King Fahd University of Petroleum and Minerals

Introduction to Artificial Intelligence (COE292-05)

Quiz 1 (10 marks)

Name: _____ Student ID: _____

Section 1: Each question carries 0.5 mark

Q1. Indicate whether each of the following statements is TRUE (T) or FALSE (F)

	Question	True or False
1	An Artificial Intelligence agent perceives and acts upon the environment using sensors and actuators	T
2	The complexity of a problem depends on the depth of the goal tree	T
3	Artificial intelligence is a science of making machines that think irrationally and act rationally	F
4	A recursive function is a function that calls itself and it contains a basis step and recursive step	T
5	The Turing test was a scientific start of artificial intelligence and it defines a machine as intelligent if one cannot differentiate between a human and a machine based on interaction only	T
6	A rational agent selects actions that maximize its (expected) utility	T
7	A tree is a collection of structures called nodes connected using edges where a single node represents a value, a state or something meaningful.	T
8	On the goal tree, the answer to "Why" question is going down in the tree level by level while the answer to "How" question is going up in the tree by one level	F

9. Given that solving Tower of Hanoi (TOH) with 3 disks requires 7 moves, then solving TOH with 5 disks requires the following number of moves:

A. 32	B. 31
C. 12	D. 15

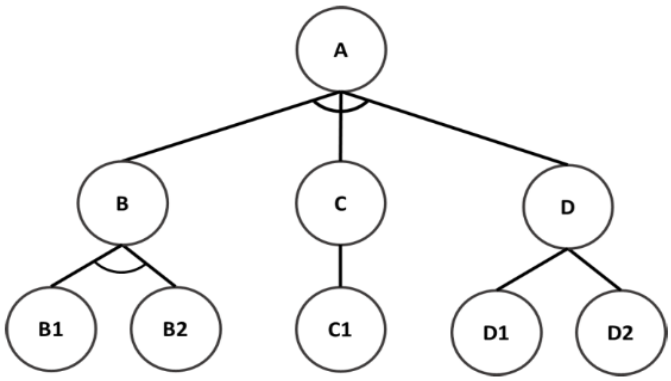
10. The following are Artificial Intelligence solution strategies except?

A. Perception (problem reduction)	B. Knowledge Logic
C. Generate and Test	D. Utility

Section 2: Each question carries 1 mark

Q1. Suppose that a student wants to earn a certificate in subject "A". The goal tree below shown specifies the certificate requirements in terms of courses and course modules. A student can use this tree to decide which course modules he/she can register in order to achieve his goal, i.e. earn the certificate subject "A".

Course	Modules in the course
B	B1, B2
C	C1
D	D1, D2



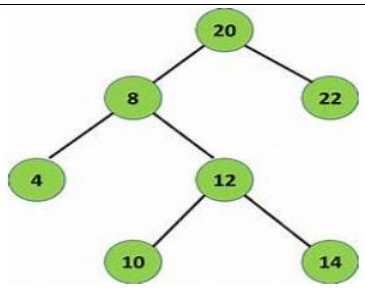
Fill the following blanks:

a. The depth of the tree is equal to __2__.

b. The number of AND node is ___2___, while the number of OR node is ___1__ .

Q2. The number of leaves in the tree shown on the right is:

a. 3
b. 4
c. 5
d. 6
e. None of the above



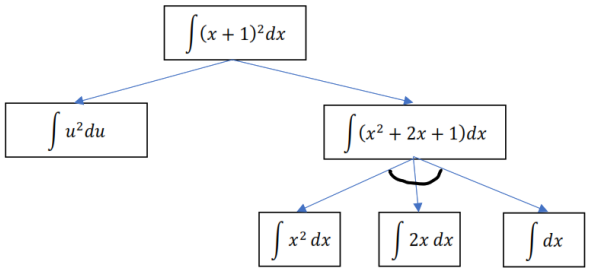
Q3. Reorder the following steps below to solve a problem successfully;	Write the correct order in alphabetical order in the space below
A. First, we must understand the problem B. Apply Reordering Algorithm C. Find the best representation for the problem. D. Expose constraints E. Identify the States (or situation)	ACEDB

Q4. Write any 2 application areas of Artificial Intelligence

A. _____
B. _____

Q5. Draw the goal tree for the following integration problem

$$\int (x+1)^2 dx = \begin{cases} \int (x^2 + 2x + 1)dx = \int x^2\,dx + \int 2x\,dx + \int dx \\ \int u^2 du \quad \text{using subistutution } u = x+1 \end{cases}$$



Bonus question (1 mark): Given that the total number of moves (n), show that the number of disks (k), that are moved from tower A to tower C using tower B, is equal to: $\log_2(n+1)$

$n = 2^k - 1$; simplify
$n + 1 = 2^k$; take $\log_2$ of both sides
$\log_2(n+1) = \log_2 2^k$
$\log_2(n+1) = k\log_2 2$, but $\log_2 2 = 1$
Therefore, $\log_2(n+1) = k$