

P. Pages : 2

Time : Three Hours

**KNT/KW/16/7469**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Due credit will be given to neatness and adequate dimensions.
 9. Assume suitable data whenever necessary.
 10. Illustrate your answers whenever necessary with the help of neat sketches.
 11. Use of non programmable calculator is permitted.

1. a) What are the essential properties of cutting tool material? Explain. 6
- b) In an orthogonal cutting operation, the following data have been observed: 7
- | | |
|----------------------|------------|
| Uncut chip thickness | = 0.127 mm |
| Width of cut | = 6.35 mm |
| Cutting speed | = 2 m/sec |
| Rake angle | = 20° |
| Cutting force | = 567 N |
| Thrust force | = 227 N |
| Chip thickness | = 0.228 mm |
- Determine :
- | | |
|---------------------------------------|------------------------------------|
| a) Shear angle | b) Friction angle |
| c) Shear stress along the shear plain | d) Power for the cutting operation |

OR

2. a) Explain the Marchant's theory and derive the relationship between ϕ , β and α . 6
- b) The following equation for tool life has been obtained for HSS tool $VT^{0.13} f^{0.6} d^{0.3} = c$ 7
- A 50 min tool life was obtained using the following cutting operations. $v = 30\text{m/min}$, $f = 0.25\text{mm/rev}$, $d = 2.3\text{mm}$ calculate the effect on tool life if speed, feed, depth of cut are together increased by 20% and if they are increased individually by 25%.
3. a) Describe the various types of form tool with neat sketches. 6
- b) Draw a neat sketch of a milling cutter to show its geometry. Also discuss how will you select its design parameters. 7

OR

4. a) What is tool life? Explain the factors affecting in details? 6

- b) A 6° back rack solid lathe tool is to be employed for machining of steel at 40m/min feed 0.05 mm/rev and a depth of cut of 0.02mm. The maximum permissible deflection at the tool point is 0.01mm and the maximum allowable stress in the tool shank is 8 kg/mm^2 . Find the cross section of a rectangular shank the work diameter is 100mm. Check your design for actual deflection at the free end and for natural frequency of the tool [$E = 20 \times 10^3 \text{ kg/mm}^2$] 7
5. a) What is meant by press tonnage. How is the tonnage of a hydraulic press and mechanical press determined. 7
- b) Explain the difference between progressive and compound dies with neat sketches. 7
- OR**
6. a) Distinguish between Bending, forming and Drawing operations. Draw neat sketches. 7
- b) What are the different Bending methods? Explain with neat sketches? 7
7. a) Explain the following with neat sketches. 6
- 1) Embossing 2) Coining 3) Curling
- b) Describe six point location principle for jigs and fixtures. Draw neat sketch. 7
- OR**
8. a) What are the different principles common to the design of jigs and fixtures? Discuss briefly. 5
- b) A symmetrical cup work piece having height 70mm, and outside diameter 40mm is to be produced from 0.8mm thick cold rolled steel. The part has inside corner radius of 1.4mm. Determine the following for designing the drawing die for this part. 8
- 1) Size of blank 2) Number of draws
- 3) Drawing pressure 4) Press capacity
9. a) What are the basic rules for die design for upset forging? Explain. 6
- b) Describe the various preliminary operations on a multi-impression forging die. 7
- OR**
10. a) What is stock size in closed and open die forging. State the various criterias and factors for determining the stock size. 6
- b) Write short notes on **any two**. 7
- 1) Fullering 2) Edging 3) Flattering
11. a) State the essential features of different types of fixtures. What do you understand by indexing Jigs and fixtures. 7
- b) Explain with neat sketch of drilling fixture. 7
- OR**
12. a) What are automatic clamping devices state the material and state the requirement of heat treatment for Jig bushes. 7
- b) Describe the different types of locators with neat sketches. 7
