

T.E. (MECHANICAL ENGINEERING)

302051: Manufacturing Process-II

UNIT 01: Theory of Metal Cutting

Q.1	Explain different types of tool wear and remedies for the same.	4
Q.2	Derive the equation for velocity relation.	4
Q.3	Write a note on Types of Chips	5
Q.4	Derive the equation for shear angle with Chip ratio thickness.	4
Q.5	Define Machinability and explain factors affecting Machinability	5
Q.6	Write a note on types of cutting fluids	4
Q.7	Explain Chip breakers with its function.	4
Q.8	Explain Turning Dynamometer	5
Q.9	Explain factors that affect tool life. And define tool life.	4
Q.10	With the help of a neat sketch explain Single Point Cutting Tool Geometry	6
Q.11	What are chip Breakers? Why they are needed?	4
Q.12	With the help of neat sketch explain the relation between shear velocity, cutting velocity and chip flow velocity.	4
Q.13	Draw the Merchant's circle of forces and explain the different quantities involved	4
Q.14	In orthogonal cutting of steel bar with 80mm dia on lathe with following data Cutting Speed = 36m/min; Rake Angle = 13° ; Feed Rate = 0.2 mm/rev; Cutting Force = 1300N; Thrust Force = 580 N and Chip Thickness = 0.45 mm Calculate Shear Angle; Friction Force and Shear Stress.	6
Q.15	A tool life of 60 minute is obtained at a cutting speed of 19m/min and 12 minute at 47 m/min. Determine Taylors Tool life equation and find tool life when speed is 32m/min	6

- Q.16 In orthogonal cutting of steel bar with 80mm dia. on lathe with following data 6
 Cutting Speed = 45m/min; Rake Angle = 10° ; Feed Rate = 0.2 mm/rev;
 Cutting Force = 970N; Thrust Force = 450 N and Chip Thickness = 0.4 mm
 Calculate Coefficient of Friction, Shear Strain and Cutting Power
- Q.17 The following data in orthogonal cutting is available 6
 Rake Angle = 13° Chip Thickness ratio 0.37 Chip Thickness = 1.2 mm
 Width of Cut = 2.75 mm Shear Stress = 285 N/mm² Coefficient of friction 0.57
 Calculate Shear Angle, Chip thickness before cut, and Cutting Force.
- Q.18 In orthogonal cutting of steel bar with 60mm dia. on lathe with following data 6
 Cutting Speed = 100m/min; Rake Angle = 10° ; Feed Rate = 0.2 mm/rev;
 Cutting Force = 200N; Thrust Force = 70 N and Chip Thickness = 0.3 mm
 Calculate Coefficient of Friction, Shear angle, Chip flow velocity, Friction angle
- Q.19 The following data from orthogonal cutting is available: 6
 Rake angle = 10° , Chip thickness ratio = 0.38, Uncut chip thickness = 0.5mm, width
 of cut = 3mm, Shear stress = 270 N/mm², Coefficient of friction = 0.7
 Determine Cutting Force and Thrust force.
- Q.20 A tool life of 70 minute is obtain at a cutting speed of 15 m/min and 7 minute at 50 5
 m/min. Determine the
 i) Taylor's tool life equation.
 ii) Calculate percentage increase in tool life when cutting speed is reduced
 by 50%.
- Q.21 A 300 mm diameter bar is turned as 45 rev/min with depth of cut of 2mm and feed of 4
 0.3 mm/rev. The forces measured at the cutting tool point are-
 i) Cutting force = 1850 N
 ii) Feed force = 450 N.
 Calculate:
 1) Power Consumption.
 2) Specific Cutting Energy.
- Q.22 A 250 mm diameter bar is turned at 40 rev/min. with depth of cut 2mm and feed of 4
 0.3 mm/rev. Calculate power consumption and specific cutting energy with cutting
 force 1500N and feed force 400N.

