



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

MECHANICAL ENGINEERING TUTORIAL QUESTION BANK

Course Name	TOOL DESIGN
Course Code	AME509
Class	V Semester
Branch	Mechanical Engineering
Year	2018 – 2019
Course Coordinator	Mr. Ch. Sandeep, Assistant Professor, Department of Mechanical Engineering
Course Faculty	Mr. Ch. Sandeep, Assistant Professor, Department of Mechanical Engineering

COURSE OBJECTIVES:

The course should enable the students:

I	Identify different properties of materials suitable for cutting/ forming tools.
II	Illustrate principle of 3-2-1 jigs and fixture to arrest the degree of freedom.
III	Design of bushing and special clamping methods for drill jigs.
IV	Gain knowledge in design and development of forming dies and punches for different materials.

COURSE LEARNING OUTCOMES:

Students, who complete the course, will have demonstrated the ability to do the following:

CAME509.01	Understand various cutting tool materials used in industries.
CAME509.02	Explain the characteristics and properties of different tool materials.
CAME509.03	Evaluate the properties of Non Metallic and Non Ferrous materials.
CAME509.04	Understand and analyze various design principles that are to be incorporated in cutting tools.
CAME509.05	Explain the design methodology of single point and multi point cutting tools.
CAME509.06	Demonstrate the selection of carbide tool steels for cutting operations.
CAME509.07	Solve problems and find methods to determine the shank size.
CAME509.08	Understand the concept of 3-2-1 principles of Jigs and Fixtures.
CAME509.09	Demonstrate the general considerations in the design of drill jigs and drill bushing.
CAME509.10	Explain design of sheet metal blanking and piercing dies.
CAME509.11	Demonstrate the methods of construction of fixtures, vice, milling and boring.
CAME509.12	Explain the fundamentals of die cutting operation, power press types.
CAME509.13	Explain about advanced and innovative material handling equipment.
CAME509.14	Solve problems on design and material selection on punches and dies.
CAME509.15	Understand the importance of sheet metal forming, bending, and deep drawing.

CAME509.16	Compare extrusion and forging processes to identify advantages and limitations.
CAME509.17	Enable students to understand various sheet metals forming for industrial applications.
CAME509.18	Enable students to understand importance of tool design for lifelong learning, Higher Education and competitive exams.

TUTORIAL QUESTION BANK

UNIT – I			
TOOL MATERIAL			
Part - A (Short Answer Questions)			
S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	List the common tool materials?	Understand	CAME509.02
2	Name the different types of cutting tool materials?	Understand	CAME509.04
3	What are different types of tool steels?	Understand	CAME509.02
4	Define non metallic materials?	Understand	CAME509.04
5	Explain about non ferrous materials?	Understand	CAME509.04
6	Define heat treating?	Remember	CAME509.03
7	Explain about the importance of cast iron?	Remember	CAME509.04
8	Give the importance of mild steel and its applications?	Understand	CAME509.04
9	What are the properties of cast iron?	Understand	CAME509.04
10	List out some properties of mild steel?	Understand	CAME509.04
11	What are the effects of heat treating?	Understand	CAME509.04
12	Write a note on pack hardening?	Understand	CAME509.04
13	Differentiate between tempering and hardening?	Understand	CAME509.04
14	What is pearlite?	Understand	CAME509.06
15	Define a tool steel?	Understand	CAME509.06
16	List of the characteristics of group D steels?	Remember	CAME509.06
17	What are the characteristics of group O steels?	Remember	CAME509.06
18	Illustrate the characteristics of group S steels?	Understand	CAME509.03
19	What is a ductile material?	Understand	CAME509.03
20	Explain about the critical cooling rate of tool steel?	Understand	CAME509.06
Part - B (Long Answer Questions)			
S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	Explain various types of non metallic and non ferrous tool materials ?	Understand	CAME509.01
2	What are ferrous tooling materials? Briefly explain them.	Remember	CAME509.02
3	Describe heat treating? Briefly explain the common terms that are associated with heat treating.	Understand	CAME509.02

