April 2019

<u>Time – Three hours</u>
(Maximum Marks: 75)

[N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART – A and PART – B

(2) Answer division (a) or division (b) of each question in PART – C.

(3) Each question carries 2 marks in PART – A, 3 marks in Part – B and 10 marks in PART – C.]

PART – A

1. Define robot.

2. What is manipulator?

3. Define spatial resolution.

4. What are the uses of three fingered grippers?

5. State the principle of binary sensor.

6. What are the lighting techniques used in machine vision system?

7. How robots are used in assembling?

8. What is teach pendant programming?

PART – B

9. What are the three motions of end effector?

10. Brief about PUMA robot.

11. How stepper motor works?

12. Brief about internal gripper.

13. What are the applications of machine vision system?

14. What is wrist sensor?

15. What is lead through programming?

16. List any three requisite characteristics of robot.

[Turn over.....

PART – C

17. (a) List and explain the components of robot.

(Or)

(b) Describe the effect of structure on control, work envelop and work volume.

18. (a) Compare electric drive, pneumatic drive and hydraulic drive.

(Or)

(b) Explain End of Arm Tooling (EOAT) and selection and design consideration of robot.

19. (a) Explain ultrasonic sensor with neat sketch.

(Or)

(b) Describe about machine vision system.

20. (a) Derive expressions for forward and reverse kinematics of manipulator with three degrees of freedom.

(Or)

(b) Explain VAL programming with an example.

21. (a) Explain the stages in selecting robots for industrial applications.

(Or)

(b) Describe construction, working and applications of Automatic Guided Vehicle (AGV).