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Your Roll No. .....

8468 **A**

B.Tech. (M)/IV

Paper EME–405 (ELECTIVE–II)

TOOL ENGINEERING

Time : 3 *Hours* *Maximum Marks* : 70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer ***all*** *questions.*

Assume suitable missing data, if any.

1. (a) What are the desirable characteristics of a cutting tool materials? How these are satisfied in the case of High Speed Steel tools ? $7 \times 2 = 14$

   (b) How do you compare cutting tool made of CBN with that made of cemented carbide?

   (c) differentiate between up milling and down milling.

   (d) What is chip space filling factor in Broaching ?

   (e) Where will you prefer press working over metal cutting for the production of metal components, and why?

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(f) Why is a tool component that is constructed with a heavy section adjacent to a thin section likely to crack during heat treatment ?

(g) What is the major difference between embossing and conining.?

2. (a) Discuss the significance of the different elements of geometry of a single point cutting tool. 7

(b) What are the advantages of indexable inserts ? How can indexable inserts and their holders be specified ? 7

Or

(a) Discuss the methods and materials used for coating of cutting tools with figure. 7

(b) Determine the necessary shank size of a carbide tool with a feed 0.5 mm, a depth of cut 4 mm and an over hang of 20 mm, Determine the safe carbide-tip thickness using a brazed tool. 7

3. (a) What is chip Breaker ? Describe its various forms. 5

(b) Give a systematic procedure for designing a flat form tool. Explain each step with an example. 9

Or

(a) Discuss the comparative performance of HSS and carbides against flank wear and crater wear. 7

(b) Discuss in brief the important elements of a drill that are to be taken care of while designing a drill. 7

4. (a) Write short notes on : 7

(i) Arbour Design in milling

(ii) Number of teeth on a milling cutter

(b) Calculate the number of teeth in an internal broach for finishing a key way to 12 mm wide and 6 mm deep in a boss of 50 mm length. Write the advantages and limitations of a broaching machine? 7

Or

(a) Write short notes on : 9

(i) Chip Breaker grooves in Broaching

(ii) Heat treating of Broach

(iii) Total length of Broach

(b) What are the advantages and disadvantages of using High rake angles in Milling cutters? 5

5. (a) What is re-drawing. Describe a typical press tool for redraw operation. 7

(b) A hole 100 mm diameter is to be punched in a mild steel plate 6 mm thick with normal clearance on the tools. Cutting is complete at 40% penetration of punch. Give suitable dimensions of punch and die. The ultimate shear stress for the plate is 3600 kg./cm^2.

Determine shear angle for the punch in order to bring the work within the capacity of 10 tonnes press. (clearance = 8.5% of plate thickness). 7

Or

(a) Explain in brief the function of a stripper, knock out and pilot in a press tool. 7

(b) Calculate the developed length of part as shown in fig. Thickness of sheet = 2 mm, K = (constant) $\frac{1}{4}$ when $R \leq t$, $\frac{1}{3}$ when $R \leq 2t$, $\frac{1}{2}$ when $R > 2t$. 7