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BME-004

B. Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) (BTME)

Term-End Examination

December, 2019

BME-004 : CNC TECHNOLOGY AND PROGRAMMING

Time : 3 Hours *Maximum Marks : 70*

Note : *Answer any five questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. (a) Briefly describe the various developmental stages of numerical control and CNC with the help of flowchart. 7

   (b) How is a CNC control system organized ? Briefly explain the function of any *three* elements in the control. 7

2. (a) Describe the various cutting tools used in CNC machines with the aid of neat diagrams. 7

(b) Why is a recirculating ball in screw universally used in the actuation system in CNC machine tools ? Give the advantages of recirculating ball screws compared to the conventional Acme screws. 7

3. (a) What are the various operations that can be completed in a CNC turning centre ? Explain any *two* operations with neat sketch. 7

(b) What is the importance of tool presetting ? Explain the procedure for the tool setting. 7

4. (a) Explain the concept of canned cycle in milling with the help of an example. 7

(b) What are the various types of tool magazines used in CNC machine tools ? Give their merits. 7

5. (a) How is the datum selected in case of CNC part programming ? Explain with suitable examples. 7

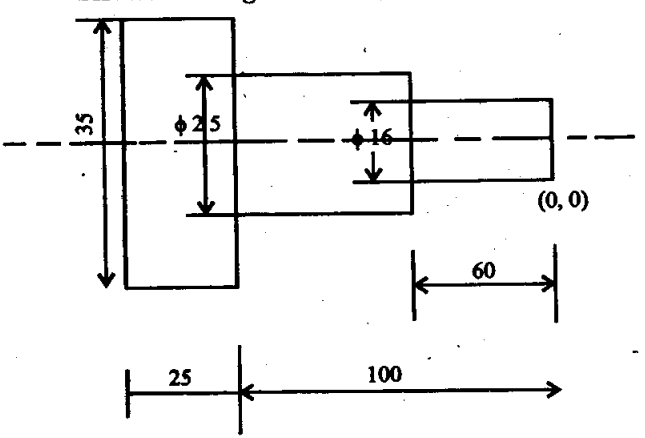
(b) What are the types of communication systems used with CNC machine tools ? Give the brief description of each of them. 7

6. (a) What are the different work holding devices for CNC machines ? Explain. 7

(b) Explain the purpose of M-Codes and G-Codes in CNC programming with suitable examples. 7

7. (a) What are the various factors considered for selecting the type of material handling system ? Also describe the automated material handling systems that are generally used in FMS. 7

(b) Write a part program for machining on CNC turning centre as the component shown in Figure. 7



All dimensions are in mm.

8. Write short notes on the following : $4 \times 3\frac{1}{2} = 14$

(a) Automatic tool changer

(b) Work setting and offsets

(c) Automated guided vehicle systems

(d) Automated storage/Retrieval systems