INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

MECHANICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Title	**MANUFACTURING PROCESSES**
Course Code	AMEB05
Programme	B.Tech
Semester	THREE
Branch	Mechanical Engineering
Academic Year	2020-2021
Course Faculty	Dr. Ch. Sandeep, Associate Professor

COURSE OBJECTIVES:

The students will try to learn:	
I	The Importance manufacturing sciences in the day-to-day life, and study the basic manufacturing processes and tools used.
II	The knowledge in thermal, metallurgical aspects during casting and welding for defect free manufacturing components.
III	Design features that make each of these manufacturing process both harder, easier, assess design and manufacturing features on real products

COURSE OUTCOMES:

At the end of the course students are able to:		
	Course Outcomes	**Knowledge Level (Bloom's Taxonomy)**
CO1	**Outline** the steps involved in making a casting the desired pattern for automotive industry components cylinder heads, engine blocks etc.	Remember
CO2	**Design** the gating and riser system needed for casting requirements to achieve defect/error free components	Apply
CO3	**Categorize** various defects and shortcomings during gas welding operation such as TIG, MIG and Spot welding etc. for real time applications.	Understand
CO4	**Illustrate** the properties and bonding techniques of plastics and various plastic molding techniques.	Understand
CO5	**Apply** the appropriate metal forming techniques, for producing components like hexagonal bolt, nut etc.,	Apply

CO6	**Explain** the working principle of hot and cold extrusion processes and their application in industries for making of pipes and tubes.	Apply
CO7	**Analyze** the manufacturing defects as well as material characterization and its application.	Apply
CO8	**Classify** the various forging techniques based on functionality, cost and time in development of critical products.	Understand
CO9	**Evaluate** the appropriate manufacturing process parameters, for effective optimization of prototype / products.	Apply

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S. No	QUESTION	ANSWER	Blooms Taxonomy Level	Course Outcomes
MODULE-I				
1	Define dry sand mould?	All parts of the mould are dried in an oven before being reassembled for casting.	Remember	CO 1
2	Define choke?	It is the deep area after sprue to guide the molten metal to travel in runner	Remember	CO 1
3	What is a flask?	A metal or wood frame without fixed top or bottom, in which the mold formed.	Remember	CO 1
4	What is parting line?	This is the dividing line between the two molding flasks that makes up the mold.	Remember	CO 1
5	What is molding sand?	Sand, which binds strongly without losing its permeability. It is a mixture of silica sand, clay and moisture un appropriate proportions.	Remember	CO 1
6	What is facing sand?	The small amount of carbonaceous material sprinkled on the inner surface of the mold cavity to give a better surface finish to the castings.	Remember	CO 1
7	What is a core?	A separate part of the mold made of sand and generally baked, which is used to create various shaped cavities in the castings.	Remember	CO 1
8	Define sweep moulding?	This are in the shape of surface of revolution along the fixed axis in 2d format	Remember	CO 1
9	What is a slick?	It is a small double ended tool having a flat on one end and a spoon on the other end.	Remember	CO 1
10	What is a runner?	The channel through which the molten metal carried from the sprue to the gate.	Remember	CO 1
11	What is squeeze machine?	It is where the mould box is squeezed between the machine table and overhead squeeze board with the help of pneumatically or hydraulically.	Remember	CO 1
12	What is a rammer?	It is a wood tool used for packing or ramming the sand into mould.	Remember	CO 1
13	What is vent on mold?	Small opening in the mold to facilitate escape of air gases	Remember	CO 1
14	Define Liquid Shrinkage?	Reduction in volume when the metal changes from liquid state to solid state at the solidus temperature	Remember	CO 1
15	Define solid shrinkage?	Reduction in the volume caused when the metal loses temperature in the solid state	Remember	CO 1
16	Define centrifugal casting?	Molten metal is poured into moulds while they are rotating with centrifugal forces.	Remember	CO 1
17	Define casting yield?	It is the ratio of weight of the casting /weight of poured metal*100	Remember	CO 1

