[Time:2.30 Hrs] **[Marks:75]**

Please check whether you have got the right question paper.
N.B: All question are compulsory.
Figures to the right indicate full marks.

Q.1 **Attempt any Three of the following:** **15**
a. Dibranchiate between a robot and an automated machine.
b. Differentiate between Passive and Active Sensors.
c. What is a 'Degree of Freedom' in robotic systems.
d. Write a short not on Effector.
e. What is Reactive Theory, and how does it influence robotic behavior?
f. Write a short note on control theory.

Q.2 **Attempt any Three of the following:** **15**
a. What is ultrasonic sensing, and how is it utilized in robotics?
b. Describe the types of cameras commonly used in robots.
c. Write a short note on feedforward (open-loop) control systems.
d. What are the benefits of using laser sensors (LiDAR) in autonomous robots?
e. Write a short note on Stereo Vision.
f. Write a short note on Edge Detection.

Q.3 **Attempt any Three of the following:** **15**
a. Write a short note on Distributed mapping.
b. What is behavior coordination.
c. Write a short note on Action selection.
d. What is navigation in the context of robotics?
e. Write a short note on Reactive systems.
f. Discuss the challenges involved in navigation and path planning for robots.

Q.4 **Attempt any Three of the following:** **15**
a. What is a heuristic function in AI?
b. Explain the Hill Climbing algorithm and its variants.
c. Discuss Define the 'Generate and Test' search strategy.
d. Explain the Branch and Bound method for pathfinding.
e. What is the A algorithm, and how does it differ from Dijkstra's Algorithm? *
f. Write a short note on A* algorithm.

Q.5 **Attempt any Three of the following:** **15**
a. What is meant by 'Embodiment' in robotics.
b. What is visual sensing in robotics, and why is it important.
c. Explain the concept of an algorithm in the context of robotics.
d. Compare Depth First Search (DFS) and Breadth First Search (BFS).
e. Describe Beam Search and its advantages.
f. What is a Depth First Search.