

Put your answers for Part 1 in the following table

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Part 1:

(1 mark each) [20 marks]

Choose the right answer:

1	In unification, we can see the answer for "Unify $p(a, X)$ and $p(Y, f(Y))$ " to be ...		
a	$a/Y$	b	$a/Y, f(a)/X$
c	$f(a)/X$	d	$a/X, f(a)/Y$

2	What is Artificial intelligence?		
a	A field that aims to make humans more intelligent	b	Programming with your own intelligence
c	is the branch of computer science concerned with making computers behave like humans.	d	is the branch of computer science concerned with making humans behave like computers.

3	Which of the following is considered as an Intelligent behavior?		
a	Learn from experience	b	Solve problems when all important information are available
c	Apply knowledge acquired from experience	d	a and c

4	The ..... measures the performance of an intelligent machine against that of a human being		
a	chess game	b	Salesman problem
c	imitation game	d	Turing machine

11	A farmer with his wolf, goat, and cabbage come to the edge of a river they wish to cross. There is a boat at the river's edge, but, of course, only the farmer can row. The boat also can carry only two things (including the Farmer) at a time. If the wolf is ever left alone with the goat, the wolf will eat the goat; similarly, if the goat is left alone with the cabbage, the goat will eat the cabbage. How many time the boat will cross the river assuming optimal path so that all four characters arrive safely on the other side of the river.	
a	4	b 7
c	6	d 5

12	.....use a heuristic to guide the search for the problem at hand and are efficient.	
a	Blind search	b Informed search
c	Uninformed search	d a and c

13	Which one of the following identities is not true ...	
a	$\neg(P \vee Q) \equiv (\neg P \wedge \neg Q)$	b $P \wedge (Q \vee R) \equiv (P \wedge Q) \vee (P \wedge R)$
c	$(P \vee Q) \equiv (\neg P \rightarrow Q)$	d $\neg(P \wedge Q) \equiv (P \vee \neg Q)$

14	"No student failed AI but at least one student failed Database." Which of the following expresses the above sentence in predicate calculus	
a	$\neg \forall x ( \text{Student}(x) \wedge \text{Failed}(x, \text{AI}) ) \wedge \exists x ( \text{Student}(x) \wedge \text{Failed}(x, \text{Database}) )$	b $\neg \exists x ( \text{Student}(x) \vee \text{Failed}(x, \text{AI}) ) \wedge \exists x ( \text{Student}(x) \wedge \text{Failed}(x, \text{Database}) )$
c	$\neg \exists x ( \text{Student}(x) \wedge \text{Failed}(x, \text{AI}) ) \vee \exists x ( \text{Student}(x) \wedge \text{Failed}(\neg x, \text{Database}) )$	d $\neg \exists x ( \text{Student}(x) \wedge \text{Failed}(x, \text{AI}) ) \wedge \exists x ( \text{Student}(x) \wedge \text{Failed}(x, \text{Database}) )$

15	Which of the following is not true	
a	$\neg \exists X p(X) \equiv \forall X \neg p(X)$	b $\neg \forall X p(X) \equiv \exists X \neg p(X)$
c	$\exists X p(X) \equiv \exists Y p(Y)$	d $\neg \forall X p(X) \equiv \exists X p(X)$



5	An Artificial intelligence system can be divided into many components:	
a	Hardware, software, data, and knowledge	b Hardware, operating system, device drivers and Users.
c	Hardware, operating system, application programs and device drivers	d people, procedures, hardware, software, data and knowledge

6	..... is a science of translating actual knowledge into a format that can be used by the computer.	
a	Expert systems	b Machine learning
c	Genetic algorithms	d Knowledge Representation

7	In triangle table, the set of preconditions of each of some actions are .....	
a	In the column before that action	b In the row before that action
c	In the column after that action	d In the row after that action

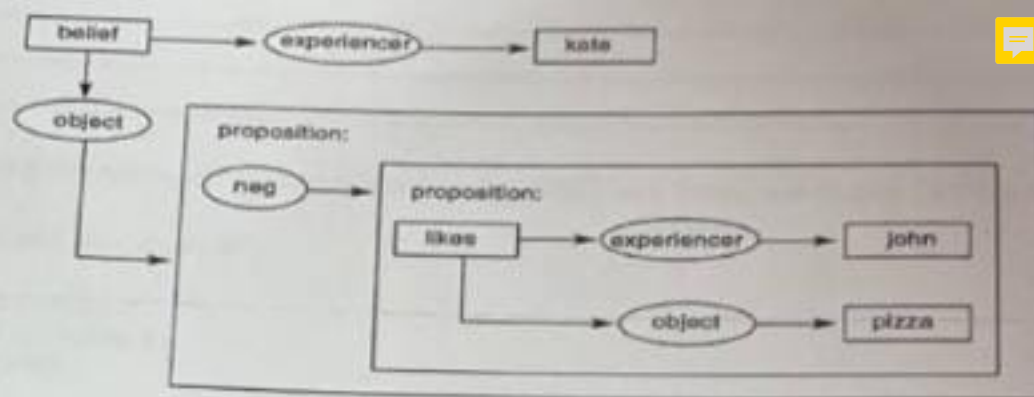
8	Place block W down at some location on the table and record the new location for W, is the meaning of.....	
a	putdown(W)	b Stack(W, V)
c	goto(X, Y, Z)	d pickup(W)