18	Explain the cause of blow hole?	It causes because of moisture and slag inclusion	Remember	CO 1
19	What is a casting?	Casting is a manufacturing process in which a liquid material is usually poured into a mold, which contains a hollow cavity of the desired shape, and then allowed to solidify. The solidified part is also known as a casting, which is ejected or broken out of the mold to complete the process	Remember	CO 1
20	What is pattern?	An approximate duplicate of the final casting used to form the mold cavity.	Remember	CO 1
21	Explain cope and drag?	Cope: The top half of the pattern, flask, mold, or core. Drag: The bottom half of the pattern, flask, mold, or core.	Remember	CO 1
22	What is a Gating system?	The network of connected channels that deliver the molten material to the mold cavities.	Remember	CO 1
23	What is a sprue?	The pouring cup attaches to the sprue, which is the vertical part of the gating system. The other end of the sprue attaches to the runners.	Remember	CO 1
24	What is Mold cavity?	The combined open area of the molding material and core, where the metal is poured to produce the casting.	Remember	CO 1
25	Define Pouring cup or pouring basin?	The part of the gating system that receives the molten material from the pouring vessel.	Remember	CO 1
26	What is Riser?	An extra void in the mold that fills with molten material to compensate for shrinkage during solidification.	Remember	CO 1
27	Define Chaplet?	Long vertical holding rod for core that after casting it become the integral part of casting, provide the support to the core.	Remember	CO 1
28	Define cooling curves?	Cooling curves are important in controlling the quality of a casting. The most important part of the cooling curve is the cooling rate which affects the microstructure and properties.	Remember	CO 1
29	Explain about Solidification?	Solidification, also known as freezing, is a phase change of matter that results in the production of a solid. Generally, this occurs when the temperature of a liquid is lowered below its freezing point.	Remember	CO 1
30	What is the meaning of pattern Allowance?	Allowance in Pattern generally +or- mm given in the original dimensions of the pattern Allowance are given because easy remove of pattern from sand mold	Remember	CO 1
31	What is Binder?	The bonding agent used as an additive to mold or core sand to improve the strength	Remember	CO 1
32	Define the term chill?	A chill is an object used to promote solidification in a specific portion of a metal casting mold. Normally the metal in the mold cools at a certain rate relative to thickness of the casting.	Remember	CO 1
MODULE-II				
1	Define weldability?	The capacity of being welded into in separable joints having specific properties.	Remember	CO 1
2	Define melting point in welding?	It's the temperature possess by the metal to undergo weld to its metal state.	Remember	CO 1
3	Define plastic welding?	The pieces of metal to be joined are heated to plastic state and then forced by external	Remember	CO 1