4	What happens when tool steel is suddenly cooled through the transformation range?	Understand	CAME509.03
5	Briefly explain the indicators that a tool has been subjected to too high a hardening temperature?	Understand	CAME509.02
6	Explain the three types of atmosphere found in heat treating furnace? What are their characteristics?	Understand	CAME509.02
7	Illustrate the most quenching media in use today in decreasing order of quenching severity?	Understand	CAME509.03
8	What determines the choice between plastics and conventional tooling material for tooling applications?	Understand	CAME509.04
9	Compared to carbide and high-speed –steel cutting tools, what are the major advantages of cast alloy cutting tools?	Remember	CAME509.03
10	Give the difference between tempering and drawing?	Understand	CAME509.06
11	What determines the final effective grain size after heat treatment?	Understand	CAME509.02
12	List out the major advantages of liquid-bath or pot-type heat –treating furnaces?	Understand	CAME509.03
13	What is the advantage of using gray cast iron as the material for the main body of a jig or fixture?	Understand	CAME509.02
14	Differentiate between stress relieving and stabilizing?	Understand	CAME509.02
15	Why do group W steels machined to complicated shapes have a tendency to crack or warp during quenching operations?	Understand	CAME509.03
16	Name the various methods of controlling scaling and decarbonisation of work piece during heat treatment?	Remember	CAME509.03
17	Explain about the Rockwell hardness of a metal-cutting file?	Remember	CAME509.03
18	What are the major characteristics of group S tool steels?	Understand	CAME509.03
19	Why are the properties of elasticity and stiffness important to the designer of cutting tools?	Understand	CAME509.03
20	Give the reason why the hot-rolled carbon is steel suited for tools that are to be fabricated by welding?	Understand	CAME509.07

Part - C (Problem Solving and Critical Thinking Questions)

S No	QUESTION	Blooms Taxonomy level	Course Learning Outcomes
1	A die block with the dimensions of 25x100x100mm is to be made from O ₂ tool steel. Can the toolmaker successfully construct the die block from a 25x100mm O ₂ tool steel?	Understand	CAME509.04
2	Six punches whose dimensions are 20mm diameter by 75mm long have been finish- machined and are ready for heat treatment. The punches are made from O ₂ tool steel. (a) How long they should be soaked in the hardening furnace before quenching? (b) What is the approximate time required to reach a drawing temperature of 200°C?	Understand	CAME509.03
3	Select the proper tool steel for the following applications and list the properties that make it applicable: (a) shear blade for cold work (12mm plate) (b) hand reamer, (c) ring gauge.	Understand	CAME509.06
4	Give the micro structural appearance of carbon in steel?	Understand	CAME509.05
5	What are the factors affecting the heat treating?	Understand	CAME509.02
6	Explain briefly the characteristics of non metallic tooling materials?	Remember	CAME509.05

7	Illustrate about the heat treatment and tool design?	Remember	CAME509.06
8	Explain the classification of ferrous tooling materials?	Understand	CAME509.03
9	Write the properties of the cutting tool materials used in the industry?	Understand	CAME509.03
10	Give the Iron carbon diagram for MS and Cast Iron steels?	Understand	CAME509.07

UNIT - II

DESIGN OF CUTTING TOOLS

Part – A (Short Answer Questions)

S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	List the basic requirements of a cutting tool?	Remember	CAME509.08
2	What is the purpose of relief angel?	Understand	CAME509.08
3	Give the limitations of high positive rake angle?	Understand	CAME509.08
4	Explain about the BUE chip association with ductile material?	Understand	CAME509.08
5	Why is large shear angle desirable?	Understand	CAME509.08
6	What is meant by machinability?	Understand	CAME509.08
7	Define hydrodynamic lubrication?	Understand	CAME509.08
8	Write a note on flank wear?	Understand	CAME509.08
9	How do slower speeds better utilize available power?	Understand	CAME509.08
10	What is the main purpose of cutting fluids?	Understand	CAME509.08
11	How does the addition of sulfur to ma mineral oil provide boundary lubrication?	Remember	CAME509.08
12	Explain about profile-relieved milling cutter?	Remember	CAME509.09
13	What is the major advantage of a form-relief cutter?	Understand	CAME509.08
14	List out the advantages of wedge behind the insert design of indexable-insert face-milling cutter?	Understand	CAME509.08
15	Why chip formation produced in a drill operation extremely complex?	Understand	CAME509.08
16	How is on-end carbide inserts resharpened?	Remember	CAME509.09
17	What is the major purpose of the helical flute of a twist drill?	Remember	CAME509.08
18	Differentiate between an expansion reamer and an adjustable reamer?	Remember	CAME509.08
19	When are tantalum carbide grades used in place of titanium carbide grades?	Understand	CAME509.08
20	What is the standard angle of chucking reamers?	Remember	CAME509.08

