

[This question paper contains 2 printed pages.]

Sr. No. of Question Paper	:	5735	Your Roll No.....
Unique paper Code/ Subject Code	:	2514010017	L
Name of Course	:	B.Sc. (H) Electronics (GE)	
Name of the Paper	:	Robotics	
Semester	:	VI	
Duration	:	3 Hr	
Maximum Marks	:	90 Marks	

Instruction for Candidates

1. There are seven questions in all, out of which you have to attempt any five questions
2. All questions carry equal marks
3. First Question is Compulsory.

1. (a) What are industrial Robots? Give examples 6x3=18
(b) What is a humanoid robot? Give examples.
(c) What is a robotic arm?
(d) Define the terms Yaw, Pitch and Roll.
(e) Give three applications of computer vision in robotics
(f) What is an actuator in a robot?
2. (a) Explain the basic components of a robot with a diagram. (6)
(b) Discuss the laws of robotics and their importance in creating a safeguard for humans. (6)
(c) Discuss the structure and working of a robotic arm along with the terms Payload, Reach and Precision for a robotic arm. (6)
3. (a) What are links and joints? What is different type of joints? Discuss the degree of freedom for various kinds of joints available. (6)
(b) Describe how accelerometer and gyroscope sensors are used in mobile robots and drones. (6)
(c) What is the significance of grippers in Industrial robotics industry? What types of grippers are preferred? (6)
4. (a) Why an Arduino used as an educational platform for robotics. Explain what is a sketch in Arduino IDE. What are other platforms available. (6)
(b) Discuss various pins available in Arduino Uno board. Elaborate on the use of serial transmission pins and the libraries used for serial communication. (6)
(c) Write a program/ algorithm / pseudocode for a robot to detect an obstacle using a proximity sensor and ring a buzzer upon detection. (6)

5. (a) What are sensors? Mention various criteria of selecting a sensor. (6)
- (b) What is an ultrasonic sensor? With the help of diagram explain the working principle behind it. (6)
- (c) What is the role of I/O Pins in an embedded system platform? How can a pin be configured as input pin and output pin (6)
6. (a) Differentiate between Simplex, Half Duplex and Full Duplex communication. Give application of each. (6)
- (b) Discuss the motion of wheeled robot using electric actuators in various directions. Can electric motors be replaced by any other types of actuators. (6)
- (c) What are various methods to increase the speed of motors in a mobile robot. (6)
7. (a) Discuss the challenges faced by robotics industry. (6)
- (b) Discuss the application of robotics in the field of health care. (6)
- (c) What are various Wireless communication protocols used in robotics. (6)