

9. (a) Explain the various considerations taken into account in robot work cell design. 6
- (b) What are the various types of robot cell layouts and give examples of preferred area of applications for each. 7

OR

10. (a) Explain error detection and recovery in context to automated machining cell. 6
- (b) Explain moving base line tracking system associated with inline robot cell. 7
11. (a) Explain quantitative techniques for economic performance of robot. 7
- (b) Explain with suitable diagram, the application of robot for die casting operation. 7

OR

12. (a) What are general considerations in robotic material handling ? 7
- (b) Explain the loading and unloading operation using robot. 7

Faculty of Engineering & Technology
Seventh Semester B.E. (Mech. Engg.) (C.B.S.)
Examination
ELECTIVE—I : INDUSTRIAL ROBOTICS

Time—Three Hours]

[Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

- (1) All questions carry marks as indicated.
- (2) Solve Question No. **1 OR** Question No. **2**.
- (3) Solve Question No. **3 OR** Question No. **4**.
- (4) Solve Question No. **5 OR** Question No. **6**.
- (5) Solve Question No. **7 OR** Question No. **8**.
- (6) Solve Question No. **9 OR** Question No. **10**.
- (7) Solve Question No. **11 OR** Question No. **12**.
- (8) Due credit will be given to neatness and adequate dimensions.
- (9) Assume suitable data wherever necessary.
- (10) Illustrate your answers wherever necessary with the help of neat sketches.

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1. (a) Explain the importance of automation in industry. Draw a neat schematic line sketch of robot wrist showing various motions on it. 7
- (b) Define Robot. Describe its advantages and applications in modern industries. 6

OR

2. (a) Explain the various configurations of robot with neat sketches and explain work envelope. 7
- (b) Explain in brief joint notation schemes in context of robot. 6
3. (a) Explain various types of gripper drive system with advantages and disadvantages. 7
- (b) Explain classification of end effectors with neat sketch. 6

OR

4. (a) Distinguish between magnetic grippers and electrostatic grippers. 6
- (b) Describe the function of grippers for molten metals with neat sketch. 7

5. (a) Explain in detail slew motion, Joint-interpolated motion and straight line motion as applicable to robotics. 7
- (b) Distinguish between forward kinematics and reverse kinematics. 7

OR

6. (a) Describe various types of robot drive systems with advantages and disadvantages. 7
- (b) Explain the function of controller and explain the forward transformation of a two degree of freedom arm. 7
7. (a) Differentiate between contact type sensor and non-contact type sensor. 7
- (b) Explain with neat sketch electro-optical imaging sensor. 6

OR

- (a) Describe range imaging sensor with the help of robot. 6
- (b) Explain safety measures in robots in context to input/output interfaces. 7