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MANIPAL INSTITUTE OF TECHNOLOGY
A Constituent Institute of Manipal University, Manipal

II SEM. M. Tech. (MANUFACTURING ENGG. & TECH.)
END SEMESTER EXAMINATIONS, MAY 2017

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. **(02)**
i) Fixed Position Layout ii) Flow Line Production Layout

1B. Explain the different advanced automation functions. **(03)**

1C. Sketch the spindle assembly of a CNC Turning center and label the parts. **(05)**

2A. Explain the working of recirculating ball screw with sketch and state its advantages over the conventional lead screw. **(03)**

2B. Explain the working of an absolute encoder which is used as a feedback device. **(03)**

2C. Explain the different types of tool turrets used in CNC turning centers with sketch. **(04)**

3A. Discuss the different types of work holding fixtures used in vertical and horizontal machining centers. **(03)**

3B. Discuss the different tool wear and tool breakage monitoring systems used in CNC machine. **(03)**

3C. Explain the following features of Computer Numerical Control systems. **(04)**
i) Tool Length offset in CNC machining center
ii)Tool Nose Radius Offset
iii)Cutter Radius Offset
iv)Diagnostic features

4A. A point P(7,3,2) is attached to a frame (n,o,a) and is subjected to the transformations mentioned below. Find the coordinates of the point relative to the reference frame at the conclusion of transformations. **(03)**

i)Rotation of 90° about the z axis
ii)Followed by rotation of 90° about y axis
iii)Followed by translation of (4,-3,7)

4B. Write the ISO coding system for i) Tungsten carbide turning tool holders and ii) Turning inserts . **(03)**

4C. Sketch the arrangement, and write the allowable error while conducting the following geometry tests on a CNC machines. **(04)**
i) Parallelism of spindle axis to carriage movement in turning center
ii) Squareness of spindle axis to table top surface in XZ plane in a vertical machining center

5A. Explain the principle of working of various types of mechanical grippers used in robots. **(03)**

5B. Discuss the different methods of programming a robot. **(03)**

5C. Explain the different types of touch sensors used in robots. **(04)**