



Course Title: Elective Course (4) "Jigs and Fixtures"

Date: 28-5-2016

Year: 4th Production Eng. Dept.

Course Code: MPD4235

Allowed Time: 3 Hrs. No. of Pages: (2)

أجب عن جميع الأسئلة (الأسئلة في صفحاتنا)

Question 1:(15 Marks)

- a- What is the difference between jigs and fixtures?
- b- List the design considerations in location and clamping systems.
- c- How locators can be classified?
- d- Illustrate with a neat sketch the concept of "redundant location". How it can be avoided?
- e- What is the difference between *hexagonal nut* clamping and *hand nut* clamping?

Question 2:(30 Marks)

1. Design a drill jig for use when *drilling* and *reaming* the $\varnothing 12$ six holes in the flange of the Adaptor shown in Fig.1. The Adaptor is complete except for these holes.

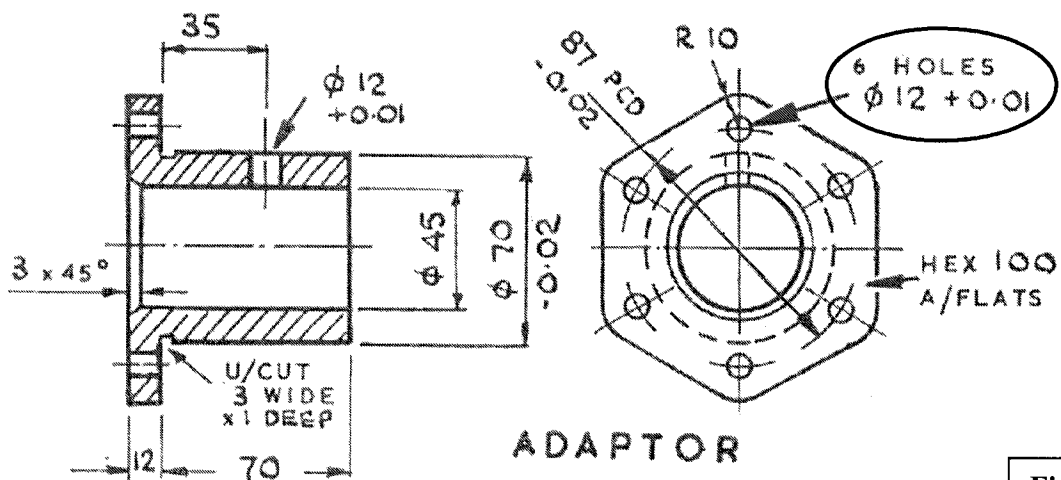


Fig. 1

2. Design a drill jig for *drilling* and *spotfacing* the $\varnothing 25$ mm boss of the Connection shown in Fig.2. This is done after the flange is drilled.

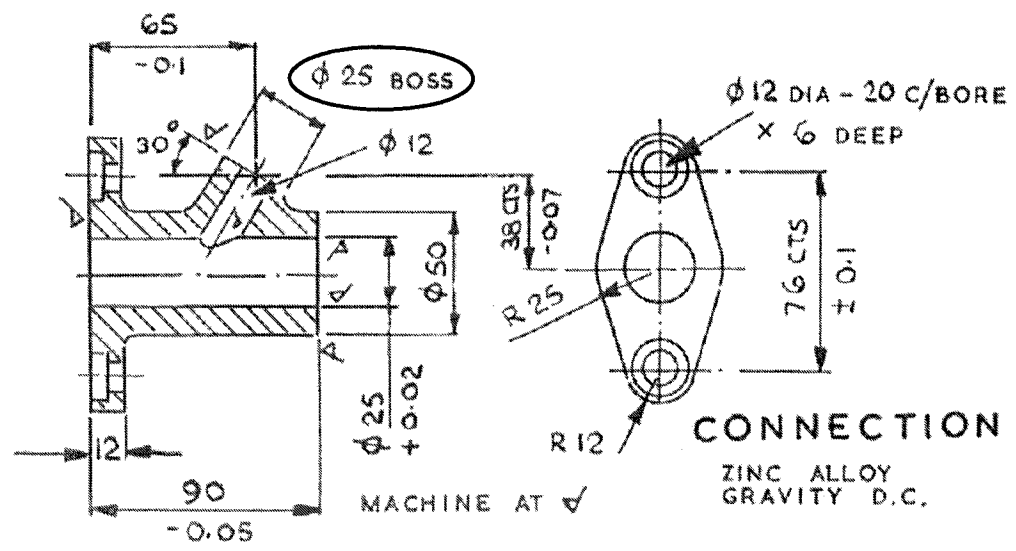


Fig. 2

Question 3:(15 Marks)

