**

**(3 hours)**                                    **Total Marks: 80**

N.B.   1. Question **No. 1** is compulsory
       2. Attempt any **three** out of remaining
       3. Assume suitable data if **necessary** and justify the assumptions
       4. Figures to the **right** indicate full marks

Q1  A  Compare microprocessor with digital signal processor.                    05

    B  State whether $x[n] = \cos(3\pi n/4)$ is an energy or power signal with proper    05
       justification.

    C  Find the cross correlation of two causal sequences $x[n] = \{2, 3, 1, 4\}$ and    05
       $y[n] = 3\delta(n-3) - 2\delta(n) + \delta(n-1) + 4\delta(n-2)$.

    D  State BIBO stability criterion for LTI systems. Test the stability of the LTI     05
       systems, whose impulse response is: $h[n] = 0.2^n u[-n] + 3^n u[-n]$.

Q2  A  Check whether the system $y[n] = a^n u[n]$ is:                            10
       i) Static or Dynamic
       ii) Linear or Non-linear
       iii) Causal or Non-Casual
       iv) Shift variant or Shift Invariant

    B  Consider analog signal $x(t) = 2\sin 80\pi t$. If the sampling frequency is 60 Hz, find    10
       the sampled version of discrete time signal $x[n]$ also find an alias frequency
       corresponding to Fs = 60 Hz.

Q3  A  Determine the output response of the LTI system using tabular method, whose    10
       input is:
       $x[n] = 1$    ; n= 0, 1
       $= 3$    ; n= 2, 3
       $= 0$    ; elsewhere
       and $h[n] = \delta[n] - 2\delta[n-1] + 3\delta[n-2] - 4\delta[n-3]$.

    B  Compute DFT of sequence $x[n] = \{0, 2, 3, -1\}$. Sketch the magnitude and    10
       phase spectrum.

Q4  A  Explain the following properties of DFT :                              10
       i) Periodicity
       ii) Linearity
       iii) Time Shift
       iv) Circular Convolution
       v) Time Reversal

    B  Compute linear convolution of the causal sequences $x[n] = \{4, 4, 3, 3, 2, 2, 1, 1\}$    10
       and $h[n] = \{-1, 1\}$ using overlap save method.

[TURN OVER]

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Q5  A  In a LTI system the input $x[n] = \{1, 2, 1\}$ and impulse response is $h[n] = \{1, 3\}$.  10
       Determine the response of LTI system using radix- 2 DIT FFT method.

    B  Explain Parseval's energy theorem.
       If IDFT $\{ X(k)\} = x[n] = \{2, 1, 2, 0\}$ using DFT properties, evaluate the          10
       following:
       i) IDFT of $\{X(k-1)\}$
       ii) IDFT of $\{X(k)$ circularly convolved with $X(k)\}$
       iii) IDFT of $\{X(k).X(k)\}$
       iv) Signal energy

Q6  A  Explain the significance of Carl's Correlation Coefficient Algorithm in digital        10
       signal processing. Evaluate Carl's Coefficient for two causal sequences
       $x[n]=\{3, 4, 7, 8\}$ and $y[n]=\{2, 1, 1, 2\}$.

    B  i) Compare 64 point DFT and FFT systems with respect to the number of                  5
       complex additions and multiplications required.
       ii) Write a detailed note on biomedical applications of DSP processors.                5

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BE-sem-vii - Computers- cBSGS- C&SS          28/11/17

Q. P. Code: 24641

(Time: 3hrs)                                    (Marks 80)

1. Question No 1 is compulsory.
2. Attempt any three out of the remaining five questions.

Q1. (a) Encrypt the message "Cryptography is fun" with a multiplicative cipher with    05
        key = 15. Decrypt to get back original plaintext.
    (b) With the help of suitable examples compare and contrast monoalphabetic       05
        ciphers and polyalphabetic ciphers?
    (c) What are the properties of hash functions? What is the role of a hash function    05
        in security?
    (d) What are the different protocols in SSL? How do the client and server         05
        establish an SSL connection

Q2. (a) What is a digital certificate? How does it help to validate the authenticity of a    10
        user? Explain the X.509 certificate format.

