UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July2020

Course: Artificial Intelligence   **Semester: VI**
Program: B.Tech. CS G&G   **Time 02 hrs.**
Course Code: CSEG3005   **Max. Marks: 100**

Mode of exam: Online through blackboard

Question 1

The first order logic (FOL) statement ((R->Q)->(P->¬Q)) is equivalent to which of the following?

((R->Q)->(P->¬Q)->(R->¬P))

((R->Q)->(P->¬Q)->(R->P))

((R->Q)->(P->¬Q)->(¬R->P))

((R->¬Q)->(P->¬Q)->(R->P))

2 points

Question 2

Which search is complete and optimal when h(n) is consistent?

Depth-first search

A* search

Both a & b

Best-first search

1 points

Question 3

Which statement describes the syntax of a formal language for knowledge representation?

It makes sure that only truth-preserving sentences are admitted in the language.

It allows the generation of new sentences that follow from a set of given sentences.

It specifies the admissible configurations of sentences in that language.

It describes how a particular sentence relates to the facts in the world.

1 points

Question 4

_____ are mathematical problems defined as a set of objects whose state must satisfy a number of constraints or limitations.

Constraints Satisfaction Problems

Local Search Problems

All of the mentioned

Uninformed Search Problems

1 points

Question 5

"Among which of the following mentioned statements can the Bayesian probability be applied?

i. In the cases, where we have one event

ii. In the cases, where we have two events

iii. In the cases, where we have three events

iv. In the cases, where we have more than three events"

ii. and iv.

Only ii.

"All i., ii., iii. and iv."

Only iv.

2 points

Question 6

"Choose the option that is not correct regarding machine learning (ML) and artificial intelligence (AI),"

ML is an alternate way of programming intelligent machines.

ML is a set of techniques that turns a dataset into a software.

AI is a software that can emulate the human mind.

ML and AI have very different goals.

1 points

Question 7

"Consider the following possible choices of error function in training a neural network for classification: cross-entropy error (I), classification error (II), and sum-of-squares error (III). Which of the following are true?"

"(II) is problematic because it s non-differentiable, but either of (I) or (III) should give the same result."

(II) is problematic because it s non-differentiable; (I) is preferred to (III) because the latter corresponds to an inappropriate noise model.

(II) is problematic because it s non-differentiable; (III) is preferred to (I) because the former corresponds to maximising the likelihood of the data.

"Any of the three could be easily used for backpropagation, but (I) is preferred because it corresponds to maximising the likelihood of the data."

2 points

Question 8

"Consider the following statement: ""The search first begins from the root node and the first one of the child node s sub-tree is completely traversed. That is, first all the one-sided nodes are checked, and then the other sided nodes are checked."" Which search algorithm is described in the above definition?"

The Breadth First Search (BFS)

None of the above

The Depth First Search (DFS)

The A* search

1 points

Question 9

Which process makes different logical expression looks identical?

Lifting

Unification

Inference process

None of the mentioned

1 points

Question 10

Which search is implemented with an empty first-in-first-out queue?

Depth-first search

Bidirectional search

Breadth-first search

None of the mentioned

1 points

Question 11

Why are decision trees relatively easy to learn? (CO4)

" Decision trees represent Boolean functions, with a binary yes/no decision for queries. "

" Even for complicated trees, a small training set is sufficient for learning. "

The hypothesis space can be traversed very effectively with simple decision tree learning procedures.

They are usually relatively small.

1 points

Question 12

"Consider the following statement: ""While taking any decision, the agent must provide specific reasons based on which the decision was taken. And this reasoning can be done by the agent only if the agent has the capability of understanding the logic."" Among which of the following situations will the agent use and apply logic for solving the problem?"

All of the above

To solve real life problems

To understand the environment variables

To play a game against a human in the same way as a human would do

1 points

Question 13

"Data set of movie reviews with positive, negative and neutral is given. Classifying reviews of a new movie is an example of:"

Supervised learning

Unsupervised learning

Semi-Supervised learning

Reinforcement learning

1 points

Question 14

"In AI systems, Knowledge can be represented in two ways. What are these two ways? i. Machine Logic ii. Predicate Logic iii. Propositional Logic iv Compound Logic"

i. and ii.

ii. and iii.

iii. and iv.

i. and iii.