T.E. (MECHANICAL ENGINEERING)

302051: Manufacturing Process-II

UNIT 02: Machine Tools and their applications

- | | | |
|-------------|---|----------|
| Q.1 | Write classification of boring machines and explain Jig boring machine. | 5 |
| Q.2 | Explain with neat sketch Radial drilling machine | 5 |
| Q.3 | Explain with neat sketch Sensitive Drilling Machine | 6 |
| Q.4 | Explain various operations on drilling machine. | 4 |
| Q.5 | Explain Continuous broaching machine with neat sketch. | 5 |
| Q.6 | Differentiate between up-milling and down-milling | 5 |
| Q.7 | Explain with neat sketch various types of Milling Cutters. | 5 |
| Q.8 | Explain broach terminology. | 5 |
| Q.9 | Explain following operations on drilling machine.
1) Countersinking 2) Trepanning 3) Spot Facing | 6 |
| Q.10 | Explain Geometry of twist Drill | 4 |
| Q.11 | Explain fixed bed type Milling machine with its classification | 5 |
| Q.12 | Discuss the geometry of Broach teeth with neat sketch. | 4 |
| Q.13 | Explain various operations on Milling Machine | 6 |
| Q.14 | A hole of 25 mm diameter and 70mm depth is to be drilled. The suggested feed is 1.3 mm per revolution and the cutting speed 60m/min. Assuming tool approach and tool over travel as 6mm, calculate; i) Spindle Speed ii) Feed speed iii) Machining Time | 6 |
| Q.15 | A spur gear of 63 teeth is to milled on milling machine ; write dividing head calculation to obtain 63 divisions of the gear blank | 5 |

Plate1:15,16,17,18,19,20 Plate2:21,23,27,29,31,33 Plate3: 37,39, 41,43,47,49

- Q.16** A plain surface 60mm wide and 230mm long is to be milled on a horizontal milling machine with cutter diameter 80mm and speed 50m/min. Take feed per tooth 0.11mm and number of teeth on cutter 12. Calculate machining time. **6**
- Q.17** A hole of 30mm diameter and 75mm depth is to be drilled. The suggested feed is 1.3 mm per revolution and the cutting speed 62m/min. Assuming tool approach as 6mm, calculate; i) Spindle Speed ii) Feed speed iii) Machining Time **6**
- Q.18** A spur gear of 69 teeth is to milled on milling machine ; write dividing head calculation to obtain 69 divisions of the gear blank. **5**
- Plate1:15,16,17,18,19,20 Plate2:21,23,27,29,31,33 Plate 3: 37,39, 41,43,47,49

T.E. (MECHANICAL ENGINEERING)

302051: Manufacturing Process-II

UNIT 03: Finishing Processes

- | | | |
|-------------|---|----------|
| Q.1 | Explain the meaning of each following letter mentioned on the grinding wheel
“W-A-10-E-5-V-25” | 4 |
| Q.2 | Explain Dressing, Truing and Balancing of Grinding wheels | 6 |
| Q.3 | Explain selection factors of Grinding Wheel | 6 |
| Q.4 | Explain with neat sketch internal and external center- less grinding. | 6 |
| Q.5 | Differentiate between honing and lapping | 4 |
| Q.6 | Explain Burnishing | 5 |
| Q.7 | Explain with neat sketch types of grinding machines. | 5 |
| Q.8 | Write note on types of Abrasives. | 5 |
| Q.9 | Differentiate between buffing and burnishing with figure. | 5 |
| Q.10 | Write a note with diagrams on shapes of Grinding wheel | 5 |
| Q.11 | Write a note on bonding Materials | 5 |
| Q.12 | Explain the meaning of each following letter mentioned on the grinding wheel
“W-C-10-E-5-V-17” | 6 |
| Q.13 | Describe with neat sketch tool and cutter grinder | 6 |
| Q.14 | Explain meaning of “Grit” ; “ Grade” and “Structure” | 6 |
| Q.15 | For finish grinding operations, calculate machining time if cutting speed is 20 m/min. Dia.of job is 40 mm, Depth of cut is 0.03 mm, stock to remove 0.6 mm for 230 mm long job with wheel having face width 70 mm. Take $k= 1.6$ | 6 |
| Q.16 | For Rough grinding operations, calculate machining time if cutting speed is 20 m/min. Dia.of job is 45 mm, Depth of cut is 0.02 mm, stock to remove 0.1 mm for 250 mm long job with wheel having face width 60 mm. | 5 |
| Q.17 | For finish grinding operations, calculate machining time if cutting speed is 30 m/min. Dia.of job is 45 mm, Depth of cut is 0.01 mm, stock to remove 0.1 mm for 250 mm long job with wheel having face width 60 mm. | 5 |