4	What is non pressure welding?	The material at the joint is heated to molten state and allowed to solidify.	Remember	CO 1
5	Define cold welding?	Joints are obtained without application of heat. But by application of pressure.	Apply	CO 2
6	Define chilled casting?	The surrounding parts are good conductors of heat they by its termed as chilled casting	Apply	CO 2
7	Define slag in weld?	Unwanted material in the molten weld pool is slag	Apply	CO 2
8	Define metal preparation?	Preparing the melts to be joining using external heat before weld	Apply	CO 2
9	Define oxy acetylene weld?	Welding created using oxy acetylene mixture with heat liberation	Apply	CO 2
10	Define neutral flame?	When gases are supplied to the torch in equal volumes, a neutral flame is produced.	Apply	CO 2
11	Define carburizing flame?	When excess of acetylene is supplied in the weld torch the flame emerged is carburizing flame.	Apply	CO 2
12	What is oxidizing flame?	Flame emerges when oxygen supply is heavy than the acetylene for welding.	Apply	CO 2
13	Define leftward welding?	Weld is made working from right to left while blow pipe is hold in right hand and weld rod in left hand	Apply	CO 2
14	Define rightward weld?	Welding carried out from left to right the rod following the blowpipe	Apply	CO 2
15	Define pressure regulator?	Which reduces the cylinder pressure to the required working condition and steady flow	Apply	CO 2
16	Define carbon arc welding?	Negative electrode used as carbon metal and positive being weld material without filler rod	Apply	CO 2
17	Define flux- cored arc welding?	An inside-out wire with the flux inside a tubular electrode with constant voltage dc supply	Apply	CO 2
18	Define submerged arc welding?	It is automatic process where arc is formed between end of continuous depositing surface under a layer of flux	Apply	CO 2
19	What is welding?	Welding is a fabrication or sculptural process that joins materials, usually metals or thermoplastics, by causing fusion, which is distinct from lower temperature metal- joining techniques such as brazing and soldering, which do not melt the base metal.	Apply	CO 2
20	What is an Arc?	The physical gap between the end of the electrode and the base metal. The physical gap causes heat due to resistance of current flow and arc rays.	Apply	CO 2
21	What is arc welding?	It is a type of welding that uses a welding power supply to create an electric arc between a metal stick (electrode) and the base material to melt the metals at the point-of- contact. Arc welding processes may be manual, semi-automatic, or fully automated.	Apply	CO 2
22	What is Gas welding?	Gas welding is a process of construction that involves the use of gases as well as oxygen to weld metals together. Other names for gas welding are oxyacetylene welding and oxy welding. Developed in 1903, gas welding is used to weld pipes and tubes together while also being an effective way to repair metal.	Apply	CO 2
23	What is arc cutting?	In an arc cutting, carbon or graphite electrode is used to melt the metal to achieve a cut on metals.	Apply	CO 2
24	What is filler metal?	The metal (material) to be added in making a welded, brazed, or soldered joint.	Apply	CO 2

25	What is filled weld?	The position in which welding is performed on the upper side of an approximately horizontal plane and the face of the weld lies in an approximately vertical plane.	Apply	CO 2
26	What is flux?	Material used to prevent, dissolve, or facilitate removal of oxides and other undesirable surface substances.	Apply	CO 2
27	What is flowability?	The ability of molten filler metal to flow or spread over a metal surface.	Apply	CO 2
28	What is fusion?	The melting together of filler metal and base metal (substrate), or of base metal only, which results in coalescence.	Apply	CO 2
29	Define Temporary weld?	A weld made to attach a piece or pieces to a weldment for temporary use in handling, shipping, or working on the weldment.	Apply	CO 2
30	Define thermal stresses?	Stresses in metal resulting from non- uniform temperature distribution.	Apply	CO 2
31	What is torch?	A device used in the TIG (GTAW) process to control the position of the electrode, to transfer current to the arc and to direct the flow of the shielding gas.	Apply	CO 2
32	Define welding rod?	A form of filler metal used for welding or brazing which does not conduct the electrical current.	Apply	CO 2
33	Define welding technique?	The details of a welding procedure which are controlled by the welder or welding operator.	Apply	CO 2
34	What is weldment?	An assembly whose component parts are joined by welding.	Apply	CO 2
35	Define wetting?	The bonding or spreading of a liquid filler metal or flux on a solid base metal.	Apply	CO 2
36	Define work angle?	The angle that the electrode makes with the referenced plane or surface of the base metal in a plane perpendicular to the axis of the weld.	Apply	CO 2
37	What is work lead?	The electric conductor between the source of arc welding current and the work.	Apply	CO 2
38	What is welding head?	The part of a welding machine or automatic welding equipment in which a welding gun or torch is in corporated.	Apply	CO 2
39	Define Thermit welding?	It is process for welding metal is based on the chemical reaction between finely divided aluminium and iron oxide.	Apply	CO 2
40	Define explosive weld?	It is carried out by bringing together properly paired metal surface with high relative velocity at a high pressure caused by explosive.	Apply	CO 2
41	Define ultrasonic weld?	Welding caused by high frequency vibratory energy in to overlapping metals into the area to be joined.	Apply	CO 2
42	Define electron beam welding?	Welding caused by the fast moving beam of electrons focused on the work piece.	Apply	CO 2
43	Define laser weld?	Welding carried out using very high intense beam of optical radiation.	Apply	CO 2
44	Define bronze welding?	A low melting alloy is introduced between metals and joint is produced by adhesion.	Understand	CO 3
45	What is soft soldering?	It is employed for joining wires and small parts using blow torch.	Understand	CO 3
46	What is hot soldering?	Its employs solders which melts at higher temperatures and are strong than those in other soldering	Understand	CO 3