1 points

Question 15

"Provide the answer for the following Cryptarithmetic problem: ""SEND MORE MONEY"""

S=12; E=5; N=6; D=8; M=1; O=0; R=8; Y=2

S=5; E=5; N=6; D=7; M=1; O=0; R=8; Y=2

S=9; E=5; N=6; D=7; M=1; O=0; R=8; Y=2

S=9; E=5; N=9; D=7; M=1; O=0; R=8; Y=2

4 points

Question 16

"What was originally called the ""imitation game"" by its creator?"

The Turing Test

Cybernetics

The Logic Theorist

LISP

1 points

Question 17

"Which among the following could the Existential instantiation of ∃x Crown(x) ^ OnHead(x, Johnny)?"

"Crown(John) ^ OnHead(John, Jonny)"

"Crown(y) ^ OnHead(y, y, x)"

"Crown(x) ^ OnHead(x, Jonny)"

None of the mentioned

1 points

Question 18

A constraint is

something that prevents an algorithm from solving a problem.

a restriction on what values the variables in the problem can take.ß?

a limitation of the problem solving approach.

1 points

Question 19

A heuristic is a way of trying

To discover something or an idea embedded in a program

To search and measure how far a node in a search tree seems to be from a goal

To compare two nodes in a search tree to see if one is better than the other

All above

1 points

Question 20

A search algorithm takes _____ as an input and returns _____ as an output.

"Parameters, sequence of actions"

" Problem, solution"

" Solution, problem"

"Input, output"

1 points

Question 21

AO* finds an optimal solution when the heuristic function underestimates the actual cost.

True

False

1 points

Question 22

"All boys are cool.''Corresponding FOL is:

∀x: boy(x) → cool(x)

∀x: boy(x) ∧ cool(x)

∀x: boy(x) → (cool,x)

∀x: boy(x) ↔ cool(x)

1 points

Question 23

An argument in a propositional logic is sequence of proposition

True

False

1 points

Question 24

Which process makes different logical expression looks identical?

Lifting

Unification

Inference process

None of the mentioned

1 points

Question 25

Which statement describes the syntax of a formal language for knowledge representation?

It makes sure that only truth-preserving sentences are admitted in the language.

It describes how a particular sentence relates to the facts in the world.

It specifies the admissible configurations of sentences in that language.

It allows the generation of new sentences that follow from a set of given sentences.

1 points

Question 26

A spam/junk filtering system has a probability of 0.95 to categorize correctly a mail as spam mail and 0.10 probability of giving false positives. it is calculated that 0.5% of the mail are actually spam mails. suppose that the system is now given a new mail to be classified as spam/not-spam,what is the probability that mail will be classified as spam?

4 points

Question 27

"Consider the following statement: ""While taking any decision, the agent must provide specific reasons based on which the decision was taken. And this reasoning can be done by the agent only if the agent has the capability of understanding the logic."" Among which of the following situations will the agent use and apply logic for solving the problem?"

All of the above

To solve real life problems

To understand the environment variables

To play a game against a human in the same way as a human would do

2 points

Question 28

"Data set of movie reviews with positive, negative and neutral is given. Classifying reviews of a new movie is an example of:"

Supervised learning

Unsupervised learning

Semi-Supervised learning

Reinforcement learning

1 points

Question 29

"The selling price of a house depends on the following factors: number of bedrooms, number of kitchens, number of bathrooms, manufacturing year and area. Given these factors, predicting the selling price of the house is an example of..........................."

Binary classification

Multiple linear regression

Multilabel classification

Simple linear regression

2 points

Question 30

A spam/junk filtering system has a probability of 0.95 to categorize correctly a mail as spam mail and 0.10 probability of giving false positives. it is calculated that 0.5% of the mail are actually spam mails.

Find the probability that, a mail is categorized as spam by the system, the mail actually being spam.

0.04556

0.95444

0.00475

0.99525

4 points

Question 31

Consider a medical test for COVID 19. The test gives 95% effective result in recognizing the Corona Virus if it is present, but has a 10% false positive rate (means result comes positive but it is actually negative). The virus is carried by 1% of all people. If someone's test comes positive for the COVID 19, what is the probability that they really affected by Corona virus? Show the calculation as well

5points

Question 32

Consider the following steps: i. Gathering knowledge ii. Defining problem iii. Applying solution iv. Planning v. Forming the state space . What is the correct order for solving an AI problem?

i. v. ii. iv. iii.

i. ii. iii. iv. v.

ii. i. v. iv. iii.

