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**PRESIDENCY UNIVERSITY BENGALURU**

**SCHOOL OF ENGINEERING SET-A**

**END TERM EXAMINATION -MAY /JUNE 2024**

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| **Semester :** Semester IV- 2022  **Course Code :** MEC3060  **Course Name :**  - Robotics  **Program :** B. Tech. | **Date :** June 14, 2024  **Time :** 9:30 AM - 12:30 PM  **Max Marks :** 100  **Weightage :** 50% |
| **Instructions:**   1. *Read all questions carefully and answer accordingly.* 2. *Question paper consists of 3 parts.* 3. *Scientific and non-programmable calculator are permitted.* 4. *Do not write any information on the question paper other than Roll Number.* |  |

**PART A**

**ANSWER ANY FIVE QUESTIONS** **5QX2M=10**

1. Explain robot chassis.

(CO1) [Knowledge]

1. Write a note on sensors?

(CO2) [Knowledge]

1. What is robot wheeled locomotion?

(CO3) [Knowledge]

1. Write a short note on trajectory planning.

(CO4) [Knowledge]

1. What are capacitors?

(CO1) [Knowledge]

1. What are Relays?

(CO2) [Knowledge]

1. List and explain different application of robots.

(CO3) [Knowledge]

**PART B**

**ANSWER ANY FIVE QUESTIONS** **5QX10M=50**

1. What are Relays? With suitable diagram explain the working of relays.

(CO1) [Comprehension]

1. With suitable diagram explain working of legged robot.

(CO2) [Comprehension]

1. What are Holonomic and Non-Holonomic drive? Explain with suitable examples.

(CO3) [Comprehension]

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| **11.**  **12.**  **13.**  **14.** | What is the difference between trajectory planning and path planning?  What are the differences between online and offline programming?  With suitable diagram explain rack and pinion gear mechanism.  What is wheel geometry? Explain with suitable examples.  **PART C** | (CO4) [Comprehension]    (CO1) [Comprehension]    (CO2) [Comprehension]    (CO3) [Comprehension] |
|  | **ANSWER ANY TWO QUESTIONS** | **2QX20M=40** |
| **15.** | What are end effectors? List and explain different types of end effectors. |  |

(CO1) [Application]

**16.** Derive forward kinematics equations of manipulator for a particular position of a robotic arm.

(CO2) [Application]

**17.** Consider a single link robot manipulator with a rotary joint. Design a cubic trajectory, which starts from the initial angular position  (0)= 10 degree and ends at the final angular position (2)=90 degree with zero initial velocity and final velocity.

(CO3) [Application]