47	Define spelte?	Harder filler material used in joint of soldering materials	Understand	CO 3
48	Define H in resistance welding?	H= I^2RT where H is heat, I is current, R is resistance and T is Time	Understand	CO 3
49	Define poor fusion?	The lack of thorough and complete union between the deposited and parent metal.	Understand	CO 3
50	Define depth of weld?	The distance that fusion extends into the base metal or previous pass from the surface melted during welding.	Understand	CO 2
51	Define slag inclusion?	The presences of nonmetallic substances in the metal when fusion takes place	Understand	CO 3
52	Define corner joint?	Joining the edges of two sheets or plates surface arc at an angle of 90^0 to each other	Understand	CO 3
53	Define Heat Zone?	It is the volume of material at or near the weld which properties have been altered due to the weld heat.	Understand	CO 3
54	What is optical radiation?	The radiation generated by the welding arc which is effecting the eyes	Understand	CO 3
55	Define fumes?	Rise of gases with oxides of metals in the environmental	Understand	CO 3
56	Define friction welding?	Welding caused by rubbing action of two metals	Understand	CO 3
57	Define TIG Welding?	Also known as GTAW (gas tungsten arc welding) this welding process welds using the heat of a non-consumable tungsten electrode. Filler metal can be used and argon inert gas or inert gas mixtures are used for shielding.	Apply	CO 2
58	What is MIG Welding?	MIG is an acronym for Metal-Inert- Gas, also known as GMAW or Gas Metal Arc Welding. This arc welding process uses a spooled, continuously fed filler metal (consumable) electrode. Shielding is provided by externally supplied gas or gas mixtures.	Apply	CO 2
59	Define molten weld pool?	The liquid state of a weld prior to solidification as weld metal.	Apply	CO 2
60	Define plasma?	A gas that has been heated to an at least partially ionized condition, enabling it to conduct an electric current.	Apply	CO 2
61	What is porosity?	Cavity type discontinuities formed by gas entrapment during solidification.	Apply	CO 2
62	Define pre-heating?	The application of heat to the base metal immediately before welding, brazing, soldering, thermal spraying, or cutting.	Apply	CO 3
63	Define Shield metalarc welding (SMAW) ?	An arc welding process which produces coalescence of metals by heating them with an arc between a covered metal electrode and the work. Shielding is obtained from decomposition of the electrode covering. Pressure is not used and filler metal is obtained from the electrode.	Apply	CO 3
64	What is shrinkage void?	A cavity-type discontinuity normally formed by shrinkage during solidification.	Apply	CO 2
65	Define spot welding?	A weld made between or upon overlapping members in which coalescence may start and occur on the faying surfaces or may proceed from the surface of one member. The weld cross section (plan view) is approximately circular.	Understand	CO 3