    (b) With reference to DES comment on the following:                              10
        i)   Block size and key size
        ii)  Need for expansion permutation
        iii) Avalanche and completeness effects
        iv)  Weak keys and semi-weak keys
        v)   Role of S-box.

Q3. (a) What are the different types of viruses and worms? How do they propagate?    10
    (b) What are the various ways for memory and address protection in Operating     10
        System?

Q4. (a) Explain briefly with examples, how the following attacks occur:              10
        i)   Phishing attack
        ii)  Denial of Service attack
        iii) SQL injection attack
        iv)  Cross-site scripting attack
    (b) How is security achieved in the transport and tunnel modes of IPSec?  What   10
        are security associations?

Q5. (a) What are the different threats to emails? Give an algorithm to secure emails   10
        being sent from user A to user B.
    (b) A and B wish to use RSA to communicate securely. A chooses public key as     10
        (7,119) and B chooses public key as (13,221). Calculate their private keys. A
        wishes to send message m=10 to B. What will be the ciphertext? With what
        key will A encrypt the message "*m*" if A needs to authenticate itself to B.

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Q6. (a) Compare and contrast (any two):  10
    i) Block and stream ciphers
    ii) MD-5 versus SHA
    iii) Key generation in IDEA and Blowfish

(b) What are the different components of an Intrusion Detection System?  10
    Compare the working of signature based IDS with anomaly based IDS.

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BE — COMPUTER — VII — CBSGS — AI    05-12-17

Q. P. Code: 24610

**3 Hours**    Total Marks = 80

**Note:**
(i) Each question carries 20 marks
(ii) Question 1 is compulsory
(iii) Attempt any three (3) from the remaining questions
(iv) Assume suitable data wherever required

Q1. Attempt any four (4) questions from the following:    [20]
 (a) Give PEAS description for an Autonomous Mars Rover. Characterize its environment.
 (b) Give the initial state, goal test, successor function, and cost function for the following problem
  "You have to colour a planar map using only 4 colours, in such a way that no two adjacent regions have the same colour".
 (c) Draw and explain architecture of Expert System.
 (d) Explain Hill-climbing algorithm with an example.
 (e) Covert the following propositional logic statement into CNF
  (i)    $A \rightarrow (B \leftrightarrow C)$

Q2. (a). Explain decision tree learning with an example.    [10]

(b) Write first order logic statements for following statements:    [10]
  (i)    Horses, cows, and pigs are mammals.
  (ii)   Bluebird is a horse.
  (iii)  Whoever can read is literate.
  (iv)   Every tree in which any aquatic bird sleeps is beside some lake.
  (v)    Anything anyone eats and is not killed by is food.

Q3. (a) Design a planning agent for a Blocks World problem. Assume suitable initial state and final state for the problem.    [10]

 (b) Consider a situation in which we want to reason about the relationship between smoking and lung cancer. Intuitively, we know that whether or not a person has cancer is directly influenced by whether she is exposed to second-hand smoke and whether she smokes. Both of these things are affected by whether her parents smoke. Cancer reduces a person's life expectancy.
  (i) Draw the Bayesian network.
  (ii) How many independent values are required to specify all the conditional probability tables (CPTs) for your network?    [10]

Q4. (a) Compare **Greedy Best first search** and **A\* search** algorithms based on performance measure with justification: Complete, Optimal, Time and Space complexity.    [10]
 (b) Write a pseudocode for alpha-beta algorithm. Apply alpha-beta pruning on example given in Figure 1 considering first node as max.    [4+6]
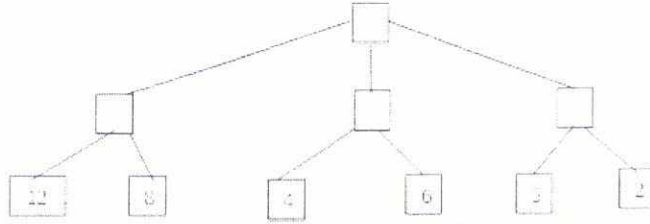
Figure 1.

