

22/11/13

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Roll No.

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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

INDUSTRIAL ENGINEERING

V<sup>th</sup> Semester

MF 9031 - ROBOTICS

(Regulation 2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

**PART-A (10 x 2 = 20 Marks)**

1. Define Roll, Pitch and Yaw with a neat sketch.
2. What is the use of power conversion unit in the robot?
3. State the advantages of hydraulic drives
4. Give the complete classification of grippers
5. Compare internal state sensors and external state sensors
6. What are the applications on Touch and Slip sensors?
7. What is difference between Forward and reverse kinematics?
8. What is lead through programming?
9. What are the Economic Analysis methods available for the robot implementation?
10. What are the problems faced in under water robotics

**Part – B ( 5 x 16 = 80 marks)**

11. Explain in detail the various specifications that one should look in order to purchase a commercial robot.
12. a) (i) Compare Stepper and servo motors (8)  
(ii) Explain the construction and working of piston pump. (8)  
(OR)  
b) (i) Explain construction and working of any two grippers types (8)  
(ii). Explain the selection and design considerations for gripper selection (8)
13. a) Explain the working principle of potentiometer in detail. State the problems faced in implementation of potentiometers and remedies for that problems.  
(OR)  
b) (i). Explain the construction of rotary absolute encoder with neat sketch. Also explain the problems encoding principle using that encoder (8)

a leadscrew with pitch = 5 mm. The worktable of a positioning system is driven by the leadscrew. The table must move a distance of 60 mm from its current position at a travel speed of 160 mm/min. Determine

How many pulses are required to move the table the specified distance (4)

What is the required motor speed and pulse rate to achieve the table speed? (4)

(or)

13 b) Explain with neat sketches working principle of the following:

i) Angular moiré fringe gratings (8)

ii) Linear inductosyn (8)

14 a i) What is meant by canned cycle? Enumerate with example any two canned cycle. (10)

ii) Describe with neat block diagram various steps involved in the development of proven part program in CNC machining. (6)

(or)

14 b) Write manual part program for the component shown in Fig Q. 14 b).

List the assumptions made.

15 a) Explain the terms, "qualified", "semi-qualified", "preset tooling" and "indexable inserts" in the context of CNC tooling.

(or)

15b) Write short notes on

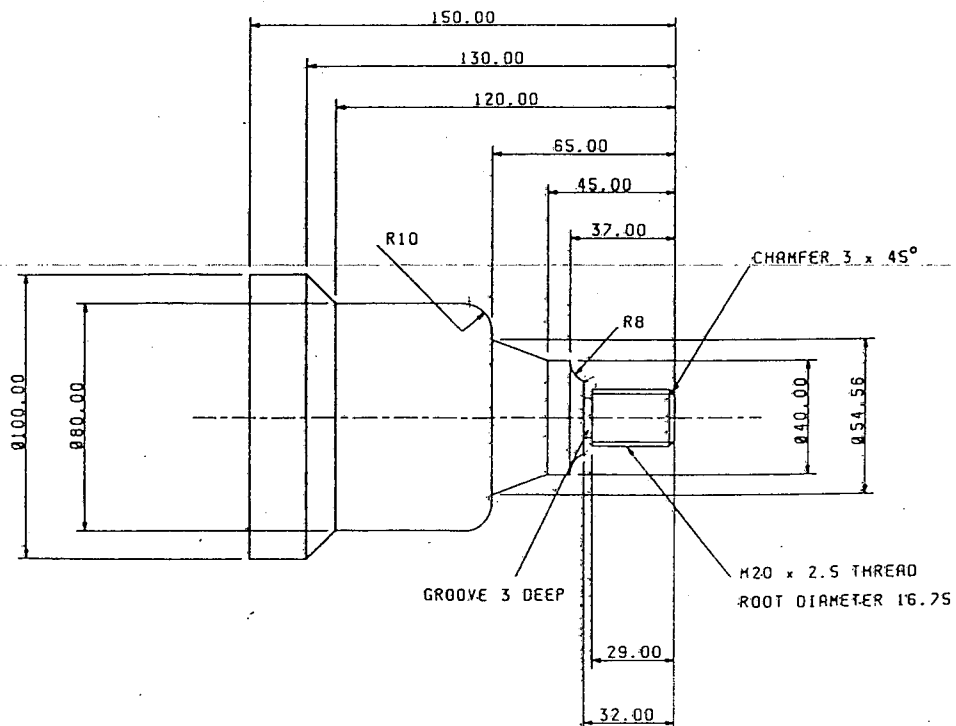
i) CBN

ii) PCD

iii) Chucks

iv) V' blocks and angle plates

(4X 4 = 16)



BILLET DIAMETER 110mm

BILLET LENGTH 200mm

ALL DIMENSIONS IN MM

Fig Q. 14 b)