66	Define T-joint?	A joint between two members located approximately at right angles to each other in the form of a T.	Understand	CO 3
67	What is inert gas?	A gas which does not normally combine chemically with the base metal or filler metal. See also protective atmosphere.	Understand	CO 3
68	Define depth of fusion?	The distance that fusion extends into the base metal or previous pass from the surface melted during welding.	Understand	CO 3
69	What is soldering?	It is a process in which two or more items are joined together by melting and putting a filler metal (solder) into the joint, the filler metal having a lower melting point than the adjoining metal. Unlike welding, soldering does not involve melting the work pieces.	Understand	CO 3
70	What is Brazing?	It is the use of a bronze or brass filler rod coated with flux to join steel workpieces. The equipment needed for braze welding is basically identical to the equipment used in brazing.	Understand	CO 3
71	Define defects?	A welding defect is any flaw that compromises the usefulness of a weldment.	Understand	CO 3
72	Define Heat Affected Zone?	The Heat Affected Zone (HAZ) is the volume of material at or near the weld which properties have been altered due to the weld heat. Since the resistance welding process relies on heating two parts, some amount of HAZ is inevitable.	Understand	CO 3
73	what is non-destructive testing of welds?	Welds may be tested using NDT techniques such as industrial radiography or industrial CT scanning using X-rays or gamma rays, ultrasonic testing, liquid penetrant testing, magnetic particle inspection or via eddy current.	Understand	CO 3
74	what is destructive testing of welds?	A number of destructive weld testing methods are used to determine weld integrity or performance. Typically, they involve sectioning and/or breaking the welded component and evaluating various mechanical and / or physical characteristics.	Understand	CO 3
75	Define hot and cold crack?	Hot Crack – It is more prominent during crystallization of weld joints where the temperature can rise more than 10,000-degree Celsius. Cold Crack – This type of crack occurs at the end of the welding process where the temperature is quite low. Sometimes cold crack is visible several hours after welding or even after few days.	Understand	CO 3
76	What is undercut?	When the base of metal melts away from the weld zone, then a groove is formed in the shape of a notch, then this type of defect is known as Undercut. It reduces the fatigue strength of the joint.	Understand	CO 3
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MODULE-III				
1	What is mechanical working?	Plastic deformation performed to change dimensions, properties and surface condition by mechanical means of pressure.	Apply	CO 5
2	Explain metal forming simulation?	In metal forming simulation, the forming of sheet metal is simulated on the computer with the help of special software. Simulation makes it possible to detect errors and problems, such as wrinkles or splits in parts, on the computer at an early stage in forming.	Apply	CO 5
3	Define deformation temperature?	It is a particular temperature point below the melting point of a metal (or material)	Apply	CO 5
4	What id radial Drawing?	Cup drawing test uses a circular blank from the metal to be tested. It is inserted in a die, and the severity of the draw it is able to withstand without tearing called the drawing ratio, is noted. The drawing ratio is the ratio of the cup diameter to the blank diameter.	Apply	CO 5
5	What is Normal Anisotropy Coefficient ?	The anisotropy coefficient is derived from the ratio of the plastic width strain the thickness strain. A material with a high plastic anisotropy also has a greater "thinning resistance." In general, the higher the anisotropy coefficient the better the material deforms in drawing operations.	Apply	CO 4
6	Define shearing?	Shearing is a cutting operation used to remove a blank of required dimensions from a large sheet	Apply	CO 5
7	What is trimming?	When parts are produced by die casting or drop forging, a small amount of extra metal gets spread out at the parting plane. This extra metal, called flash, is cut – off before the part is used, by an operation called trimming. The operation is very similar to blanking and the dies used are also similar to blanking dies.	Apply	CO 5
8	What is notching?	It is an operation in which a specified small amount of metal is cut from a blank. It is different from punching in the sense that in notching cutting line of the slug formed must touch one edge of the blank or strip.	Apply	CO 4
9	What is nibbling?	Nibbling is variation of notching, with overlapping notches being cut into the metal. The operation may be resorted to produce any desired shape, for example flanges, collars, Etc	Apply	CO 5
10	Define Perforating?	Perforating is an operation is which a number of uniformly spaced holes are punched in a sheet of metal. The holes may be of any size or shape. They usually cover the entire sheet of metal.	Apply	CO 5
11	What is bend allowance?	It is the length of the neutral axis in the bend. This determines the blank length needed for a bent part. It can be approximately estimated from the relation $L_b = a (R + kt)$	Apply	CO 5
12	What is minimum bend radius?	As the ratio of the bend radius to the thickness of sheet (R / t) decreases, the tensile strain on the outer fibres of sheet increases. If R / t decrease beyond a certain limit, cracks start appearing on the surface of material. This limit is called Minimum Bend Radius for the material.	Apply	CO 5
13	What is Bending Force?	There are two general types of die bending: V – die bending and wiping die bending. V – die bending is	Apply	CO 5