Part - B (Long Answer Questions)

S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	An orthogonal cut of 3mm depth produces a chip thickness of 3.8mm. What is the cutting ratio? What cutting action and quality of surface finish can be expected?	Understand	CAME509.08
2	What surface finish could be expected when turning AISI 1120 steel, 160 BHN at 45m/min and 0.25mm/rev using a high-speed steel cutting tool with 1.6mm nose radius?	Understand	CAME509.08

3	Sketch a high-speed-steel single-point cutting tool with the following tool signature: 0-8-24-8-10-0-1.6?	Understand	CAME509.08
4	A single-out cutting tool has a back rake of -5° , a side rake of 10° and a side cutting-edge angle of 15° . Solve for the true rake and angle of inclination mathematically?	Understand	CAME509.08
5	A C-1 grade of tungsten carbide is being used to machine cast iron. After being in service for a short period of time, the cutting edge shows excessive flank wear. Make recommendations?	Understand	CAME509.08
6	What is the effect of adding titanium carbide to the basic carbide-cobalt composition of carbide cutting tools?	Remember	CAME509.08
7	How is the effective rake angle changed on a standard drill when the drill geometry is fixed by the manufacturer?	Remember	CAME509.08
8	What is the amount that a properly sharpened 13mm drill will cut oversize? A 20mm drill? A 25mm drill?	Understand	CAME509.08
9	Why is it important to know the horsepower required at the motor of the machine tool for a specific set of cutting conditions?	Understand	CAME509.08
10	If the overhang of a 16mm diameter boring bar is increased from 50 to 25mm, how much more will it deflect under a given load?	Understand	CAME509.08
11	With regard to cutting fluids, why is boundary lubrication more important than hydrodynamic lubrication?	Understand	CAME509.08
12	Name the design and machining practices that help to reduce the built-up edge on the BUE chip?	Understand	CAME509.08
13	What is an emulsifiable or soluble mineral oil?	Understand	CAME509.08
14	How is the size of a single point cutting tool designated?	Understand	CAME509.08
15	What tool materials are usually supplied in solid-type- single point tools?	Understand	CAME509.09
16	Give the purpose of the carbide seat provided to support the throwaway type tools?	Remember	CAME509.08
17	What is the advantage of eccentric relief on small milling cutters?	Remember	CAME509.09
18	Why is the chisel edge a problem area during a drilling operation?	Understand	CAME509.09
19	Explain about the straight-fluted chucking reamers designed with staggered flutes?	Understand	CAME509.08
20	How can improper alignment be corrected when reaming on machines with worn spindles and worn reamer-holding devices?	Understand	CAME509.08

Part – C (Problem Solving and Critical Thinking)

S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	Design a stub boring bar to machine a hole in cast-iron gear housing. The bore is 100mm in diameter by 50mm deep and is a through hole. The machine tool is a horizontal boring mill.	Understand	CAME509.08
2	A carbide face-milling cutter is listed in a catalog as having $+5^{\circ}$ positive axial rake and -7° negative radial with 10mm by 45° chamfer angle. (a) What is the true rake and angle of inclination? (b) What cutting efficiency can be expected?	Understand	CAME509.09
3	A highly alloyed cast iron is being machined with a C-3 grade of tungsten carbide. A crater develops in the top of the insert when the chip flows over it after a short period of time. Make recommendations.	Understand	CAME509.08
4	A single point cutting tool has a back rake of -7° , a side rake of 15° and a side cutting-edge angle of 25° . Solve for the true rake and angle of inclination mathematically?	Understand	CAME509.08
5	A H-1 grade of tungsten carbide is being used to machine cast iron. After being in service for a short period of time, the cutting edge shows excessive flank wear. Make recommendations?	Understand	CAME509.08