KJ's Educational Institute

TRINITY ACADEMY OF ENGINEERING, PUNE

(Approved by AICTE, New Delhi, Govt. of Maharashtra & affiliated to SPPU, DTE Code: EN6634)

(Accredited by NAAC with 'A' Grade)



T.E. (MECHANICAL ENGINEERING)
302051: Manufacturing Process-II
UNIT 04:Advanced Machining Processes

Q.1	Explain the principle, applications and working of AJM process with neat sketch.	8
Q.2	Explain the principle, applications and working of USM process with neat sketch.	8
Q.3	Compare EDM and LBM process	8
Q.4	Justify the need of unconventional manufacturing process in today's industries.	8
Q.5	Compare AJM and USM	8
Q.6	Explain the principle, applications and working of ECM process with neat	8
Q.7	Explain the principle, applications and working of EDM process with neat sketch	8
Q.8	Explain the principle, applications and working of LBM process with neat sketch	8
Q.9	Compare ECM and EDM	8



T.E. (MECHANICAL ENGINEERING)

302051: Manufacturing Process-II

UNIT 05:CNC Technology

Q.1	Write a note on DNC.	6
Q.2	Describe new trends in CNC cutting tools.	6
Q.3	Explain Open loop and close loop CNC system	4
Q.4	What is Canned Cycles and Sub-routine in CNC Programming	4
Q.5	Write a note on Modular tooling system for turning	6
Q.6	Explain with sketch Automatic Tool Changer (ATC) and Automatic Pallet changer (APC)	6
Q.7	Write a note on Stepper Motor and Servo Motor drives Explain	6
Q.8	Turning tool specification (ISO 1832 Coding system).	4
Q.9	Explain need of tool offsets and Radius compensations in CNC programming.	4
Q.10	Which are basic elements of CNC machine	6
Q.11	Explain with neat sketch NC motion control systems	5
Q.12	Explain following Codes.: G02; G91;G98; M03; M02	5
Q.13	Explain following Codes.: G03; G91; M00; M08; M06; M09 (Any Four)	4
Q.14	Write note on Types of Machining Centers. What are its advantages and disadvantages?	6
Q.15	Differentiate between Absolute and Incremental Co-ordinate System	5
Q.16	What are G codes and M codes explain. What is open loop and close	4
Q.17	loop system?	5
Q.18	What is 2 axis; 3 axis and 5 axis machining centers?	6



KJ's Educational Institute

TRINITY ACADEMY OF ENGINEERING, PUNE

(Approved by AICTE, New Delhi, Govt. of Maharashtra & affiliated to SPPU, DTE Code: EN6634)

(Accredited by NAAC with 'A' Grade)



T.E. (MECHANICAL ENGINEERING)

302051: Manufacturing Process-II

UNIT 06: Jigs and Fixtures

Q.1	Explain principles of clamping.	6
Q.2	Describe Poka Yoke concept.	4
Q.3	Explain concept of Modular Fixturing	6
Q.4	List and explain in brief various types of fixtures.	4
Q.5	Explain with neat sketch any three Quick Clamping devices.	6
Q.6	Differentiate between Jig and Fixture.	4
Q.7	Explain 3-2-1 principal of location.	4
Q.8	Explain design Principal of Jig and Fixture.	6
Q.9	Explain with neat sketch Locating Devices used in Jig and Fixture.	6
Q.10	Explain with figure Diamond Pin Locator.	4
Q.11	Explain principles of Locating.	6
Q.12	What are advantages of Jig and fixtures?	6
Q.13	Write note on Milling Fixture	6
Q.14	Write note on Indexing Jigs and Fixtures	6
Q.15	Explain any Two types of Indexing Devices	6