		used expensively in brake die operations and stamping die operations. The bending force can be estimated from the following simple relation.P = k.Y.L.t2 / D		
14	Define embossing?	Embossing is an operation in which sheet metal is drawn to shallow depths with male and female matching dies.	Apply	CO 5
15	What is single action presses?	A single action press has one reciprocation slide that carries the tool for the metal forming operation. The press has a fixed bed. It is the most widely used press for operations like blanking, coining, embossing, and drawing.	Apply	CO 5
16	What is double action presses?	A double action press has two slides moving in the same direction against a fixed bed. It is more suitable for drawing operations, especially deep drawing, than single action press	Apply	CO 5
17	Define triple action presses?	Triple action press has three moving slides. Two slides (the blank holder and the inner slide)	Apply	CO 5
18	What is dial feed?	Dial feeds consist of rotary indexing tables (or turntables) having fixtures Forholding	Apply	CO 5
19	What is hot working process?	When plastic deformation of metal is carried out at temperature above the recrystallization temperature the process, the process is known as hot working.	Apply	CO 5
20	What is cold working process?	If this deformation is done below the recrystallization temperature the process is known as cold working.	Apply	CO 5
21	Define recrysallisation temperature?	The recrystallisation temperature for steels is typically between 400 and 700°C. The recrystallisation conditions, such as heating rate and soaking time depend on the degree of cold work and the steel composition.	Apply	CO 5
22	Explain strain hardening?	is the strengthening of a metal or polymer by plastic deformation. This strengthening occurs because of dislocation movements and dislocation generation within the crystal structure of the material.	Apply	CO 5
23	What is Recovery?	Recovery is a process by which deformed grains can reduce their stored energy by the removal or rearrangement of defects in their crystal structure	Apply	CO 5
24	Explain metal rolling?	In metalworking, rolling is a metal forming process in which metal stock is passed through one or more pairs of rolls to reduce the thickness and to make the thickness uniform. The concept is similar to the rolling of dough.	Apply	CO 5
25	What is Stamping?	Stamping includes a variety of sheet-metal forming manufacturing processes, such as punching using a machine press or stamping press, blanking, embossing, bending, flanging, and coining	Apply	CO 5
26	Explain Forming processes?	Forming processes are particular manufacturing processes which make use of suitable stresses (like compression, tension, shear or combined stresses) which cause plastic deformation of the materials to produce required shapes.	Apply	CO 5
27	Define blanking?	Punching or blanking is a process in which the punch removes a portion of material from the larger piece or a strip of sheet metal. If the small removed piece is the useful part and the rest is scrap, the operation is called blanking	Apply	CO 5

28	Define piercing?	It is a process by which a hole is cut (or torn) in metal. It is different from punching in that piercing does not generate a slug. Instead, the metal is pushed back to form a jagged flange on the back side of the hole.	Apply	CO5
29	What is bending?	Bending is a manufacturing process that produces a V-shape, U-shape, or channel shape along a straight axis in ductile materials, most commonly sheet metal.	Apply	CO5
30	what is drawing process?	Drawing is a metal working process which uses tensile forces to stretch metal or glass. As the metal is drawn (pulled), it stretches thinner, into a desired shape and thickness.	Apply	CO5
31	What is Wire drawing?	Wire drawing is a metal working process used to reduce the cross- section of a wire by pulling the wire through a single, or series of drawing die(s). Although similar in process, drawing is different from extrusion, because in drawing the wire is pulled, rather than pushed, through the die.	Apply	CO5
32	what is tube drawing process?	Tube drawing is a process to size a tube by shrinking a large diameter tube into a smaller one, by drawing the tube through a die. This process produces high- quality tubing with precise dimensions, good surface finish, and the added strength of cold working.	Apply	CO5
33	what is coining process?	Coining is a closed die forging process, in which pressure is applied on the surface of the forging in order to obtain closer tolerances, smoother surfaces and eliminate draft. Closed die forging is a process in which forging is done by placing the work piece between two shaped dies.	Apply	CO5
34	What is hot spinning?	Hot spinning involves spinning a piece of metal on a lathe while high heat from a torch is applied to the work piece.	Apply	CO5
35	What is cold spinning?	Metal spinning, also known as spin forming or spinning or metal turning most commonly, is a metalworking process by which a disc or tube of metal is rotated at high speed and formed into an axially symmetric part. Spinning can be performed by hand or by a CNC lathe.	Apply	CO5
36	What is Press tools?	Press tools are commonly used in hydraulic, pneumatic, and mechanical presses to produce the sheet metal components in large volumes	Apply	CO5
37	What is deep drawing?	Deep drawing is one of the most widely used processes in sheet metal forming. Apart from its use in many other sectors, it is applied in the automotive industry for the manufacturing of car body parts.	Apply	CO5
MODULE-IV				
1	Define extrusion	Extrusion is a process used to create objects of a fixed cross-sectional profile. A material is pushed through a die of the desired cross-section. ... The extrusion process can be done with the material hot or cold. Commonly extruded materials include metals, polymers, ceramics, concrete, modelling clay, and foodstuffs.	Apply	CO 6

