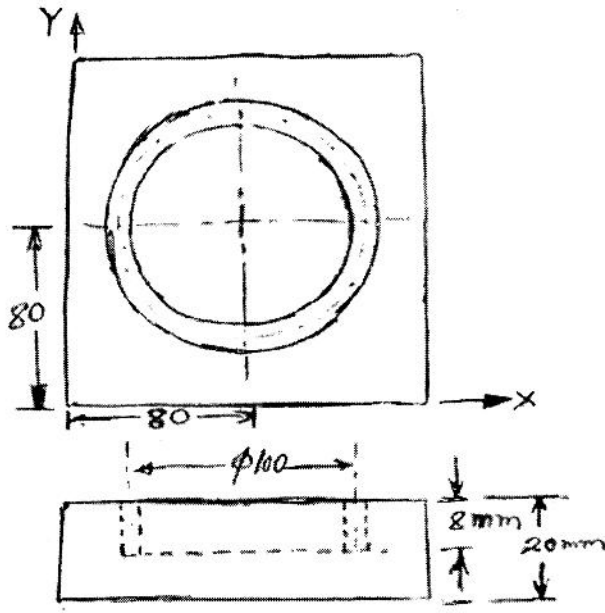


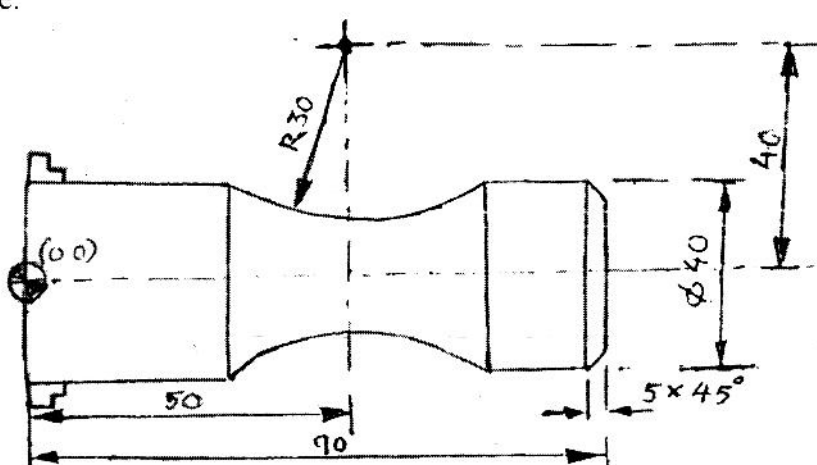
B. PRODUCTION 4TH YEAR 1ST SEM. SUPPLEMENTARY EXAMINATION, 2017

SUBJECT : CNC MACHINES & ROBOTICS

Time : Three hours

Full Marks : 100

No. of questions	Answer any ten questions	Marks
<ol style="list-style-type: none"> 1. With neat sketches show the axis system in CNC lathe and CNC milling machine. 2. Discuss the differences between point-to-point, straight line (paraxial) and continuous path (contouring) control in CNC.. 3. Explain the need for position/displacement sensors for closed loop control of slide movement of CNC m/c tools. Explain the working principle of any position /displacement sensor for providing feedback for angular position of the axis leadscrew 4. Write a manual part program to machine a circular slot as shown in fig. 1 in a CNC milling machine. 		<p>5+5 10 5+5 10</p>
 <p>FIG. 1</p>		

No. of questions		Marks
5.	<p>Write a manual part program for turning a job for the finishing cycle as shown in fig. 2 in a CNC lathe.</p>  <p style="text-align: center;">FIG. 2</p>	10
6.	<p>Show the basic components of a robot using a neat sketch of an industrial robot, indicating the locations of actuators and internal sensors for the various joints and the electrical interface between them & the various components of the robot controller.</p>	10
7.	<p>What do you mean by the working envelope of a robot? Draw the working envelopes for any two types of robot configuration</p>	2+8
8.	<p>Show the various robot configurations using neat sketches, stating their co-ordinate systems.</p>	10
9.	<p>Explain the need for internal sensors at each joint of a robot. Show any one mechanism of two fingered parallel jaw type robot grippers</p>	5+5
10.	<p>Calculate the minimum gripping force, to be exerted by each finger of a two-fingered parallel jaw type robot gripper to hold an object of weight of 2 kgf using friction. Also calculate the same for picking up the same object vertically upwards with an acceleration of 2 m/sec^2. The co-efficient of friction, $\mu = 0.2$</p>	10
11.	<p>Why are additional 3 degrees of freedom required at the robot wrist? Show how this can be achieved, using a neat sketch</p>	2+8
12.	<p>Classify end effectors. Explain the working principle of magnetic gripper. State the applications of magnetic grippers in industry.</p>	2+6+2