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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Fourth Semester, B.E. - Mechanical Engineering

Semester End Examination; June/July - 2015

Manufacturing Process -II

Time: 3 hrs

Max. Marks: 100

Note : Answer **FIVE** full questions, selecting **ONE** full question from each **Unit**.

UNIT – I

1. a. Briefly explain the mechanism and types of Chip formation with neat sketches. 10
- b. Derive an expression for the shear angle in orthogonal cutting in terms of a rake angle and chip thickness ratio. 6
- c. List the properties of Ceramics. 4
- 2 a. Write a short notes on: 8
 - (i) HSS
 - (ii) CBN
- b. The following details relates to an orthogonal cutting operation. Feed = 1.25 mm/rev, Chip thickness 2 mm, rake angle of tool 10°. Calculate; (i) Chip thickness ratio and shear angle (ii) If the shear strength is 6000 kg/cm², width of cut 10 mm, cutting speed 30 mpm and coefficient of friction 0.9; determine the following: 12
 - (I) Shearing force
 - (II) Friction angle
 - (III) Cutting Force
 - (IV) Thrust force

UNIT – II

- 3 a. List the functions of cutting fluid. 4
- b. Explain the factors which affect the tool life. 8
- c. A Lathe running at a speed of 30 m/min cuts a mild steel rod of 160 mm diameter with a HSS tool. The life of the tool under this condition was observed to be 2.1 hours. When the cutting speed was reduced to 25 m/min, the tool life was observed to be 5.2 hours. Calculate the value of the constant C and the exponent n in the tool life equation. 8
- 4 a. List and explain different types of tool wear. 10
- b. The total life for a HSS tool is expressed by the relation $VT^{1/7} = C_1$ and for tungsten carbide $VT^{1/5} = C_2$. If the tool life for a cutting speed of 24 m/min is 128 min. Compare the life of the two tools at a speed of 30 m/min. 10

UNIT - III

- 5 a. Define cutting speed, feed and depth of cut. 9
- b. Explain with neat sketch turret lathe and labeling the parts of turret lathe. 11

- 6. a. Differentiate between shaping and planing machines. 6
- b. Sketch and Explain double housing planner. 10
- c. List the specifications of a shaper. 4

UNIT – IV

- 7 a. Define indexing. Explain briefly simple and compound indexing methods. 10
- b. Sketch and Explain:
 - (i) up milling (ii) down milling 10
 - (iii) Straddle milling (iv) Face milling
- 8 a. Sketch and Explain universal milling machine. 10
- b. List the different types of milling machines. 5
- c. Write short notes on milling operations. 5

UNIT - V

- 9 a. Sketch and Explain any four drilling related operations. 16
- b. List the important application of radial drilling machines. 4
- 10 a. What are the factors considered in the selection of a grinding wheel? Explain briefly. 10
- b. Sketch and Explain centre less grinding. 10

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