Seat No:

PARUL UNIVERSITY **FACULTY OF ENGINEERING & TECHNOLOGY**

B.Tech. Summer 2018-19 Examination

Semester: 7 Subject Code: 03109431 Subject Name: Industrial Automation and Robotics (IAR)

Date: 13/05/2019 Time: 10:30am to 01:00pm **Total Marks: 60**

Instructions:

- 1. All questions are compulsory.
- 2. Figures to the right indicate full marks.
- 3. Make suitable assumptions wherever necessary.
- 4. Start new question on new page.

Q.1 (A) True or False:

- 1. The maximum and minimum value of inputs or outputs for which the instruments are recommended to use are known as **Range** of the instrument.
- 2. Dedicated FMS is more flexible than Random-Order FMS
- 3. The tolerance specified in the manufacturing drawing is a manufacturing attribute of the workpiece.
- 4. When the planner works in modifying the raw work-piece until it takes on the final design qualities, it is known as forward approach.
- 5. Redundant type of robot has 6 DOF.

Q.1 (B) Fill in the blanks:

- 1. Group Technology is suited for ______ type of production systems
- 2. AS/RS stands for
- 3. The 'Level 0' of Automation Pyramid consists of ______.
- 4. The fundamental laws of robotics were given by _____
- 5. MRP-II stands for

Q.1 (C) Multiple Choice Questions:

1. Which one of the following is not a D-H parameters:

- a) Link Length
- b) Joint Offset

c) Joint Angle d) Pitch Angle

> c) Ring Gauge d) Thread Gauge

c) Large Quantity

c) Hybrid-Code

c) Both A and B

d) None of the Above

d) None of the Above

d) Each and Every product

2. The easiest way to measure diameter of a hole is:

- a) Snap Gauge
- b) Plug Gauge
- 3. Fixed Plant Layout is suitable for:
 - a) Low Quantity
 - b) Medium Quantity
- 4. OPTIZ coding system is a:
 - a) Mono-code
 - b) Poly-code
- 5. The external diameter of the work-piece is a:
 - a) Design Attribute
 - b) Manufacturing Attribute
- Q.2 Answer the following questions. (Attempt any three)
 - A) Explain the architecture of Industrial Automation (Automation Pyramid).
 - B) Briefly explain Contact types of inspection techniques used in CAQC.
 - C) Explain the robotic drive systems with their relative advantages and disadvantages.
 - D) Write a short note on the applications areas of robots.

- 05

(10)

(15)

Q.3 A) Classify the robots based on degrees of freedom and work volume.

- B) Write a short note on:
 - (1) OPITZ coding system
 - (2) AGVs.

OR

B) Apply Rank Order clustering method to classify the following parts into part families and (08) identify the corresponding machine cells:

MACHINES	PARTS								
	А	В	С	D	Е	F	G	Н	Ι
1	1			1				1	
2					1				1
3			1		1				1
4		1				1			
5	1							1	
6			1						1
7		1				1	1		

Q.4	A) Explain different material handling equipment used in industries.
-----	--

(07)

OR

A) Compare Generative and Variant approach of Computer Aided Process Planning along with their (07) relative advantages.

B) Describe various flexibility criterion used to define the level of flexibility in Flexible (08) Manufacturing Systems. Use this criterion to explain Dedicated FMS and Random-order FMS.

(07) (08)