9	Because it always examines all the nodes at level n before proceeding to level n + 1, ..... always finds the shortest path to a goal node.	
a	Best first Greedy search	b Hill climbing
c	Depth first search	d Breadth-first search

10	..... is a strategy for selectively searching a problem space	
a	Depth First Search(DFS)	b A heuristic
c	Breadth first search(BFS)	d AI

**Part 2: Answer the following questions:**

**1-Translate the conceptual graph of the Figure into English sentence.**



[1 Mark]

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**2- Consider the following Prolog program.**

[1 Mark]

```

studies(charlie, csc135).
studies(olivia, csc135).
studies(jack, csc131).
studies(arthur, csc134).
teaches(kirke, csc135).
teaches(collins, csc131).
teaches(collins, csc171).
teaches(juniper, csc134).
professor(X, Y) :-
teaches(X, C), studies(Y, C).
    
```

**What is the output of the following queries?**

?- studies(W, csc135).

?- professor(kirke, jack).

?- teaches(kirke, Y).

?- studies(A, csc134).



3- Represent the following sentences in Prolog:

a- Ahmed loves everyone who gives Mohammed a book.

[1 Mark]

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b- Having the following knowledgebase, using **ONLY** one query, ask Prolog "Which house is free of mice, and who owns it"

[1 Mark]

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hound(rex).  
mouse(jerry).  
cat(tom).
```

```
person(saleh).  
person(sami).
```

```
has(saleh, cat(tom)).  
has(sami, hound(rex)).
```

```
house(hID_1234).  
house(hID_5678).
```

```
owns(saleh, hID_1234).  
owns(sami, hID_5678).
```

```
howls(X, night):- hound(X).
```

```
lightSleeper(X):- person(X), not(has(X, hound(Y))).
```

```
freeOfMice(Y):- person(X), owns(X, Y), house(Y), has(X, cat(Z)).
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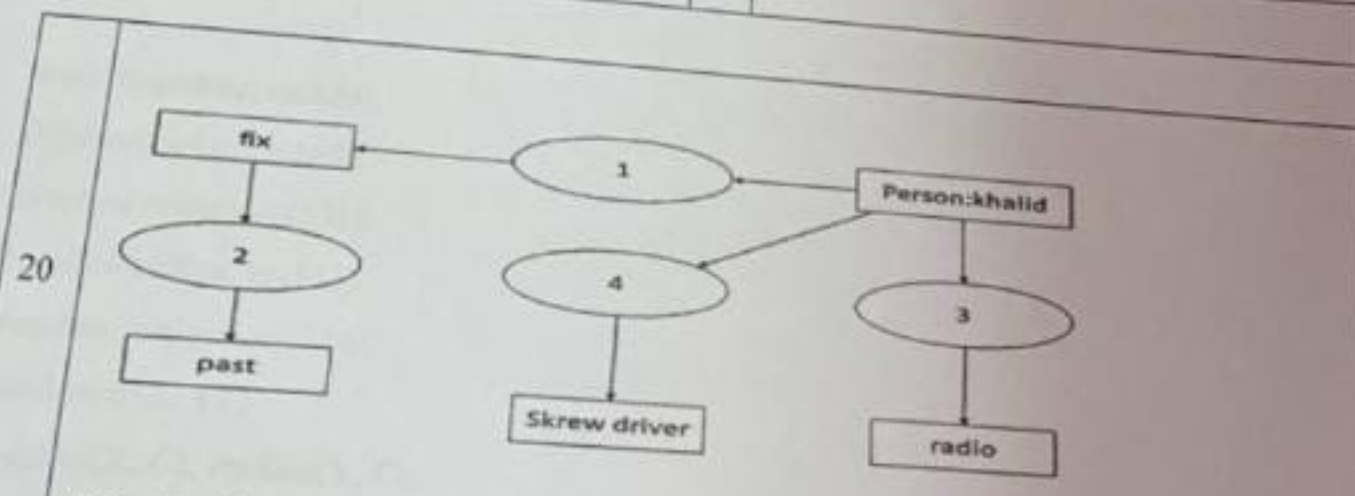
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16	$\forall X (Girl(X) \rightarrow nice(X)). Girl(Saly).$ What is the conclusion of above predicates?	a	Saly is not a girl	b	Saly is not nice
		c	Saly is nice	d	a and c

