

4E4142

Roll No. _____

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B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

Mechanical Engg.

4ME3A Machining & Machine Tools

Common with AE

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

Instructions to Candidates:-

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. _____

2. _____

UNIT – I

Q.1 (a) Explain geometry of single point cutting tool with neat sketches. [8]

(b) Differentiate between orthogonal and oblique cutting. [4]

(c) Discuss factors responsible for production of various types of chips. [4]

OR

Q.1 (a) What is the effect of high cutting temperature on tool and workpiece? Explain how chip-tool interface temperature can be measured. [4+4=8]

(b) Prove that shear strain

[8]

$$\gamma \Rightarrow \cot \phi + \tan (\phi - \alpha)$$

Where $\phi \Rightarrow$ shear angle &

$\alpha \Rightarrow$ rake angle

UNIT – II

Q.2 (a) Discuss various factors affecting machinability in detail.

[8]

(b) Explain various mechanism of tool wear.

[5]

(c) Name different types of tool material.

[3]

OR

Q.2 (a) The Taylor tool life equation for machining C-40 steel with a 18:4:1 H.S.S. cutting tool at a feed of 0.2mm/min and a depth of cut of 2mm is given by $VT^n=C$, where n & C are constants. The following V and T observation have been noted

V_1 m/min 25 35

V_2 m/min 90 20

Calculate

(i) n and c

(ii) Hence recommend the cutting speed for a desired tool life of 60 min. [8]

(b) What is function of cutting fluid during machining? Discuss various types of cutting fluids.

[2+6=8]

UNIT – III

- Q.3 (a) Explain any one quick return mechanism of a shaping machine. [8]
(b) Explain working of a cylindrical grinding machine. [8]

OR

- Q.3 (a) Differentiate between a capstan and a turret lathe machine with suitable sketches. [8]
(b) Explain tracer attachment in machine tools. [8]

UNIT – IV

- Q.4 (a) Discuss various types of abrasives used for grinding. [8]
(b) Explain process of manufacturing of a grinding wheel. Why harder wheel is used for soft material and softer wheel for hard material? [5+3=8]

OR

- Q.4 (a) Explain Honing operation and its applications. [8]
(b) Explain thread milling and thread grinding operations. [8]

UNIT – V

- Q.5 (a) Explain gear shaping process. What are its advantages and limitations? [8]
(b) Discuss various gear finishing processes. [8]

OR

- Q.5 Explain any two methods. [16]
(a) Hydraulic forming
(b) Explosive forming
(c) Magnetic pulse forming.