EVENING

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Uni. Roll No. ....

Program: **B.Tech. ME (Batch 2018 onward)**
Semester: **5th**
Name of Subject: **Industrial Automation and Robotics**
Subject Code: **PCME-114**
Paper ID: **16381**

Time Allowed: **03 Hours**   Max. Marks: **60**

NOTE:

1) Parts A and B are compulsory.
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice.
3) Any missing data may be assumed appropriately.

Part – A   [Marks: 02 each]

Q1.

(a) What is hard automation?

(b) Which different logic can be used in pneumatic circuit design?

(c) What do you understand by the work envelope of a robot?

(d) Distinguish between hydraulic and pneumatic systems.

(e) Draw the symbol of the 5/3 solenoid-operated spring return DC valve.

(f) Give the symbol of the NOR gate with the truth table.

Part – B   [Marks: 04 each]

Q2. Explain the architecture of a Programmable logic controller with the help of a neat sketch.

Q3. A double-acting cylinder is to extend when a push button is operated. Upon release of the push button, the cylinder is to retract. The cylinder is of a small bore (25 mm diameter), requiring a small flow rate to operate at the correct speed. Draw the circuit

diagram for the problem. Designate the valves and indicate the numbering system for the connections (ports).

Q4. Discuss the use of a vibratory bowl feeder with the help of a diagram.

Q5. What is meant by the Coanda effect? Sketch any fluidic device and explain its operation—state its applications.

Q6. Discuss the industrial applications of robots.

Q7 What are the different types of end effectors used in robots?

Part – C   [Marks: 12 each]

Q8. How is machine vision implemented in robots? Discuss the advantages and constraints of machine vision integration in robotics.

OR

Compare the pneumatic, hydraulic and electric drives to power the robot.

Q9. What is a control system? Show, with the help of a diagram, the difference between an open-loop control system and a closed-loop control system.

OR

Draw meter in circuit and meter out circuit, and explain it.

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