Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

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

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: 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.	Derive an expression for gripper force.	**05**
1B.	With a neat sketch explain variable reluctance stepper motor.	**03**
1C.	Sketch and explain the features of timing belts.	**02**
2A.	With neat sketches explain the working of inductive sensor.	**04**
2B.	Compare pneumatic and hydraulic systems.	**03**
2C.	With a neat sketch explain the working of harmonic drive.	**03**
3A.	Explain performance and precision parameters of robot.	**05**
3B.	Sketch and explain the working of rotary potentiometer.	**03**
3C.	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 OY axis is 60^0.	**02**
4A.	With neat sketches explain cylindrical and cartesian configuration of robot.	**04**
4B.	Sketch and explain incremental encoder.	**03**
4C.	Sketch and explain the sensor which is used to detect all solid and liquid materials.	**03**
5A.	With a neat sketch explain the working of brushed DC motor.	**05**
5B.	A mobile body reference frame OABC is rotated 60^0 about OX axis of the fixed base reference frame OXYZ. If $P_{XYZ}= (2,4,7)^T$ and $R_{XYZ} = (3,5,6)^T$ are the co-ordinates with respect to OXYZ plane, what are the corresponding co-ordinates of P and R with respect to mobile body reference frame?	**03**
5C.	Sketch an electromagnetic gripper. List two advantages.	**02**