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Brainware University
398, Ramkrishnapur Road, Barasat
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BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – Dip.RA-2024

Course Name – Robotic Fundamentals

Course Code - DEC40112

(Semester IV)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) State, the Hummingbird _____ require extra power to be able to work.
 - a) Sensors
 - b) LEDs
 - c) Motors
 - d) Tri-Color LEDs
- (ii) Name the branch of technology that deals with the design, construction, operation, and application of robots_____
 - a) levers
 - b) robotics
 - c) creative power
 - d) Science CSF
- (iii) When working in a group for robotics, students report _____ -
 - a) stay on task but don't work with other group members
 - b) Socialize with group members outside of your group and then work alone
 - c) Socialize with other group members and don't help your group
 - d) stay on task and work with other group members appropriately
- (iv) Indicate, the processor belongs to the _____
 - a) Sensory system
 - b) Mechanic system
 - c) Electric system
 - d) Control system
- (v) Indicate, which is NOT a type of robot _____
 - a) Medical
 - b) Industrial
 - c) Household
 - d) Apologetic
- (vi) Report, The small mobile robot base used in the Robot Educator. This robot is able to perform some but not all of the tasks in the Robotics Engineering activities_____
 - a) Light sensor
 - b) Lego Mindstorms Education Software
 - c) Robot
 - d) Robot Educator Model (REM)

(vii) Show, a block is the basic unit of programming in the NXT programming Software. Blocks perform their operations in order along the Sequence Beam_____

- a) Touch Sensor
- b) Block (programming)
- c) Ports
- d) Behaviors

(viii) State, the primary source of physical motion in the Mindstorms NXT system.

- a) Interactive Servo Motor
- b) Behaviors
- c) Light Sensor
- d) Touch Sensor

(ix) The three characteristic capabilities that define a robot_____

- a) Comment
- b) Sensor
- c) Sense-Plan-Act
- d) NXT Brick

(x) When working in a group for robotics, students should_____

- a) Socialize instead of work and then work alone
- b) stay on task and work with group members appropriately

(xi) General term for any command or group of commands in a program. In the NXT Programming Software, this is one or more blocks_____

- a) Comment
- b) Code
- c) Ports
- d) Robot

(xii) Based on the coordinate system robots can be classified as_____ robots.

- a) Cartesian
- b) Spherical
- c) Cylindrical
- d) a, b & c

(xiii) A manipulator with 6 DOF explain _____

- a) 1-D Manipulator
- b) 2-D Manipulator
- c) 3-D Manipulator
- d) Spatial Manipulator

(xiv) State, following is the robotic like device.

- a) Telecheries
- b) exo-skeleton
- c) locomotive device
- d) all the above

(xv) Select, which is the first robot to get citizenship in any country?

- a) Eskimo
- b) Ansino
- c) Asimo
- d) Sophia

Group-B

(Short Answer Type Questions)

3 x 5=15

2. State, the laws of the robotics. (3)
3. What do you mean by direct and inverse kinematics? (3)
4. How can you describe a manipulator? (3)
5. Define base and tool Coordinate system. (3)
6. Explain the different steps in trajectory planning. (3)

OR

Explain the types of rotary joint notations. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain the four basic robot configuration available commercially. (5)
8. Describe briefly about SCARA robots. (5)
9. Explain any five types of mechanical grippers. (5)
10. Explain the TRL configuration of robot. (5)
11. Give some examples of tool as robot end effector. (5)

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12. Explain the working of inductive type proximity sensor. (5)

OR

Categorize the factors which must be considered while choosing the drive system for robots. (5)

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