MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (INDUSTRIAL & PRODUCTION) ENGINEERING

END SEMESTER MAKE-UP EXAMINATIONS, DECEMBER 2017

SUBJECT: PE-V: INDUSTRIAL ROBOTICS [MME 4019]

REVISED CREDIT SYSTEM

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:
- ❖ Answer **ALL** questions.
- ❖ Missing data may be suitable assumed.

1A.	Compare different robot drive systems.	**04**
1B.	With a neat sketch explain the working of LVDT.	**03**
1C.	List and sketch three degrees of freedom associated with robot's wrist.	**03**
2A.	List and explain configuration parameter of robot.	**04**
2B.	Define Hall effect. Explain hall effect sensor with neat sketches.	**04**
2C.	The co-ordinates of point P with respect to base reference frame is given by $(2,5,7)^T$ Determine the co-ordinates of P with respect to mobile rotated frame of the robot if the angle of rotation with the OZ axis is 60^0.	**02**
3A.	Sketch and explain components of pneumatic system.	**04**
3B.	In a robot slide mechanism of 0.75m length, the robot has a control memory of 12 bit capacity. The mechanical accuracy associated with the moving arm is a random variable with standard deviation of 0.12mm. Determine the control resolution, spatial resolution, accuracy and repeatability.	**03**
3C.	With a neat sketch explain cam actuated mechanical gripper.	**03**
4A.	With a neat sketch explain the working of brushed DC motor.	**05**
4B.	Sketch and explain the working of an electromagnetic gripper.	**03**
4C.	List the different types of sensors.	**02**
5.	With neat sketch explain the following	**02*05**

        a. Permanent magnet stepper motor
        b. Range sensor
        c. Repeatability
        d. Vacuum gripper
        e. Forward and inverse kinematics