- a- Illustrate with a neat sketch the function of *setting block* and *tenon* in milling fixtures design.
- b- Why *feeler* is used in locating the milling cutter?
- c- Design a milling fixture for use when milling the 6 mm slot in the Base shown in Fig.3. This is the last machining operation to be done on the Base. Details of the milling machine table are given in the figure.

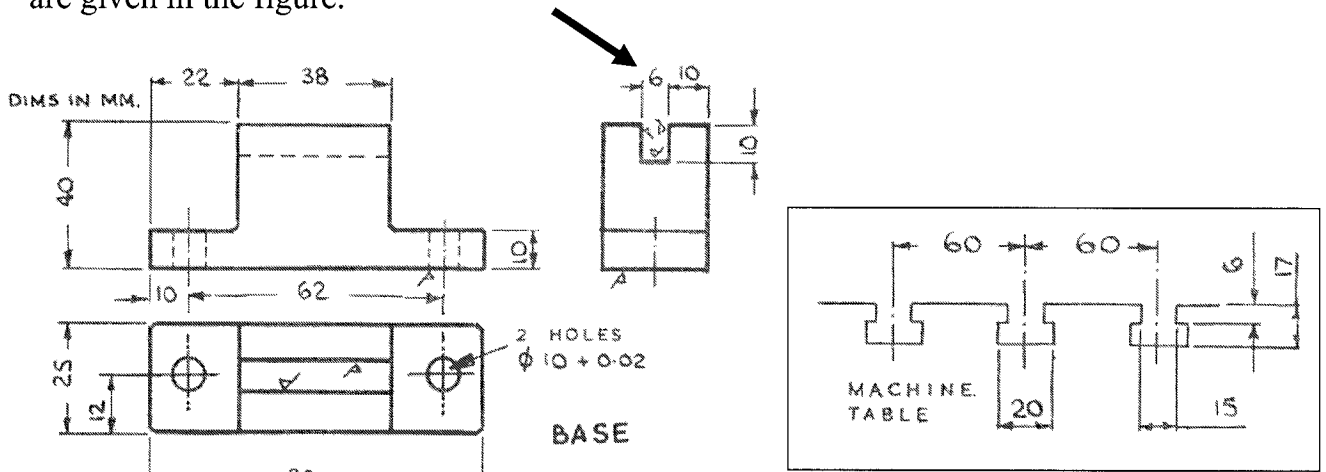


Fig. 3

Question 4:(15 Marks)

Design a turning fixture for use when machining the 38mm diameter bore in the **Bearing Bracket** shown in Fig.4. The **Bearing Bracket** is complete except for this machining, and the lathe spindle nose is as illustrated in the figure.