Q5. (a) Define the terms chromosome, fitness function, crossover and mutation as used in Genetic algorithms. Explain how Genetic algorithms work?    [4+6]

(b) Consider the graph given in Figure 2 below. Assume that the initial state is A and the goal state is G. Show how **Greedy Best first Search** would create a search tree to find a path from the initial state to the goal state:    [10]
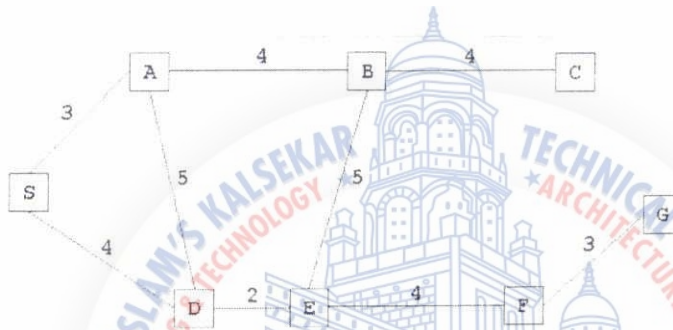


Figure 2.

At each step of the search algorithm, show which node is being expanded, and the content of fringe. Also report the eventual solution found by the algorithm, and the solution cost. Assuming the straight-line distance as the heuristics function: $h(S)=10.5$, $h(A)=10$, $h(B)=6$, $h(C)=4$, $h(D)=8$, $h(E)=6.5$, $h(F)=3$ and $h(G)=0$.

Q6. Answer any two (2) of the following    [20]

(i)     What are steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence.

(ii)    Draw and explain the basic building blocks of Learning Agent.

(iii)   How will you convert the propositional logic statement into CNF? Give a suitable example at each step.

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**Subject:** Correction in QP Code 24610

**From:** University of Mumbai (support@muapps.in)

**To:** controllerktc@yahoo.com;

**Date:** Tuesday, 5 December 2017 12:57 PM

University of Mumbai

Correction in Program Code T4527 - B.E.(COMPUTER ENGG)(SEM VII) (CBSGS) (REV 2012) / T1308 - Artificial Intelligence  **QP Code 24610**

Read as Correction:

**Q.5 (b) Consider the graph given in Figure 3 below. Assume that the initial state is S and the goal state is G.**

University of Mumbai
https://muapps.in
support@muapps.in
022-26534263 / 022-26534266
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B.E - Sem - VII - CBSGS - Computers - ERP & SCM          12/12/17

**Duration: 3 Hours**                **Total Marks assigned: 80**

N.B.: (1) Question No. **1 is compulsory.**
  (2) Attempt any **three** of remaining **five** questions.
  (3) Assume any suitable **data** if necessary and clearly state it.

| | | | |
|---|---|---|---|
| 1. | (a) | Explain the various business modules of an ERP system | [05] |
| | (b) | How can we improve the power of ERP using business intelligence | [05] |
| | (c) | List various benefits of ERP system | [05] |
| | (d) | Explain the key elements of SCM | [05] |
| | | | |
| 2. | (a) | Explain the importance of post implementation phase of ERP systems | [10] |
| | (b) | Explain what do you mean by bill of material with an example | [10] |
| | | | |
| 3. | (a) | Explain the various phases of CRM | [10] |
| | (b) | Explain business process re-engineering (BPR) in detail | [10] |
| | | | |
| 4. | (a) | Explain Electronic Data Interchange along with its benefits | [10] |
| | (b) | Explain agility as incorporated in supply chain management | [10] |
| | | | |
| 5. | (a) | Explain e- procurement mechanism in details | [10] |
| | (b) | Explain SCOR model in detail | [10] |
| | | | |
| 6. | | Write a short note on any **two** of the following | [20] |
| | (a) | News paper supply chain | |
| | (b) | Material management system | |
| | (c) | Impact of Internet on ERP products | |
| | (d) | Mathematical model of SCM | |

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