None of the above

1 points

Question 33

Constraint satisfaction problems are

ways of formulating problems using variables and constraints

problems that arise after constraint satisfaction

an alternative formulation for general problem solving method

problems that come in the way of satisfying constraints

2 points

Question 34

General algorithm applied on game tree for making decision of win/lose is _____

Greedy Search Algorithms

DFS/BFS Search Algorithms

MIN/MAX Algorithms

Heuristic Search Algorithms

1 points

Question 35

Hill climbing can get stuck due to which of the following phenomenon? Choose the most appropriate ans.

Local Maxima

All of the mentioned

Plateau

ridges

1 points

Question 36

How do you handle missing or corrupted data in a dataset?

All of the above -

Drop missing rows or columns

Assign a unique category to missing values

Replace missing values with mean/median/mode

1 points

Question 37

How do you represent All dogs have tails .

$\forall x: dog(x) \rightarrow hastail(x)$

$\forall x: dog(y) \rightarrow hastail(x)$

$\forall x: dog(x) \rightarrow has \rightarrow tail(x)$

$\forall x: dog(x) \rightarrow has\ tail(y)$

1 points

Question 38

How many types of quantifiers are there that are used to represent knowledge?

User can define as many quantifiers he wants

3 types

None of the above

2 types

1 points

Question 39

Imagine a new born baby start to learn walking. It will try to find a suitable policy to learn walking after repeated falling and getting up. Specify what type of machine learning algorithm is best suited to do the same.

Reinforcement learning

Unsupervised learning

Supervised learning

Semi-Supervised learning

2 points

Question 40

Which of the following doesn't required NLP algorithm?

Building a sentiment analyzer for tweets on twitter

"Classifying images of scanned documents as ""hand written"" or ""printed"""

Automatically generating captions for images

Classifying Spam emails from good ones

1 points

Question 41

Which of the following are true regarding alpha and beta nodes?

Alpha nodes are discriminative in nature while beta nodes are assimilative in nature

An alpha node can have a beta node as its parent

An alpha node can have only one parent

A beta node can have only one parent

1 points

Question 42

Choose all those which can be considered as an agent

Softbots

Autonomous spacecrafts

Human

Expert system like cardiologist

1 points

Question 43

Match the column A with column B and choose the correct option

[- ∨] Crossword puzzle	A.	Learning agent
[- ∨] Satellite Image Analysis System	B.	Partially Observable
[- ∨] The problem generator	C.	Fully Observable
[- ∨] The Face Recognition system	D.	Applied Artificial Intelligence

4 points

QUESTION 44
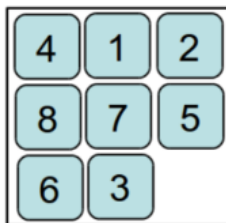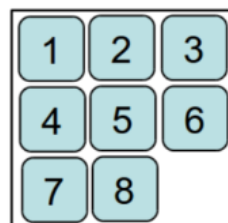
Start state   Goal state

This is an 8-puzzle problem with the start and goal state.
The heuristic function h1(N) = number of cells out of place,
What is the heuristic value of the start state.

[   ]

3 points

Question 45

Consider the cryptarithmetic problem where TWO and FOUR are three and four digit numbers respectively. Choose the correct set of constraints for modelling this problem. Assume that X1,X2 and X3 are carry overs resulting from additions at the unit, tens and hundreds place. Also all digits are distinct
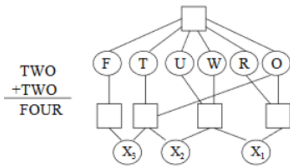
X1+W+T=U+10.X2X2+T+T=O+10.FT>0, F>0F=X3=1

X1+W+W=U+10.X2X2+T+T=O+10.FT>0, F>0F=X3=1

X1+W+W=U+10.X2X2+T+T=O+10.FX3=1

X1+W+W=U+10.X1X2+T+T=O+10.FT>0, F>0F=X3=1

4 points

Question 46

Heuristic search method: Consider the 8-puzzle in which you can move one of the 8 tiles to an adjacent blank space if there is one horizontally or vertically. Consider the given search space:

on the left three moves are possible – Right (move tile 1), Up (move tile 8), or Left (move tile 2).

