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10MA81

Eighth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Tool Engineering and Design

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Explain the different types of chip formation with neat sketches. (10 Marks)
b. According to Ernst-Merchants theory, prove that $\phi = \frac{\pi}{4} - \frac{\beta}{2} + \frac{\alpha}{2}$ with the usual notations. (10 Marks)
- 2 a. Discuss the variation of hardness with temperature, for reversal types of tool materials. (10 Marks)
b. Discuss the various turning-tool designs with inserts. (10 Marks)
- 3 a. Design a single point cutting tool of circular cross section to resist a cutting force of 1650 N with an overhang of 70 mm. The value of $\sigma_b = 400 \text{ N/mm}^2$. If the maximum deflection for the above tool is limited to 0.05 mm. Find out the permissible overhang of the tool. State the assumption made and check for rigidity. (10 Marks)
b. What are form tools? Explain with the help of suitable sketches the flat form tool and circular form tool indicating the angles. (10 Marks)
- 4 a. What are the important angles provided twist drill and explain their influence on the cutting performance? (10 Marks)
b. Design a profile sharpened milling cutter of arbor diameter 30 mm. (10 Marks)

PART – B

- 5 a. Illustrate the basic elements of broach construction. (10 Marks)
b. Illustrate the basic elements of straight shank reamer. (10 Marks)
- 6 a. Clearly explain 3-2-1 principle of location. (10 Marks)
b. Explain the following:
(i) Pin and button locator
(ii) Diamond locating pin (10 Marks)
- 7 a. Illustrate the following:
(i) Wedge-type edge clamp (12 Marks)
(ii) Latch-type clamp (08 Marks)
b. Sketch and explain a plate type drill jig.
- 8 a. Sketch and explain a turning fixture. (10 Marks)
b. Sketch and explain a milling fixture. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.