CBCS SCHEME

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18IP63

Sixth Semester B.E. Degree Examination, June/July 2023
Tool Engineering and Design

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is tooling and give the classification of tooling with an example. **(06 Marks)**

b. Explain the detailed steps involved in the design of a cutting tool. **(10 Marks)**

c. List and explain different types of tools with an example. **(04 Marks)**

OR

2 a. Define tool signature and explain with an example. **(04 Marks)**

b. Turning tool of HSS material is to be designed to resist a cutting force of 1860N. Permissible tool overhang and deflection of cutting tool under loading is 70mm and 0.06mm. Determine the dimensions of a rectangular tool shank for strength and rigidity. Assume the Young's modulus as $2.1 \times 10^5 N/mm^2$ and bending stress as $220N/mm^2$. **(08 Marks)**

c. Sketch and explain the important design elements of a twist drill. **(08 Marks)**

Module-2

3 a. Design a form relieved milling cutter of HSS material suitable to be mounted on arbour of 20mm diameter used for milling aluminium alloy. Assume the suitable necessary data as per the design standards. **(10 Marks)**

b. Sketch and explain the various elements of a pull type broach. **(10 Marks)**

OR

4 a. Explain 3-2-1 principle of location. **(08 Marks)**

b. List the important design and operational factors to be considered in clamping. **(06 Marks)**

c. Sketch and explain quick acting clamp. **(06 Marks)**

Module-3

5 a. Differentiate between Jig and fixture. **(04 Marks)**

b. Sketch and explain a lathe fixture for holding irregular job. **(08 Marks)**

c. List and explain any one type of drill Jig. **(08 Marks)**

OR

6 a. Explain the broad classification of gauges. **(08 Marks)**

b. List the factors to be considered in the design of gauges. **(04 Marks)**

c. Shafts of 75 ± 0.02mm diameter are to be inspected by a snap gauge. Design the gap gauge by assuming wear allowance of 5% and gauge makers tolerance of 10%. Also the draw the gauge with GO and NOT GO dimensions. **(08 Marks)**

Module-4

7 a. Sketch and explain different types of press operations. **(08 Marks)**

b. Explain scrap strip layout used for economical stock utilization. **(06 Marks)**

c. Explain the procedure used to determine the centre of pressure in press operations with an example. **(06 Marks)**

OR

8 a. Design a progressive die to produce a steel washer of 30mm outside diameter with a 15mm hole, from a 1.6mm thick sheet metal. Ultimate shear strength of the material is 320N/mm^2. Assume necessary data as per design standards. **(14 Marks)**

b. Sketch and explain a blanking die. **(06 Marks)**

Module-5

9 a. Explain different types of bending. **(06 Marks)**

b. A shell of 48mm diameter and 48mm height with a corner radius of 2mm is to be produced using medium carbon steel of 1mm thickness. Design a suitable drawing die by assuming necessary data as per the design standards. **(14 Marks)**

OR

10 a. Give the broad classification of automats and list their applications. **(06 Marks)**

b. Sketch and explain the tool layout and CAM design for automatic screw cutting machine. **(14 Marks)**

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