

B.TECH SEM – V (2007 COURSE) (PRODUCTION ENGG.) :
WINTER - 2017

SUBJECT: TECHNOLOGY OF METAL CUTTING

Day **Saturday**
Date **20/01/2018**

W-2017-2483

Time **02.30 PM TO 05.30 PM**
Max. Marks: 80

N.B.

- 1) Q.1 and Q.5 are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from each Section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Assume suitable data if necessary.

SECTION – I

- Q.1**
- a) Explain types of chips with suitable sketches. **(05)**
 - b) Discuss Lee and Shaffer theory of metal cutting. **(05)**
 - c) Describe the properties of cutting fluids. **(04)**
- Q.2**
- a) What is chip thickness ratio? **(07)**
Prove that $\tan\beta = \frac{r \cos\alpha}{1 - r \sin\alpha}$
Where, r = chip thickness ratio
 β = Shear angle
 α = rake angle
 - b) What are the main cutting tool materials? Explain any two in detail. **(06)**
- Q.3**
- a) During machining a steel work piece with 0–10–5–5–8–90–1 mm (ORS) shaped carbide cutting tool, following observations have been made: **(07)**
 - i) Feed = 0.25 mm/rev
 - ii) Cutting speed = 240 m/min
 - iii) Cutting force = 180 kg
 - iv) Feed force = 100 kg
 - v) Chip thickness = 0.32 mmCalculate : i) Shear angle and shear force.
ii) Normal force acting on shear plane.
iii) Coefficient of friction and friction angle.
 - b) How are dynamometers classified? Explain the working of ‘Mechanical Dynamometer’. **(06)**
- Q.4**
- a) Describe “Tool Failure” in detail. **(07)**
 - b) What are the main factors which influence the tool life? Explain the effect of cutting speed on tool life. **(06)**

SECTION – II

- Q.5**
- a) Discuss High Speed machining in brief. **(04)**
 - b) Explain types of reamers. **(05)**
 - c) Explain in which conditions form tool is selected for machining. State its merits. **(05)**
- Q.6**
- a) Explain the criteria for Minimum costs and Maximum production. **(07)**
 - b) Describe the different tools used for CNC machine and Machining Centers. **(06)**
- Q.7**
- a) Explain with suitable sketch, nomenclature of Twist drill. **(07)**
 - b) Write a note on: **(06)**
 - i) Slot mill cutters
 - ii) Hobs
- Q.8**
- a) Explain the graphical method for determining profile of a flat form tool. **(07)**
 - b) What is form tool? Explain with suitable sketches different types of form tool. **(06)**

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