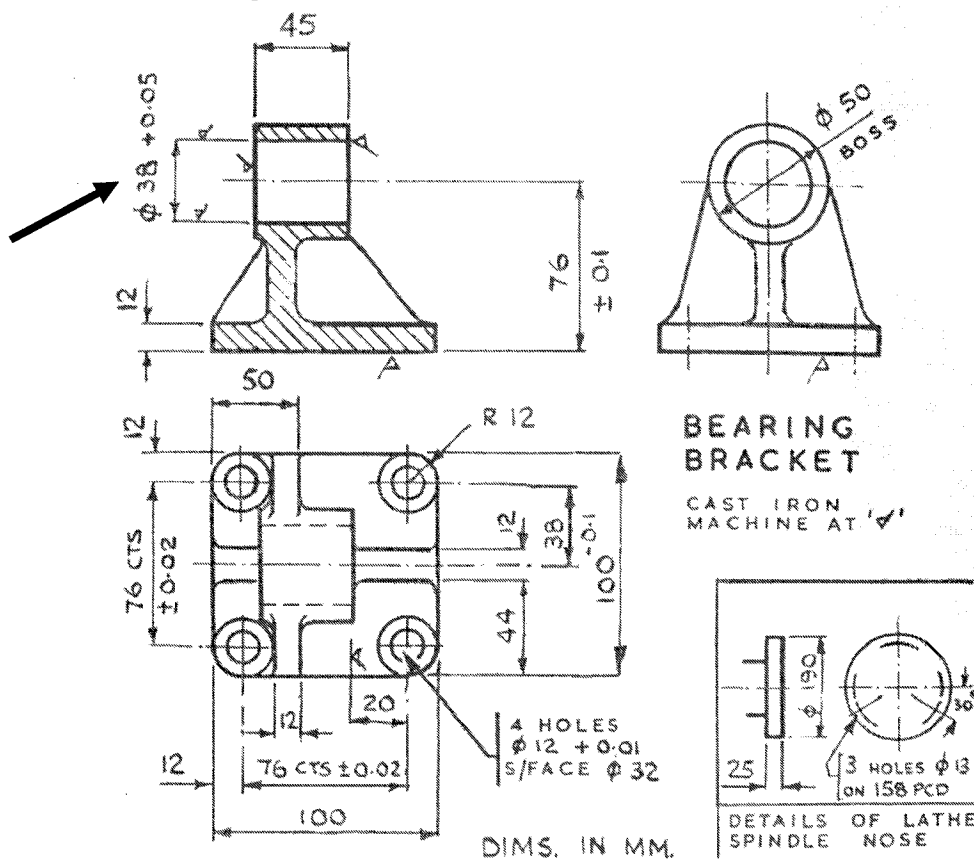


Fig. 4

Good Luck



Course Title: Tools Design and Prod Facilities Course Code: MPD4233
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Answer All The Following Questions or Solve As You Can:-

Question (1):-[20 Marks]

- Name and briefly describe the types of chips that occur in metal cutting? What are the basic categories of cutting tools in machining? Give examples of machining operations that use each of the tooling types.
- Distinguish between generating and forming when machining workpart geometries? Name the three modes of tool failure in machining?, Define the machinability?.
- What are the machining requirements? What are the basic functions of machine tools? Define the machine tool?.

Question (2):-[20 Marks]

- What are the two principal locations on a cutting tool where tool wear occurs? Identify the mechanisms by which cutting tools wear during machining.
- What are the purposes and principles and definition of machining?.
- Tool life tests on a lathe have resulted in the following data: (1) at a cutting speed of 375 ft/min, the tool life was 5.5 min; (2) at a cutting speed of 275 ft/min, the tool life was 53 min. Required: (a) Determine the parameters "n" and "C" in the Taylor tool life equation. (b) Based on the "n" and "C" values, what is the likely tool material used in this operation. (c) Using your equation, compute the tool life that corresponds to a cutting speed of 300 ft/min. (d) Compute the cutting speed that corresponds to a tool life T= 10 min.

Question (3):-[20 Marks]

- Define the jigs and fixtures? What is the purpose of jigs and fixtures? What are the advantages of using jigs and fixtures?.
- Note that both the terms "tool strength" and "tool-material strength" have been used in the text. Do you think there is a difference between them? Explain.
- Machining tests have resulted for "AISI 2340" by using cutting tool "HSS" according to the following equation:-

$$V.T^{0.13}.f^{0.77}.d^{0.37} = 50.4$$

at tool life was (100 min) , and at cutting speed of (45 m/min), and depth of cut (2.5 mm), and feed is (0.3715 mm/rev).

Required: - Calculate the tool life when following :-

- increasing cutting speed by 20%.
- increasing feed speed by 20%.
- increasing depth of cut by 20%.
- increasing the three (cutting speed , feed, depth of cut) by 20%.

Question (4):-[20 Marks]

- In modern manufacturing, which types of metal chips would be undesirable and why?.
- What are some basic principles or rules need to be followed while planning for locating blanks in fixtures?.

P.T.O. → (2)

(c) *What constitutes suitability for die production? Explain design criteria for die-manufacturing products.*

Question (5):-[20 Marks]

(a) *Define: Functionability Aspects – Manufacturability Aspects – Edge Formation.*

(b) *What is the hopper in injection molding machine? Define the bulk density and liquidity and fluidity material during injection?.*

(c) *What are the design considerations for jigs and fixtures? What are the principles or rules of locating in jigs and fixtures?.*

{{ The End of Examination Paper }}

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