[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 859 **E** **Your Roll No.....**

Unique Paper Code : 234607

Name of the Course : **B.Sc. (H) Computer Science**

Name of the Paper : Artificial Intelligence (CSHT–616)(ii)

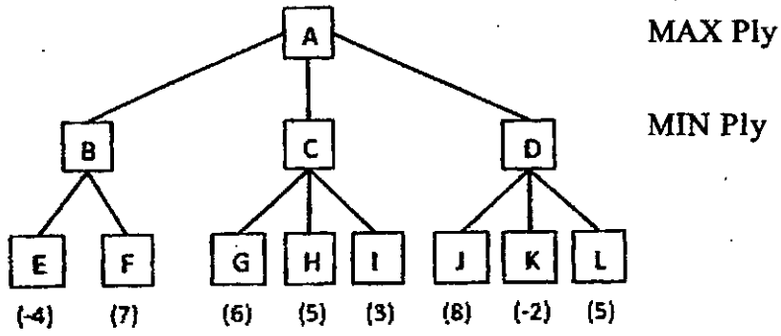
Semester : VI

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1 (one)** is compulsory.
3. Attempt any **4** of questions Nos. **2** to **7.**
4. Parts of a question must be answered together.

1. (a) Consider the following game tree with ply depth 2, in which the indicated scores are from the MAX player's point of view. What move should MAX choose, and why ? (3)



(b) Define Heuristic Search technique. What is the role of a heuristic function ? (4)

(c) Transform the sentence : (P V (~ P & Q & S)) into conjunctive normal form. (3)

(d) What is non-monotonic reasoning ? Explain with a suitable example. (1+2)

P.T.O.

(e) Define in your words :

(i) Artificial Intelligence

(ii) Agent

(iii) Rationality (3)

(f) What are the similarities and differences between Conceptual Graph (CG) and Conceptual Dependency (CD) representation structures ? (5)

(g) Write a context free grammar that can accept the sentence: "Ram hit the ball". (3)

(h) Which searching technique among Breadth First Search and Hill Climbing search is more intelligent, and why ? (3)

(i) Elaborate on the additional capabilities of an Augmented Transition Network (ATN) as compared to a Recursive Transition Network (RTN). (4)

(j) Compare and contrast propositional and predicate logic. (4)

2. (a) Find the probability of the event A when it is known that some event B occurred. From experiments it has been determined that $P(B|A) = 0.84$, $P(A) = 0.2$, and $P(B) = 0.34$. (4)

(b) Create a script for going to a movie. (6)

3. (a) Define utility based agents and list their benefits. (5)

(b) Define alpha and beta cutoffs. Explain how these are used in minimizing search space in MINIMAX procedure ? (5)

4. (a) Consider the following Prolog Program and answer (a) & (b) :

```
invented(edison,lightbulb).
invented(colmeraurer,prolog).
iq(einstein,210).
iq(edison,160).
```

```
iq(waldorf,90).
genius(Person):-
        iq(Person,IQ),
        IQ > 150.
genius(Person):-
        invented(Person,_).
```

(i) For the query ?-genius(A), what is the first answer that Prolog will return ? (2)

(ii) Define a predicate "smart_invention" (given as under) which returns inventions that are invented by people with an IQ of 160 or more.

```
smart_invention(Invention):-
        _____?
```
(3)

(b) What do you understand by Closed Word Assumption in knowledge representation ? (2)

(c) Represent the sentence "John went from Delhi to Shimla" using Conceptual Dependency structure. (3)

5. (a) Give one example for each of 0, 1, 2 and 3 type of Grammars by Chomsky. (4)

(b) Write a short note on the following :

(i) Default Reasoning (3)

(ii) Abductive Inference (3)

6. (a) Find the meaning of the statement

$$(\neg P \vee Q) \ \& \ R \rightarrow S \vee (\neg R \vee Q)$$

for the following interpretation : P is true, Q is true, R is false, S is true. (3)

(b) Transform the following sentence into disjunctive normal form :

$$\sim(P \vee \sim Q) \ \& \ (R \rightarrow S) \qquad (3)$$

(c) Explain, why should the heuristic function in A* should always underestimate ? (4)

7. (a) After a coin is tossed, consider the following statements and their equivalent symbolic form in propositional calculus :