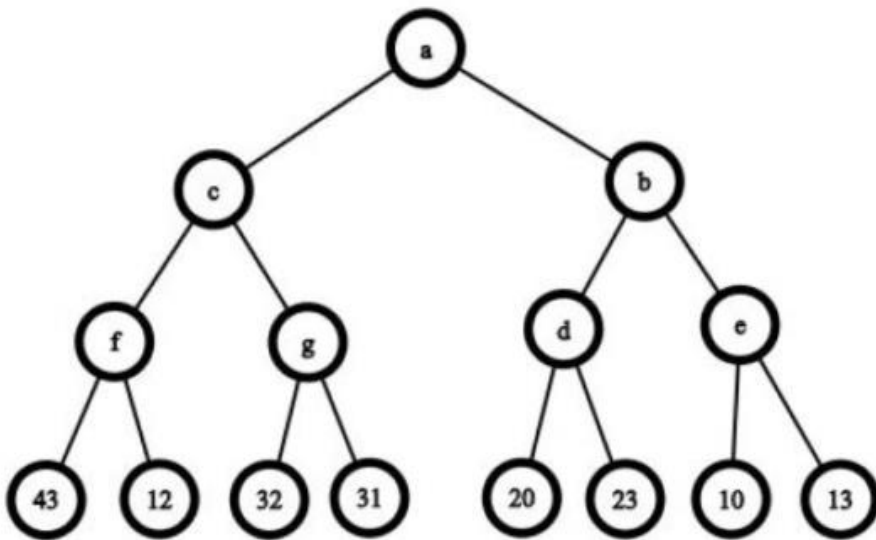Without looking ahead and simply by inspecting the current scenarios which move seems best?

The Goal State
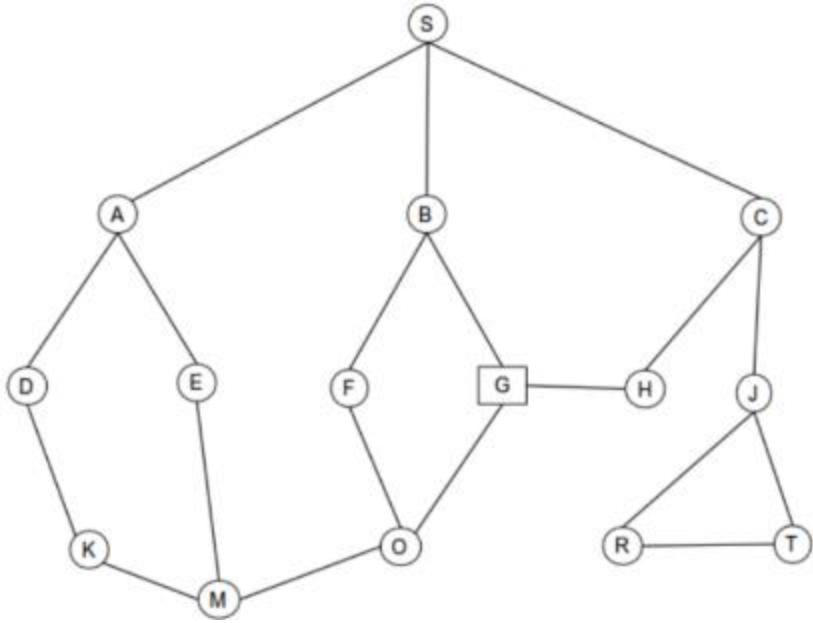
Left

Up

Right

3 points

Question 47

How many nodes included internal and leaf nodes will alpha-beta pruning based Min Max algorithm visit in a given tree, aassuming each successor is ordered left to right. The root node is 'a'
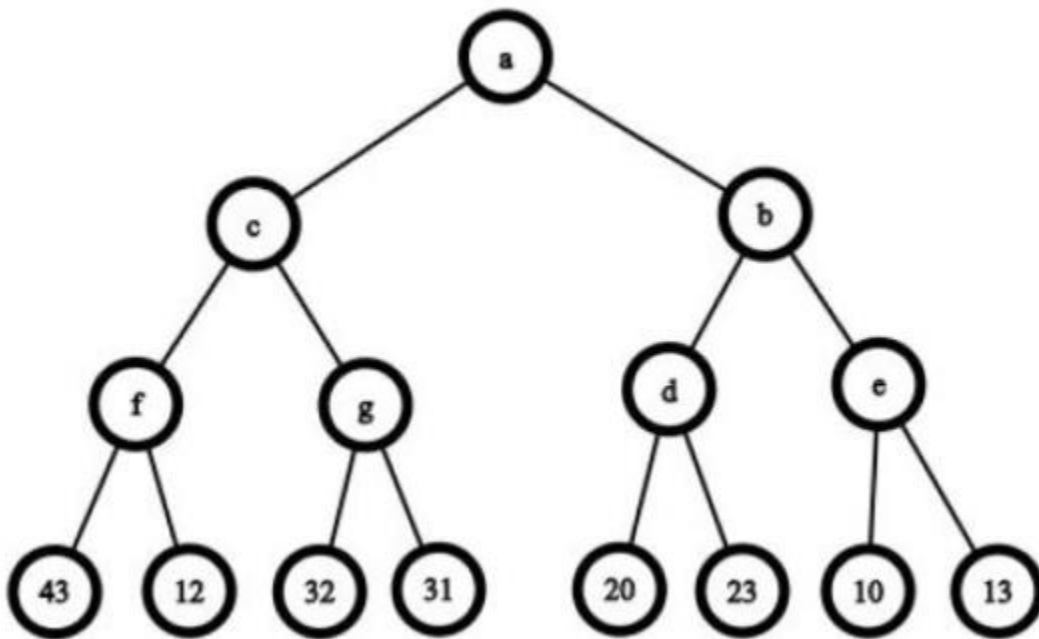