6	Determine the required nose radius to obtain a surface finish of 100µm rms when turning AISI 4130 steel, 183BHN at 300 fpm and 0.2 feed using carbide cutting-tool materials?	Remember	CAME509.08
7	Design a stub boring bar to machine a hole in cast-iron gear housing. The bore is 200mm in diameter by 75mm deep and is a through hole. The machine tool is a horizontal boring mill.	Remember	CAME509.11
8	Determine the required nose radius to obtain a surface finish of 125µm rms when turning malleable cast iron, 120 BHN at 45m/min and 0.4 mm/rev feed, using a high-speed-steel-cutting-tool.	Understand	CAME509.08
9	A single point cutting tool has a back rake of -9° , a side rake of 25° and a side cutting-edge angle of 35° . Solve for the true rake and angle of inclination mathematically?	Understand	CAME509.08
10	Design a stub boring bar to machine a hole in mild-steel gear housing. The bore is 150mm in diameter by 55mm deep and is a through hole. The machine tool is a horizontal boring mill.	Understand	CAME509.08

UNIT-III

DESIGN OF JIGS AND FIXTURES

Part - A (Short Answer Questions)

S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	Define a drill jig?	Understand	CAME509.09
2	What is the difference between a drill jig and a fixture?	Understand	CAME509.08
3	Write the advantages of tumble jigs?	Remember	CAME509.11
4	Why should complicated clamping devices be avoided?	Understand	CAME509.10
5	Give reasons for the use of loose parts on drill jigs be avoided?	Understand	CAME509.10
6	Why should locating points on a drill jig be visible whenever possible?	Understand	CAME509.09
7	What are the three ways chips are removed from drill jigs?	Understand	CAME509.09
8	Give the reason for providing area relief below the work pieces?	Understand	CAME509.10
9	Why should a drill jig stand on four legs rather than three?	Remember	CAME509.09
10	What is the hardness of standard drill bushing?	Understand	CAME509.09
11	General rule for clearance between the drill and the bushing hole?	Understand	CAME509.09
12	Define the term fixture derived?	Understand	CAME509.08
13	Give the importance of keys mounted to the base of mill fixtures?	Remember	CAME509.11
14	Write the two general classes of boring fixtures?	Understand	CAME509.10
15	How are broaching fixtures classed?	Understand	CAME509.10
16	What is the advantage of magnetic and vacuum chucks?	Understand	CAME509.09
17	What is the standard taper on a plain mandrel?	Understand	CAME509.09
18	How is a faceplate fixture located on the lathe faceplate?	Understand	CAME509.10
19	Explain about the various methods of production milling?	Remember	CAME509.09
20	Why must the clamps on milling fixtures be extremely rigid?	Understand	CAME509.09

Part – B (Long Answer Questions)