2	Define Hot extrusion	Hot extrusion is one of the most popular method to develop objects having a fixed cross-sectional profile. This extrusion process is done at increased temperature, which keeps the materials from work hardening along with making the procedure of pushing the material through the die simpler.	Apply	CO 6
3	Define cold extrusion	Cold extrusion is also defined as a compressive forming process (push- through), where the starting material is billet/ slug and the process is carried out at the room temperature. During the cold extrusion process, deformation heating of the deforming material takes place at several hundred degrees.	Apply	CO 6
4	Define forging force?	The forging force, F, required to forge material by impression – die forging operation can be determined by the relation, $F = k . s f . A$	Apply	CO 6
5	Define wire drawing?	Wire drawing is primarily the same as bar drawing except that it involves smaller – diameter material that can be coiled. It is generally performed as a continuous operation on draw bench.	Apply	CO 6
6	Define forgeability?	The ability of the metal to deform without rupture.	Apply	CO 6
7	What is box furnace?	These furnaces are constructed of a rectangular steel frame with one or more burners for gas	Apply	CO 6
8	What is induction furnace?	The stocks are passed through induction coils in the furnace.	Apply	CO 6
9	Define forging temperature?	Metal must be heated to a temperature at which it will possess high plastic properties both at the beginning and at the end of the process.	Apply	CO 6
10	Define finishing temperature?	The temperature at which the hammering of a forging is left off.	Apply	CO 6
11	Define upsetting?	It is process of increasing the thickness of bar at the expense of its length and brought by the end pressure.	Apply	CO 6
12	Define setting down?	It is a localized thinning down the effect by the set hammer or set	Apply	CO 6
13	Define fullering?	The axis of the job is positioned perpendicular to the width of the flat die.	Apply	CO 6
15	Define annealing?	It is a for the heat treatment which is applied to remove stresses and improve the mechanical properties.	Apply	CO 6
16	Define normalizing?	Heating in furnace and subsequent cooling of air	Apply	CO 6
17	Define hammer capacity?	The amount of energy needed for particular job ie 4 kgf per cm^2 of cross sectional area to be worked in material.	Apply	CO 6
18	Define productivity?	Productivity =output/input.	Apply	CO 6
19	What is the dead metal zone in extrusion process?	This flow pattern is good for indirect extrusion. The metal at the center of the billet moves faster than the metal at the periphery. In the corner of the leading end of the billet,a separate metal zone is formed between the die face and the container wall, known as a dead-metal zone.	Apply	CO 6
20	Define backward extrusion?	Indirect extrusion (backward extrusion) is a process in which punch moves opposite to that of the billet. Here	Apply	CO 6

