

**BACHELOR OF VOCATION**  
**Robotics and Automation**  
**Subject: Mobile Robots**  
**Subject Code: DBME-303**  
**Semester: Fifth**  
**January 2021**  
**Theory (External): 35 Marks**  
**Time: 03 Hours**

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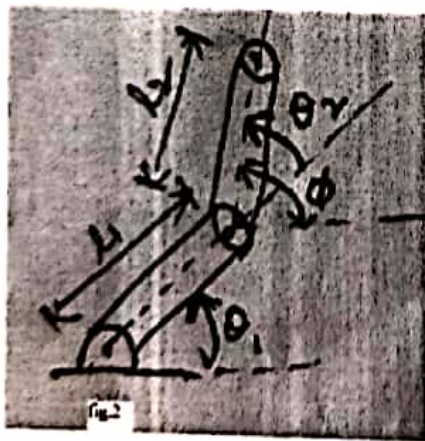
**Instructions to the Students**

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number										

**SECTION –A (SHORT/OBJECTIVE TYPE QUESTIONS)**  
**(10x1=10 Marks)**

- A. What is meant by autonomous?
- B. Where are mobile legged robots preferred?
- C. What is S-Map.
- D. Define array?
- E. What is localization in mobile robots.
- F. Which software is used for embedded C?
- G. What language does arduino use?
- H. What is robot locomotion?
- I. Which degree of freedom is present in this diagram shown in Fig 2?



**FIG.2**

- J. Name the joint space in fig. 2

**SECTION – B (ESSAY TYPE QUESTIONS)**  
**(5×5 = 25 Marks)**

1. How to compare performance between obstacle avoidance algorithms of a mobile robot?
2. What are major components of mobile robot? And how do the mobile robot can sense?
3. Explain the basic arduino programming?
4. Suppose a differential drive robot has wheels of differing diameters. The left wheel has diameter 2 and right wheel has diameter 3.  $L=5$  for both wheels. The robot is positioned at  $\theta = \pi/4$ . The robot spins both wheels at a speed of 6. Compute the robot's instantaneous velocity in the global reference frame. Specify  $x$ ,  $y$ ,  $\phi$ .
5. Define multiple – robot and architectures in details.
6. Define cellular robotics. What are its main characteristics?
7. Define heading sensors. How heading sensors used in navigation application for mobile robot.
8. How are companies integrating autonomous mobile robot's in general automation?

**\*\*\*END OF PAPER\*\*\***