S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	What methods are used when two or more holes are so close together that it is impossible to have an individual standard bushing for each hole work pieces?	Understand	CAME509.08
2	Differentiate between reaming with guide bushing and drilling with guide bushing?	Understand	CAME509.09
3	Why is it often undesirable to use compressed air as a chip-removal medium?	Understand	CAME509.09
4	What alterations to drill geometry will cause metal chips to break?	Understand	CAME509.09
5	Why should dowel holes be drilled completely through both the jig component and jig body?	Understand	CAME509.10
6	Describe about ANSI classification of drill bushings, and how is each classification used?	Understand	CAME509.09
7	Why is it considered poor practise to clamp the part with the hinged plate of a leaf-type jig?	Remember	CAME509.09
8	Write briefly will increasing the drill feed sometimes cause chips to break on borderline materials?	Remember	CAME509.10
9	What is the general rule for the distance between the bottom of a drill bushing and the work piece?	Understand	CAME509.10
10	Why it is necessary for the rear pilot of a double-piloted boring bar to be larger than the sweep of the cutter?	Understand	CAME509.09
11	Explain the difference between a lathe fixture and the external broaching fixture?	Understand	CAME509.09
12	What precautions should be taken when designing external broaching fixtures?	Understand	CAME509.08
13	List out the advantage of using a rocking jaw on a three-jaw chuck?	Understand	CAME509.11
14	What conditions unique to a grinding process must be taken into account when designing grinding fixtures?	Understand	CAME509.10
15	Illustrates the standard method of holding parts for surface-grinding operations?	Understand	CAME509.10
16	How is face plate fixture located on the lathe faceplate?	Remember	CAME509.09
17	What is the result if the bore diameter of wraparound jaws is not held within ± 0.025 mm?	Remember	CAME509.09
18	What is considered the minimum area of a workpiece that is held by a vacuum?	Understand	CAME509.10
19	Explain the methods of construction of fixture and vice fixtures?	Understand	CAME509.09
20	Describe the methods of construction of milling, boring and lathe grinding fixtures?	Understand	CAME509.09
Part – C (Problem Solving and Critical Thinking)			
S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes

1	Design a lathe fixture to turn the OD of the pulley. Assume 16mm hole has been previously machined?	Understand	CAME509.14
2	Give the outline on broaching fixture to broach the slots in the V-block clamp?	Understand	CAME509.12
3	Sketch a milling fixture to mill the finished surface on the clevis. Holes will be drilled after the surfaces have been machined?	Understand	CAME509.12
4	Design a grinding fixture to surface grind the workpiece. The work piece is 1090 heat-treated steel, and 0.4mm per side must be removed?	Understand	CAME509.13
5	Determine the milling fixture to machine the end surface and flange edges of the link connecting rod. Assume that the end holes have been previously bored to size?	Understand	CAME509.11
6	Model a drill jig to drill the 1.5mm hole in the clevis pin?	Remember	CAME509.14
7	Model a prototype to drill jig to drill the 6mm hole in the pin fork?	Remember	CAME509.12
8	Sketch a tumble jig to drill all the holes in the work pieces?	Understand	CAME509.12
9	Design a drill to drill and ream the hole in the given workpiece?	Understand	CAME509.13
10	Draft a drill to drill the five holes in the crank arm?	Understand	CAME509.11
UNIT-IV			
DESIGN FOR SHEET METAL FORMING-I			
Part – A (Short Answer Questions)			
S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	Define blanking and piercing?	Remember	CAME509.15
2	Give the difference between lancing and cutting off and parting?	Remember	CAME509.15
3	What is the difference between shaving and trimming?	Remember	CAME509.15
4	Define notching?	Understand	CAME509.15
5	Explain about the range in size of an OBI press?	Understand	CAME509.15
6	Why is angular clearance necessary?	Understand	CAME509.15
7	How is the penetration of particular material expressed?	Understand	CAME509.15
8	Give the significance of die-clearance?	Understand	CAME509.15
9	What is the result of insufficient die-clearance?	Remember	CAME509.15
10	Write a brief note on slug pulling?	Remember	CAME509.15
11	Explain the term insert dies?	Understand	CAME509.15
12	Write the advantages of indirect pilots?	Understand	CAME509.15
13	What is a direct pilot?	Understand	CAME509.15
14	Define fool proofing a die block?	Understand	CAME509.15
15	Why are sectional dies used?	Understand	CAME509.15
16	What is the shut height of a die set?	Understand	CAME509.15
17	Explain why double shear is preferred over single shear?	Remember	CAME509.15
18	Different methods used to reduce cutting force?	Remember	CAME509.15

