15939

BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – Dip.RA-2023
Course Name – Robotic Fundamentals
Course Code - ECPC402
(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) Which of the following describes the a use of technology or machinery, specifically involving gases?

a) Pneumatics b) Hydraulics
c) Actuation d) Carbonation

(ii) Nmae, a mechanism having its motive power so concealed that it appears to move spontaneously

a) Automatic b) Clock Jack
c) Robot d) Automata

(iii) Select, which of the following is not an advantage of Robots?

a) They can assist humans with disabilities b) They can replace jobs
c) They can be used in dangerous environment d) They don't get tired or require a break

(iv) The three characteristic capabilities that define a robot_____

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

(v) A manipulator with 6 DOF explain _____

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

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

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

(vii) State, which sensor can be used in robots for measuring distance?

a) mpu6050 b) Piezoelectric sensor
c) LDR module d) Ultrasonic Sensor

(viii) Report the root word of "robot", which is derived from Slavic language?

a) Robot
b) Robota
c) Roboto
d) Robust

(ix) Which type of sensors are used for tracking the humanoid's body and joints movement, its orientation, position and speed?

a) mpu6050
b) ECG monitoring sensor
c) Proprioceptive
d) Exteroceptive

(x) State, which of the following "laws" is Asimov's first and most significant robotics law?

a) robot events must never result in damage to the robot
b) robots must make a business a more profitable business
c) robots must obey the directions given by humans
d) robots must never take actions harmful to persons

(xi) Select, which among the following is an Indian robot, made by ISRO (Indian space research organisation) for space exploration purpose?

a) Valkyrie
b) Sita
c) Athlete
d) Vyommitra

(xii) State, which of the following terms refers to the rotational motion of a robot arm?

a) swivel
b) axle
c) retrograde
d) roll

(xiii) What is the name for space inside which a robot unit operates?

a) environment
b) spatial base
c) work envelope
d) exclusion zone

(xiv) State, which of the following places would be LEAST likely to include operational robots?

a) warehouse
b) factory
c) hospitals
d) private homes

(xv) Which of the following basic parts of a robot unit would comprise the computer circuitry that could be programmed to Identify which of the following the robot would do?

a) sensor
b) end effector
c) arm
d) controller

Group-B

(Short Answer Type Questions) 3 x 5=15

2. List the name of the areas where the robotics can be applied. (3)
3. Explain the application scenario of SCARA manipulator configurations. (3)

4. Define base and tool Coordinate system. (3)
5. Differentiate between the sensor & transducer. (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. Describe briefly about SCARA robots. (5)
8. Discuss the types of drive systems used in robots. (5)
9. List any TWO important advantages and disadvantages of a pneumatic gripper. (5)
10. Analyze the technology-robot classifications and specifications. (5)

11. Explain the concept of Direct Kinematics in robotics and provide an example. (5)
12. Explain Joint Notation Scheme. (5)

OR

Explain the TRR configuration of robot. (5)

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