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| <p>التاريخ: 2014/1/6<br/>الزمن: 3 ساعات<br/>الدرجة: 90</p> |  | <p>الجامعة الإسلامية العالمية<br/>امتحان الفصل الدراسي الأول<br/>2013 - 2012<br/>الفرقة الرابعة</p> |
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**Answer All questions**

**Question 1 (15 Marks)**

- What are the advantages of jigs and fixtures? (5)
- List the materials used in jigs and fixtures. (5)
- Show only by sketches (with all nomenclatures) (5)
  - Screw adjusted (V) location.
  - Two different types of bushing used in drill jig.
  - Pivoted two way clamp.

**Question 2 (30 Marks)**

Design (using free-hand sketches)

- Milling fixture for machining 20x6 slot. (15)
- Turning fixture bore 30<sup>φ</sup> in Fig. (1). (15)

**Question 3 (25 Marks)**

- Explain (with help of graphs) the role of rake and clearance angles on machinability. (5)
- Compare between horizontal, vertical and turret lathe and cam operated machines. (5)
- Using (G – M) code, write a part program to machine the outside contour, the holes, and the slots of the part shown in Fig. (2), in one program, on a general purpose CNC Machine. The holes and slots are to be machined under lubricated conditions. All speeds, feeds, tool numbers, and any other required parameters should be suitably assumed. (15)

**Question 4 (20 Marks)**

- Sketch the coordinate conventions for horizontal milling and lathe machine. (5)
- Sketch two different methods of reducing friction and improving response of slides. (5)
- Compare between open-loop and closed-loop control systems in CNC. (5)
- Using (G – M) codes, write a part program to turn the shaft in Fig. (3). All tools, feeds, and other required parameters should be suitably assumed. (5)

All dimensions in mm

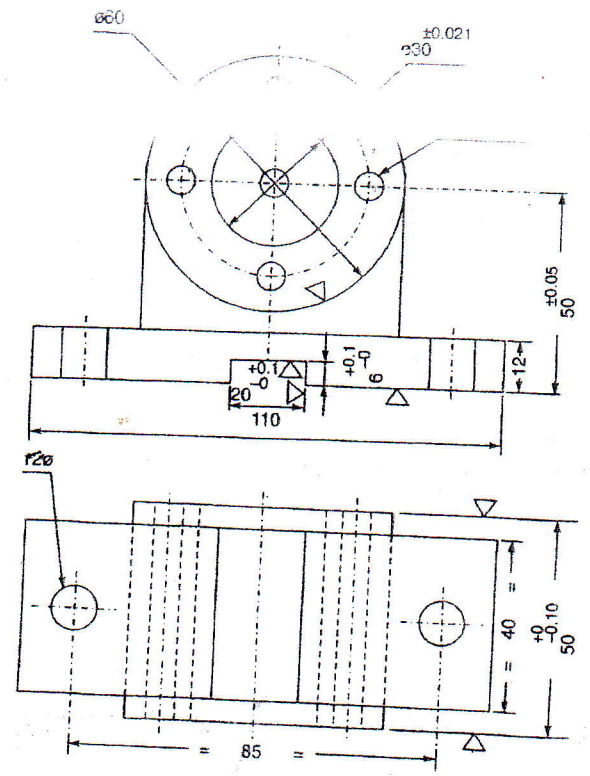


Figure (1)

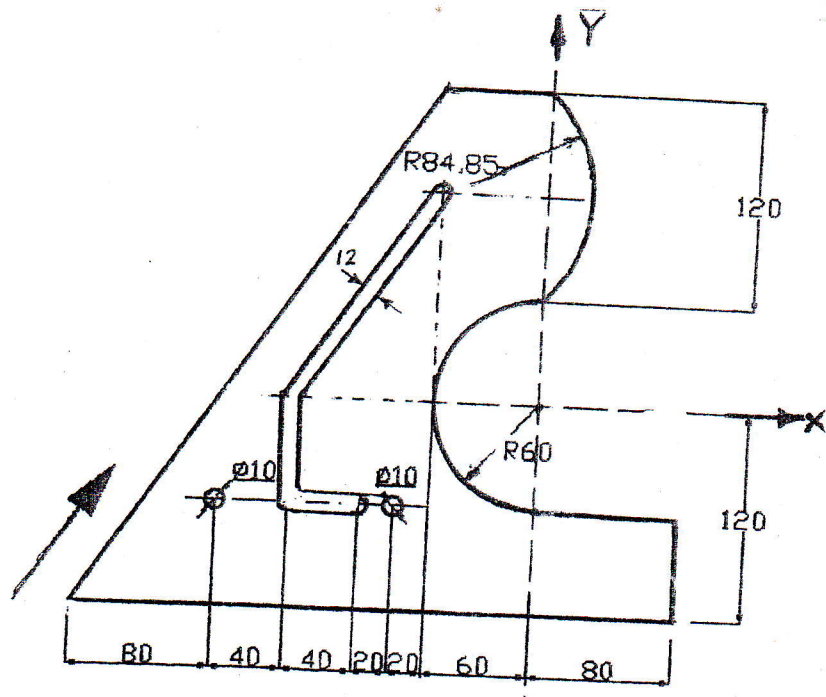


Figure (2)

