Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

II SEM. M. Tech. (MANUFACTURING ENGINEERING)
MAKEUP EXAMINATIONS

JUNE 2019

SUBJECT: **PRODUCTION AUTOMATION [MME- 5222]**
REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer all the questions.
- Missing data may be suitable assumed.

1A. Explain the salient features of following types of production with sketch. **(03)**
i) Cellular Layout ii) Fixed Position Layout.

1B. Write the nomenclature of tungsten carbide tool inserts used in CNC turning center. **(03)**

1C. Explain the different advanced automation functions. **(04)**

2A. Explain the working of Linear Motion Guide ways with sketch and state its advantages over conventional guide ways. **(03)**

2B. Sketch the arrangement, and write the allowable error while conducting the following geometry tests on a CNC Turning center. **(03)**
i) Run out of the spindle
ii) Parallelism of axis of centers with the movement of the carriage

2C. Sketch the spindle assembly showing the location of bearings **(04)**

3A. Sketch and explain the different types of standard fixtures used in CNC Turning and Machining Centers. **(03)**

3B. Explain the different types of compensations provided for improving the accuracy of CNC machine. **(04)**

3C. Describe the principle of working of linear encoder feedback device with sketch. **(03)**

4A. Derive the transformation equation for Roll-Pitch-Yaw (RPY) motion of **(03)**

the robot end effector

4B. Describe the working of mechanical type external and internal grippers **(04)**

4C. Sketch and explain the working of cylindrical configuration robot. **(03)**

5A. Explain the need of image segmentation. The matrix shown below shows the pixel intensity of a typical frame in 16 bit register. Using region growing method segment the image. Consider the seed value as 7 and threshold value as 3. **(03)**

5	6	6	7	7	7	6	6
6	7	6	7	5	5	4	7
6	6	4	4	3	2	5	6
5	4	5	4	2	3	4	6
0	3	2	3	3	2	4	7
0	0	0	0	2	2	5	6
2	1	0	1	0	3	4	4
1	0	1	0	2	3	5	4

5B. A Robot must pick up the components from incoming conveyor system and place on different locations of the pallet as shown in the figure Q 5(B). Write program for performing pick and place operation of 100 components (one after other) for the work cell layout using VAL command. Mention the assumptions made for programming. **(02)**

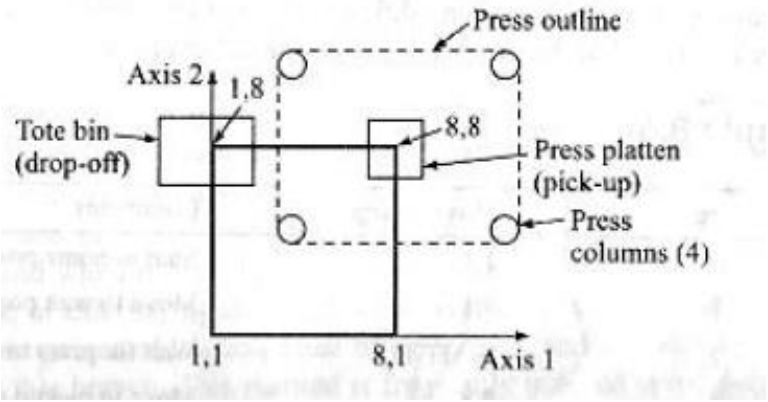

Figure Q 5(B) Pallet for placing components

5C. Explain the working of range sensors in robots. **(03)**

5D. Derive the transformation equation for Roll-Pitch-Yaw (RPY) motion of the robot end effector **(02)**