

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**M.Tech.Winter 2019 - 20 Examination**

**Semester: 1****Subject Code: 203208101****Subject Name: Theory of Machining Science****Date: 16/12/2019****Time: 10.30 am to 1.00 pm****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1** A) Explain conversion from ASA to ORS. What are the assumptions made by merchant for getting various forces in metal cutting? (05)
- B) Show the regions of heat generation with neat sketch and explain causes behind the heat generation. (05)
- C) Define tool life. The tool life equation for a given operation is  $VT^{0.5} = 7$ . What will be the change in tool life if speed is cut down to 50%? (05)
- Q.2** Answer the following questions. (Attempt any three) (Each five mark) (15)
- A) Define machinability? State factors affecting machinability.
- B) Draw neat sketch of chip formation in metal cutting and derive the relation for the shear angle ( $\phi$ ), nose radius ( $r$ ), and rack angle ( $\alpha$ ).
- C) List the types of chips produced during machining and discuss the factors affecting on it.
- D) Explain design requirement for tool-force dynamometers and discuss measurement of cutting force by Piezoelectric transducer
- Q.3** A) Derive equation of optimum cost based on minimum production cost (07)
- B) Explain experimental method of determining average chip tool interface temperature. What is self sharpening action in grinding? (08)

**OR**

- B) During an orthogonal machining (turning) operation of C-25 steel with 10-10-6-6-8-90-1mm (ORS) shaped triple carbide tool, the following observation have been made
- (1) uncut chip thickness = 0.127 mm (2) width of cut = 0.2 mm/rev (3) Speed = 2 m/s  
 (4) rack angle = 10 degree (5) cutting force = 567N (6) thrust force = 227N  
 (7) Chip thickness = 0.288 mm

Calculate: (08)

- (1) shear angle
- (2) shear stress along the shear plane
- (3) cutting power
- (4) kinetic co-efficient of friction
- (5) chip flow velocity

- Q.4** A) List various modes of tool wear and explain any two of them. (07)

**OR**

A) Differentiate:

- 1) Conventional and non-conventional machining (07)
- 2) Orthogonal and Oblique Machining

B) Discuss the effect of parameters on MRR in Electro Discharge Machining process. (08)