19	What is stock pusher, and how is it used?	Remember	CAME509.15
20	Why should spring pockets be bored oversize?	Remember	CAME509.15
Part – B (Long Answer Questions)			
S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	What is meant by single, two or four-point suspension of a press?	Understand	CAME509.15
2	Give the characteristics of non-gear-drive presses?	Understand	CAME509.15
3	What are the major advantages of short-run tooling for piercing operations?	Remember	CAME509.15
4	Why is grain direction of the strip a consideration in locating the blank when a bending operation is required?	Remember	CAME509.15
5	Give the reason for indirect pilots be spring-loaded when used on material over 1/16 1.6mm thick?	Understand	CAME509.15
6	Why it is desirable initially to select stripper springs from lowest load-rating series?	Understand	CAME509.15
7	What is the general rule for piercing-punch diameter with respect to material thickness?	Understand	CAME509.15
8	Why should perforator punches with small heads be backed up with plates of hardened steel?	Understand	CAME509.15
9	What is the minimum number of screws and dowels necessary to accurately position a die component and hold it in place?	Understand	CAME509.15
10	How it is possible to blank a part without die break by using the fine-blanking process?	Understand	CAME509.15
11	What are the major advantages of steel-rule dies?	Understand	CAME509.15
12	How it is possible to blank a part without die break by using the fine blanking process?	Remember	CAME509.15
13	What materials are commonly used in the manufacture of die sets?	Remember	CAME509.15
14	Why should guide pins be 12mm shorter than the shut height of the die set?	Understand	CAME509.15
15	What factors contribute to the amount of force needed to strip material from punches?	Remember	CAME509.15
16	Determine the magnitude of the radius formed at the top edge of a punch hole?	Understand	CAME509.15
17	To what extent are cutting forces reduced by adding shear to punch?	Understand	CAME509.15
18	Why gap frame presses are often manufactured with a separate frame to be inclined at an angle?	Understand	CAME509.15
19	What is the advantage of the cast-frame construction of presses?	Understand	CAME509.15
20	Why should spring pockets be bored oversize?	Understand	CAME509.15
Part – C (Problem Solving and Critical Thinking)			
S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	Sketch a spring-operated stripper to mount on the die block in design (a) starting stop, (b) stock pusher, (c) method of preventing wear on back gage and (d) automatic die stop.	Understand	CAME509.15
2	Design either a compound or progressive die to blank one of the work pieces as assigned by your instructor. Follow the general instructions.	Understand	CAME509.15
3	Explain the following basic die-cutting operations: (a) Blanking, (b) Piercing, (c) Lancing, (d) Cutting off and parting, (e) Notching, (f) Shaving and (g) Trimming.	Understand	CAME509.15

4	Determine the proper die clearance for a 19mm round punch and die that is to be used on a universal iron worker they will pierce all types and thickness of metal?	Understand	CAME509.15
5	What are various types of die construction? Explain in detail.	Understand	CAME509.15
6	Design compound die to blank one of the work pieces as assigned by your instructor. Follow the general instructions.	Remember	CAME509.15
7	Select the proper stripper springs for a compound die. The work piece material is 1020 steel and thickness is 3.25mm, with a blanking perimeter of 70mm, Consider the free length of the spring to be 51mm.	Remember	CAME509.15
8	Design progressive die to blank one of the work pieces as assigned by your instructor. Follow the general instructions	Understand	CAME509.15
9	Determine the proper die clearance for a 25mm round punch and die that is to be used on a universal iron worker they will pierce all types and thickness of metal?	Understand	CAME509.15
10	Select the proper stripper springs for a compound die. The work piece material is 1020 steel and thickness is 2.75mm, with a blanking perimeter of 80mm, Consider the free length of the spring to be 41mm.	Understand	CAME509.15

UNIT-V

DESIGN FOR SHEET METAL FORMING-II

Part - A (Short Answer Questions)

S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	Explain three groups of metal-shaping operations?	Understand	CAME509.16
2	What is corner setting?	Remember	CAME509.16
3	Define air bending?	Remember	CAME509.16
4	Write a note on ironing?	Remember	CAME509.16
5	How much should metal be squeezed for corner setting?	Understand	CAME509.16
6	What is the advantage of bottoming dies compared to air dies?	Understand	CAME509.16
7	Specify the importance of air cushion?	Understand	CAME509.16
8	List out the advantages of air cushion?	Understand	CAME509.16
9	Define a curling die?	Understand	CAME509.16
10	Determine the size of curl?	Understand	CAME509.16
11	What is a double-action draw die?	Remember	CAME509.16
12	How are deep draws made in single-action dies?	Remember	CAME509.16
13	How are pressures working lubricants applied?	Remember	CAME509.16
14	General rule for the draw radius?	Understand	CAME509.16
15	What is the result when the radius on the draw ring is too sharp?	Understand	CAME509.16
16	What will be the result if the blank holder pressure is too heavy?	Understand	CAME509.16
17	Explain about bulging operations?	Remember	CAME509.16
18	Differentiate between embossing and coining?	Understand	CAME509.16
19	What are the major advantages of coining?	Understand	CAME509.16