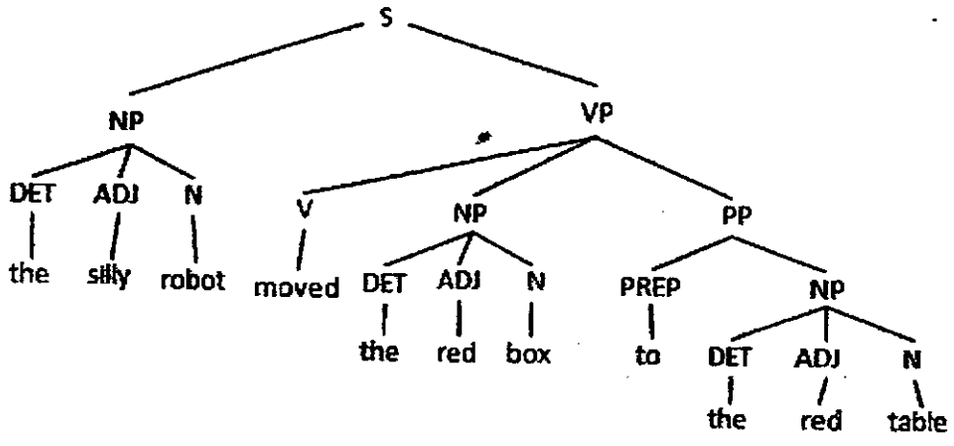
Statement	Symbolic Form
It comes either Head or Tail	H V T
If it is Heads, I win	$H \rightarrow IW$
If it is Tails, you lose	$T \rightarrow YL$
If you lose, I win	$YL \rightarrow IW$

Based on the above information :

(i) Convert these statements into clausal form, and (2)

(ii) Using resolution prove that I win. (4)

(b) Based on the context free grammar represented by the following parse tree, draw the corresponding Recursive Transition Network (RTN). (4)



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Sr. No. of Question Paper : 860 **E** **Your Roll No.....**

Unique Paper Code : 234609

Name of the Course : **B.Sc. (H) Computer Science**

Name of the Paper : Network Programming and Administration (Elective) [CSHT–616(iii)]

Semester : VI

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All questions in **Section – A** are compulsory.
3. Attempt any **four** question in **Section – B.**

SECTION – A

*(**All** questions are compulsory.)*

1. (a) Which end of a connection goes through the TIME WAIT state ? What is the duration of this state ? What is the reason for having this state ? (1+1+2)

   (b) What happens if the process writes to a socket which has already received a RST ? (3)

   (c) What is a slow system call ? When is an error of EINTR returned by such call ? (1+2)

   (d) What is I/O multiplexing ? Why Asynchronous (I/O) multiplexing is better than the Synchronous (I/O) multiplexing. (1+2)

   (e) Explain the importance of socket pair in network communication. (3)

   (f) Give the steps that allow an IPV4 TCP client to communicate with an IPV6 server. (3)

   (g) What are Resource Records ? Explain the various types of resource records. (5)

   (h) What is the purpose of ping program ? Give example. (1+2)

   (i) What is byte ordering ? Explain the byte ordering used in network communication. (1+2)

P.T.O.

(j) What happens if IPv6 router receives a datagram whose size exceeds outgoing link's MTU ? (3)

(k) What are asynchronous errors ? Explain. (2)

SECTION – B

(Attempt any **four** *questions from Section B)*

2. (a) Define wait and waitpid functions. Explain the differences between the two. (4)

(b) Write short notes on the following : (3+3)
(i) SNMP
(ii) Netstat

3. (a) Explain the error returns from the connect( ) system call under different circumstances ? (6)

(b) How can we change the behavior of close socket call by using SO_LINGER option ? (4)

4. (a) By nature, UDP server is iterative or concurrent ? Explain. (3)

(b) Explain the purpose of SO_REUSEADDR and SO_REUSEPORT. (4)

(c) Briefly explain Nagle algorithm. (3)

5. (a) Assume both a client and server set the SO_KEEPALIVE socket option and the connectivity is maintained between the peers but there is no exchange of data. When the keepalive timer expires every 2 hours, how many TCP segments are exchanged across the connection ? Justify your answer with an illustration. (3)

(b) WAP to check whether FTP and HTTP services are running on a host. If the services are supported then print their respective port numbers. (4)

(c) What do we mean by connected UDP socket ? What are the advantages and disadvantages of using connect in UDP ? (3)

6. (a) What are denial-of-service attacks ? (2)

(b) Explain the purpose of recvfrom( ) and accept( ) socket calls. Explain all the parameters also. (4+4)

7. Write a TCP Client and TCP server (iterative) where the client sends a "Hello" to the server and the server responds with "How are you ?" (10)