Sir Syed University of Engineering & Technology

Faculty of Computing and Applied Sciences

Department of CS/SE/IT/BI

Midterm Examination Winter Session 2020-21

Subject	**CS316, SWE314: Artificial Intelligence**	**Program**	BS (CS/SE)
Instructor	Engr. Farheen Qazi	**Semester**	5th, 6th
Maximum Marks	20		
Start date & Time	Dec 28th, 2020 at 2:00 PM	**Submission Deadline**	Dec 28th, 2020 at 5:00 PM
Students must meet their submission deadline as there is no re-take or re-attempt after the deadline.			

IMPORTANT INSTRUCTIONS:

Read the Instructions carefully

- This paper contains **03** questions. You have to attempt all.
- Attempt All Questions on MS-Word. Font theme and size must be Times New Roman and 12 points respectively. Use line spacing 1.5. Convert file to PDF format before submitting.
- You may provide answers HANDWRITTEN. The scanned solution must be submitted in PDF file format (Use any suitable Mobile Application for Scanning)
- For Diagrams, you can use paper and share a clear visible snapshot in the same Answer Sheet.
- You may use mathematical mode typing in MS-Word to type the equations or numeric solution.
- Arrange questions and their subsequent parts in sequence.
- You may use your course text books, recommended reference books and lecture notes **without taking help from others.**
- Make sure that your answers are not plagiarized or copied from any other sources. In case of plagiarism, **ZERO** marks will be awarded.
- Provide relevant, original and conceptual answers, as this exam aims to test your ability to examine, explain, modify and develop concepts discussed during the course.
- Recheck your solution before submitting it on **VLE** to correct any content or language related errors.
- You must upload your answers via the **VLE** platform ONLY.

You must follow "general guideline for students" before online examination and during online examination which had already shared by email and WhatsApp.

This paper has a total of _03__ pages including this title page

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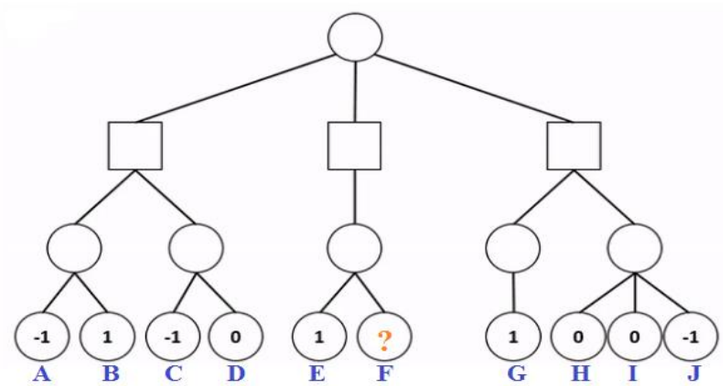
Q.No.1	(5 Marks)

(a) Explain PEAS (Performance, Environment, Actuators, Sensors) for an automated car parking system that displays available parking space and also notifies the incoming driver about the availability of space. **(02 Marks)**

(b) An autonomous Robot is serving as a waiter in a well reputed restaurant located in Tariq Road, Karachi. The Robot is capable to record experiences and create or adopt new representations. The Robot is taking the order from the customers and sends customer's order notification to the kitchen desktop, after that it will serve order/food to the customers. The Robot is also capable to take multiple orders in parallel and deliver as per their order.
Discuss what kind of agent is this Robot? i. Goal-based, ii. Learning-based, iii. Utility based iv. Reflex-based? Justify your answer. **(03 Marks)**

Q.No.2	(7 Marks)

(a) Consider the following game tree:



In the above figure, ○ and □ represent the maximum (MAX) and minimum (MIN) player rounds respectively, while the numbers at the bottom represent the revenue for a given terminal position. If mini-max algorithm is applied, analyze which of the following nodes will be maximum or which one is minimum? **(03 Marks)**

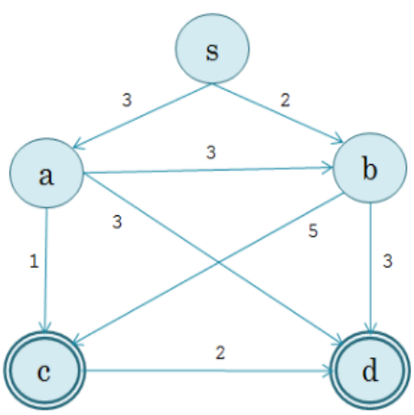
Note: First place the value of "F", then solve the question. F = "sum of first and last digit of your roll number". Suppose, your roll number is 2017-SE-327 so the sum of first and last digit of your roll number will be: 3+7=10.

(b) Given a 4-gallon container, 7-gallon container and a 16-gallon container, how can we measure exactly 14 gallons of water in one of these container? **(04 Marks)**

Note: There are no markings on the bucket, so you must fill each bucket completely. You must generate at-least two combination for it. Also write the problem formulation in your own words.

Q.No.3	(08 Marks)

Consider **"s"** as initial state and both **"c"** and **"d"** as goal state. If you are reached any of the goal state either **"c"** or **"d"** you will stop your searching.



Node Name	Heuristic Values (h)
s	1
a	Sum of your roll number
b	3
c	0
d	0

Note: First place the node value of "a" then solve the question. Heuristic value (node value)

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for "a" is the sum of your roll number. Suppose, your roll number is 2018-SE-348 so the sum of your roll number will be: 3+4+8=15.

(a) Apply **Depth First Search (DFS)** on the above mentioned graph and search the goal state. **(03 Marks)**

(b) Apply **A* Search** on the above mentioned graph and search the goal state. **(05 Marks)**
