

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION)**

**CLASS: BE  
BRANCH: PRODUCTION**

**SEMESTER: VI  
SESSION : SP/2020**

**SUBJECT : PE6007 MANUFACTURING AUTOMATION AND ROBOTICS**

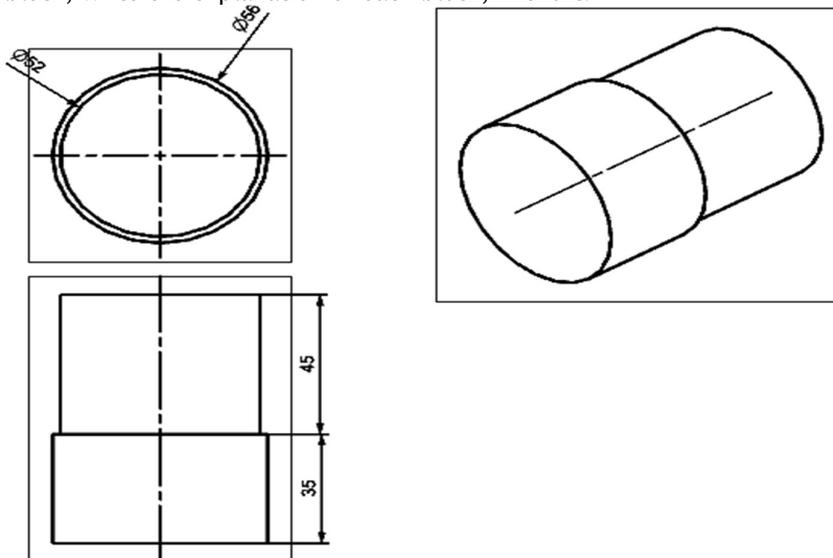
**TIME: 1.5 HOURS**

**FULL MARKS: 25**

**INSTRUCTIONS:**

1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

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- Q1 (a) What do you mean by automation? Explain various types of automation as a function of product variety and production volume. [2]  
(b) NC system consists of three basic elements. Explain them in the light of role played by each in accomplishing the job of NC system. [3]
- Q2 (a) Differentiate between Direct numerical control and Distributed numerical control with the help of block diagrams. [2]  
(b) Differentiate briefly between [3]  
(i) Absolute and Incremental positioning systems.  
(ii) Fixed and Floating zero methods.
- Q3 (a) Sketch the NC machine tool axis system for milling and lathe machine tools. [2]  
(b) Enumerate various types of sources of variability in machining? Explain adaptive control system with the help of block diagram. [3]
- Q4 (a) Differentiate between open and closed loop control system. When would one use open loop control system? [2]  
(b) With an example explain the following preparatory/miscellaneous functions of a Part program: (i) G01, (ii) M06, (iii) M03, (iv) G03 and (v) M08 [3]
- Q5 Write a part program to machine the finished part shown in Fig 1 from a bar of diameter 56mm and length 91 mm. Take radial depth of cut as 1 mm. On the right side of each block, write the explanation of each block, in short. [5]



- Q6 (a) What is PLC? What are the main components of PLC? [2]  
(b) Enlist the conditions under which automated production lines are appropriate. [3]