17	Which of the following is/are admissible algorithm(s)?	a	Breadth first search	b	A
		c	A*	d	a and c

18	A fair six-sided die is tossed five times and the numbers up are recorded in a sequence. How many different sequences are there?	a	$6^5$	b	$6!$
		c	$6!/5!$	d	$6^5/5!$

19	How many words can be formed by using all letters of the word 'STAR'?	a	120	b	24
		c	720	d	60



What are the relations missing in the following diagram?

a	1-agent, 2-time, 3-instrument, 4-object	b	1-agent, 2-time, 3-object, 4-instrument
c	1-agent, 2-time, 3-receipient, 4-instrument	d	1-receipient, 2-time, 3-object, 4-instrument



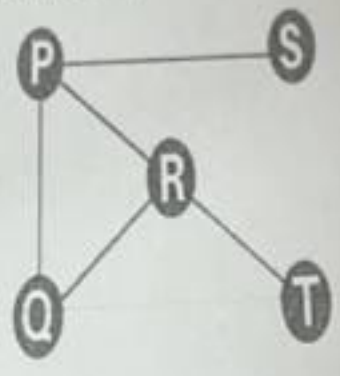






[2 Marks]

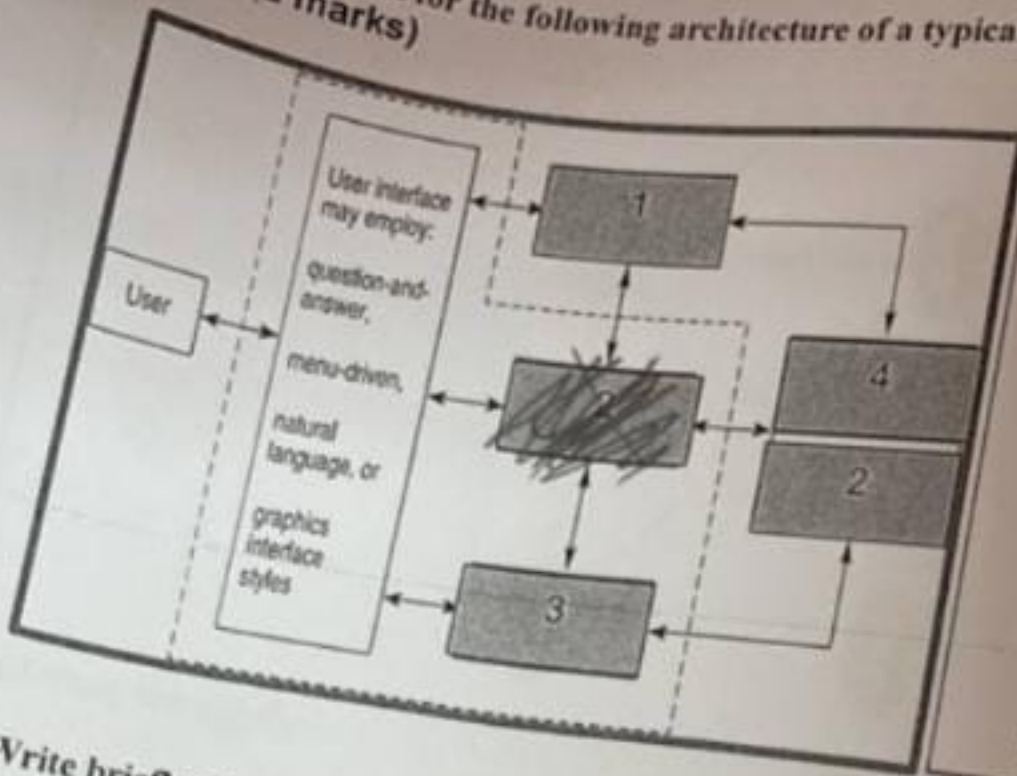
9- What will be the complete traverse path for the following graph



- in case we apply
- 1- Depth First search beginning from P: ---
  - 2- Breadth first search beginning from P: .....

*The End*

7- Fill in the blank for the following architecture of a typical expert system for a particular domain. (2 marks)



Your Answer:

1. ....
2. ....
3. ....
4. ....

8-

a- Write briefly about one of artificial intelligence applications

[1 Marks]

b- Translate the following English statement into first order logic formula

[2 Mark]

1- Some students take ADB

2- Some young males do not like horror movies

c- Give 2 examples of intelligent behavior

[1 Marks]

d- what is meant by machine learning?

[1 Mark]