5 points

Question 48

What is the path found by Depth First Search(DFS) algorithm in the given graph
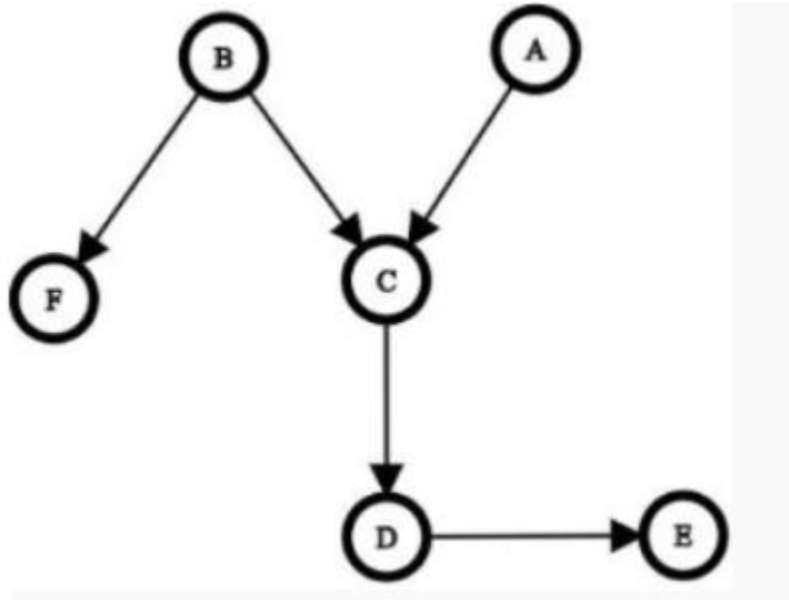
3 points

Question 49

What is the value of root node 'a' after MinMax search. Consider root node 'a' as Max node

3 points

Question 50

Which of the following the following pair of variables are conditionally independent in the given Bayesian Network.Consider evidance of C is given

A,B

A,D

D,E

A,F

2 points

Question 51

First Order Logic is also known as _____

First Order Propositional Logic

First Logic

Predicate Logic

AI Logic

1 points

Question 52

The _____ is a touring problem in which each city must be visited exactly once. The aim is to find the shortest tour.

Finding shortest path between a source and a destination

Depth first search traversal on a given map represented as a graph

Map coloring problem

Travelling Salesman problem

1 points

Question 53

What are the 2 types of learning

Improvised and unimprovised

supervised and unsupervised

Layered and unlayered

None of the above

1 points

Question 54

What is Naive assumptions in Naive bayes classifier?

The most probable feature for a class is the most important faecture to be considered for classification

All the features of the class are conditionally dependent on each other

All the features of the class are independent of each other

All the classes are independent of each other

2 points

Question 55

What is meant by agent s percept sequence?

None of the mentioned

Complete history of perceived things

Complete history of actuator

Used to perceive the environment

1 points

Question 56

What is the action of task environment in artificial intelligence?

Solution

Agent

Problem

Observation

1 points

Question 57

What is the consequence between a node and its predecessors while creating bayesian network?

Dependant

Both Conditionally dependant & Dependant

Functionally dependent

Conditionally independent

1 points

Question 58

What is the heuristic function of greedy best-first search?

f(n) = h(n)

f(n) != h(n)

f(n) < h(n)

f(n) > h(n)

1 points

Question 59

When will Hill-Climbing algorithm terminate?

Stopping criterion met

No neighbor has higher value

Global Min/Max is achieved

All of the mentioned

1 points

Question 60

.. is called the father of AI.

Alan Turing

Dennis Ritchie

James C Gosling

Isaac Newton

1 points