Code No: RT32034   R13   SET - 1

III B. Tech II Semester Supplementary Examinations, November -2018
ROBOTICS
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Discuss the role of robots in engineering.	[3M]
	b)	Define degree of freedom.	[3M]
	c)	Explain briefly about Eular angles.	[4M]
	d)	What are the challenges of end effectors?	[4M]
	e)	Explain why path planning is required for a robotic system.	[4M]
	f)	Discuss the working principle of Acoustic sensors.	[4M]

PART -B

2	a)	Describe the functions of the robot.	[8M]
	b)	With the help of line diagram explain basic components of a Robot system.	[8M]
3	a)	What are the requirements and challenges of end effectors?	[8M]
	b)	What is meant by Joint gripper? Explain.	[8M]
4	a)	Explain the following i) Euler angles ii) RPY representation	[8M]
	b)	Derive the Inverse kinematics of the 3-DOF manipulator by considering an example.	[8M]
5	a)	Derive the Denavit and Hartenberg 4×4 transformation matrix.	[8M]
	b)	Define and explain a geometric Jacobian.	[8M]
6	a)	Explain the various capabilities and limitations of the robot languages.	[8M]
	b)	Discuss the following categories of program instructions in VAL robot programming: i) Robot configuration control ii) Motion control	[8M]
7	a)	Explain the operation of optical encoder used in robot as a feedback device.	[8M]
	b)	What are essential characteristics of a spot welding manipulator?	[8M]

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