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

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B.E. - Automobile Engineering

Semester End Examination; June - 2017

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. Sketch and explain the mechanism of chip formation. 6

b. Compare orthogonal and oblique cutting system. 6

c. In an orthogonal cutting process, the following data were obtained :

Chip length obtained = 96 mm, uncut chip length = 240 mm, rake angle used = 20°, depth of cut = 0.6 mm, horizontal component cutting force = 2400 N and vertical component of cutting force = 240 N. 8

Calculate for the given data :

i) Shear plane angle ii) Chip thickness

iii) Friction angle iv) Resultant cutting force.

2 a. Discuss the desirable properties of cutting tool material. 6

b. Draw merchants circle diagram and indicate all forces and angles involved in it. 6

c. Write a short note on :

i) Cemented carbide ii) Ceramics 8

iii) Cubic boron nitride iv) HSS.

UNIT - II

3 a. What is tool life? Explain different tool failure. 6

b. Explain the measurement of tool tip temperature with sketch. 6

c. A cast iron bar stock was turned at 50 m/min for which a tool life was 3 hours for the same material at 40 m/min; the tool life was 5 hours. Find the value of constant '*c*' and *n* in the Taylor's tool life equation. Also state the type of tool material based on the value of *n*. 8

4 a. What are the purposes of cutting fluids? What are the properties of cutting fluids? 6

b. What are the various forms of wear found in single point cutting tool? 6

c. What are factors affecting heat generation in metal cutting? 8

UNIT - III

5 a. Classify different types of lathe and explain the principle and working of centre lathe. 14

b. Compare capstan and turret lathe. 6

Contd…2

6	a.	Classify the shaping machine according to various forms.	5
	b.	List the differences between planer and shaper machine.	5
	c.	A cast iron plate of dimensions 450 X 150 X 60 mm is to be rough shaped along its wide face. Calculate the machining time taking cutting speed = 10 mpm, return speed = 15 mpm, approach length = 30 mm, over travel length = 30 mm, allowances on either side of the plate width = 6 mm and feed/cycle = 1.5 mm.	10

UNIT - IV

7	a.	Sketch and explain the construction and working of an upright drilling machine.	10
	b.	A 12 mm hole is to be drilled through a 20 mm thick plate. The cutting speed is 12 m/min and the feed rate is 0.12 mm/rev. Estimate the machining time. Take, over travel plus the clearance of the tool as 5 mm.	10
8	a.	Discuss the classification of grinding machine.	6
	b.	Sketch and explain the center less grinding machine.	8
	c.	Discuss the factors to be considered while selecting a grinding wheel for different application.	6

UNIT - V

9	a.	Explain the following milling operations : i) Face milling ii) Slot milling iii) Gang milling.	9
	b.	Describe the principle of operation of a vertical milling machine with the help of neat sketch.	5
	c.	Write a note on indexing and indexing mechanism.	6
10	a.	With neat sketch, describe the working principle of ultrasonic machining.	10
	b.	Explain the following surface finishing operations : i) Honning ii) Lapping.	10

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