



Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

17.11.17 FN

Question Paper Code : 50830

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Seventh/Eighth Semester

Mechanical Engineering

ME 6010 – ROBOTICS

**(Common to Automobile Engineering/Manufacturing Engineering/Mechanical and
Automation Engineering/Production Engineering)**

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Draw the revolving and twisting joints.
2. State the laws to qualify as a robot.
3. What is end effector ?
4. List the advantages of stepper motor used in robotics.
5. How time of flight camera works ?
6. What is piezoelectric sensor ?
7. Write a translational matrix of X, Y, Z of a frame.
8. How to calculate degrees of freedom of a serial manipulator ?
9. What are the levels of safety followed in robot work cell ?
10. What is AGV ?

PART – B

(5×16=80 Marks)

11. a) With neat sketch explain the 3P, TLO, 3R, 2RP and VRO configuration and discuss the characteristics, work volume and application of each.

(OR)

- b) i) Explain the anatomy of serial manipulator and list various parts involved in constructing robot. **(8)**
- ii) What is optical encoder and explain the construction and working different types of optical encoders ? **(8)**



12. a) Describe the construction and working of following :

i) Magnetic gripper. (8)

ii) Vacuum gripper. (8)

(OR)

b) i) With neat sketch, explain the construction and working of hybrid stepper motor. (10)

ii) Write a short note on servomotor with a neat sketch. (6)

13. a) Briefly describe the construction and working of LVDT to measure the linear displacement.

(OR)

b) Explain the following concepts in machine vision systems.

i) Types of lighting and image sensors. (8)

ii) Image processing steps involved in machine vision. (8)

14. a) Explain the steps to solve the forward and inverse dynamics of a serial manipulator.

(OR)

b) Derive the forward and inverse kinematic solutions of RR planar manipulator.

15. a) Briefly discuss the safety consideration and its levels of robot in industrial environment.

(OR)

b) i) List the various benefits of adopting AGV in industry. (8)

ii) With a neat sketch explain the construction and uses of teach pendant. (8)