20	Why do we use a curling die?	Understand	CAME509.16
Part - B (Long Answer Questions)			
S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
1	What problems may be encountered in the case of mass feed when solid form blocks are mounted in a progressive die?	Understand	CAME509.16
2	Why should a radius be provided when the work material must move over form edge?	Understand	CAME509.16
3	List the methods used to remove the work piece from the punch or die cavity after a forming operation?	Understand	CAME509.16
4	Explain the advantages of hydro pneumatic die cushions?	Understand	CAME509.16
5	Illustrate the disadvantage when springs are used to provide pressure for the pressure pads?	Understand	CAME509.16
6	What can be done with the metal tears or wrinkles with a particular design in an embossing die?	Remember	CAME509.16
7	Why is rubber or urethane preferred as a pressure dispersing agent for bulging operations?	Remember	CAME509.16
8	How must a fast acting press be use while using a liquid as pressure dispersing agent for bulging operations?	Understand	CAME509.16
9	Illustrate the type of lubricant is used when it is necessary to prevent galling and seizure between the tool and work material during a drawing operation?	Understand	CAME509.16
10	What are three principles classes of low carbon sheet steel for drawing purpose?	Understand	CAME509.16
11	Why is mill oxide on the surface of work material detrimental to deep drawing?	Remember	CAME509.16
12	What is the maximum percentage of reduction for one draw that can be obtained under production conditions?	Remember	CAME509.16
13	Explain the theoretical maximum percent reduction that can be obtained in one draw?	Understand	CAME509.16
14	Why is it necessary to anneal the work piece between each draw in an extreme draw situation?	Understand	CAME509.16
15	Why must a fast acting press to be used when using a liquid as pressure dispersing agent for bulging operations?	Understand	CAME509.16
16	What is the only sure and practical way to determine the necessary amount of over bend?	Remember	CAME509.16
17	When bending why the work is piece oriented so that the bend is made across the grain produce in rolling mills?	Remember	CAME509.16
18	How is flanged shell that cannot pass through the die removed from the draw die?	Understand	CAME509.16
19	What is the drawing speed for low carbon steel and non ferrous materials?	Understand	CAME509.16
20	Describe one of the major methods of reducing friction during a drawing operation?	Understand	CAME509.16
Part – C (Problem Solving and Critical Thinking)			
1	What do you understand by bending dies? Explain in detail.	Understand	CAME509.16
2	Calculate the bending force in tons for the channel bend. The bend length is 36in and die radius is 0.375 in.	Understand	CAME509.16
3	Calculate the bending force for 35° bend in 24ST3 aluminium, 2.5mm thick and 2.53 m long, with a die opening eight times the metal thickness. The bend is to be made by air bending methods?	Understand	CAME509.16
4	What is the theoretical maximum percent reduction that can be obtained in one draw?	Understand	CAME509.16

5	Explain how a flanged shell that cannot pass through the die removed from a draw die?	Understand	CAME509.16
6	What will be the result when the radius on the draw ring is too sharp?	Remember	CAME509.16
7	Calculate the bending force for 45° bend in 24ST3 aluminium, 1.6mm thick and 1.22 m long, with a die opening eight times the metal thickness. The bend is to be made by air bending methods?	Remember	CAME509.16
8	With a neat sketch explain the drawing operations?	Understand	CAME509.16
9	What methods are used to remove the work piece from the punch or die cavity after a forming operation?	Understand	CAME509.16
10	Describe the variables that affect metal flow during drawing.	Understand	CAME509.16

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