		there is no relative motion between container and billet.		
21	Define direct extrusion?	Direct extrusion can be employed for extruding solid circular or non- circular sections, hollow sections such as tubes or cups.	Apply	CO 6
22	What is Impact extrusion?	Hollow sections such as cups, toothpaste containers are made by impact extrusion. It is a variation of indirect extrusion. The punch is made to strike the slug at high speed by impact load. Tubes of small wall thickness can be produced. Usually metals like copper, aluminum, lead are impact extruded.	Apply	CO 6
23	What is aluminum extrusion used for?	Aluminum extrusion is a technique used to transform aluminum alloy into objects with a definitive cross-sectional profile for a wide range of uses. The extrusion process makes the most of aluminum's unique combination of physical characteristics.	Apply	CO 7
24	Define tube extrusion?	Employing hollow billet and a mandrel at the end of the ram, hollow sections such as tubes can be extruded to closer tolerences. The mandrel extends upto the entrance of the die.	Apply	CO 7
25	Define hydrostatic extrusion?	In hydrostatic extrusion the container is filled with a fluid. Extrusion pressure is transmitted through the fluid to the billet. Friction is eliminated in this process because of there is no contact between billet and container wall. Brittle materials can be extruded by this process.	Apply	CO 7
26	define rapid prototyping	Rapid prototyping is a group of techniques used to quickly fabricate a scale model of a physical part or assembly using three-dimensional computer aided design data. Construction of the part or assembly is usually done using 3D printing or "additive layer manufacturing"	Apply	CO 7
27	Why do we use rapid prototyping?	3D Rapid prototyping advancements allow for faster and lower cost prototypes and model fabrication by eliminating manpower and expensive tooling which allow companies and inventors to bring there products and designs to market faster than the competition.	Apply	CO 7
28	Define rapid tooling	Rapid Tooling is the result of the unison of Rapid Prototyping techniques with conventional tooling practices in order to produce a mold quickly. This process, as well, is used to prepare parts of a functional model from CAD data in less time and at a lower cost.	Apply	CO 7
29	What is mandrel in extrusion?	Extrusion is a compressive deformation process in which a block of metal is squeezed through an orifice or die opening in order to obtain a reduction in diameter and increase in length of the metal block. The resultant product will have the desired cross-section. Extrusion involves forming of axisymmetric parts.	Apply	CO 7
MODULE-V				
1	Explain forging?	Forging isa manufacturing process involving the shaping of metal using localized compressive forces.	Understand	CO 8

2	Define power forging?	Machines which help in blowing with pressure.	Understand	CO 8
3	Define precession forging?	The metal is deformed in cavity so that no flash is formed and the final dimensions are very close to the desired component dimension.	Understand	CO 8
4	Define die drop forging?	The process uses shaped dies to control the flow of metal. The heated metal is positioned in the lower cavity and on it one or more blows are struck by the upper die. This hammering makes the metal to flow and fill the die cavity completely. Excess metal is squeezed out around the periphery of the cavity to form flash.	Understand	CO 8
5	What is cold shut defect?	A cold shut is a fault in the surface of a piece of metal caused by two streams of molten metal not joining properly when the piece is being cast. Check for defects such as cracks and cold shuts in the castings.	Understand	CO 8
6	What is die hummer forging?	It is the simplest forging process which is quite flexible but not suitable for large scale production. It is a slow process. The resulting size and shape of the forging are dependent on the skill of the operator.	Understand	CO 8
7	Define smith forging?	Open-die forging is also known as smith forging. In open-die forging, a hammer strikes and deforms the workpiece, which is placed on a stationary anvil.	Understand	CO 8
8	Define Roll forging?	Roll forging is a forging technique used to reduce the thickness of a metal bar, while simultaneously increasing its length. A good candidate for roll forging is cylindrical piece of metal. The roll forging process begins with the heating of the metal to be shaped.	Apply	CO 9
9	What is Rotary forging?	Rotary forging is a specific cold forging technology which uses incremental steps locally with the material to accurate, precision results.	Apply	CO 9
10	What is Cold forging?	Cold forging is a manufacturing process where a bar stock is inserted into a die and squeezed with a second closed die. The deformation starts at room temperature and changes the shape and size of the initial part until it has assumed the shape of the die.	Apply	CO 9
11	What is Swaging?	Swaging is a forging process in which the dimensions of an item are altered using dies into which the item is forced. Swaging is usually a cold working process, but also may be hot worked.	Apply	CO 9
12	What is Cold forging?	Various forging processes conducted at or near ambient temperatures to produce metal components to close tolerances and net shape. These include bending, cold drawing, cold heading, coining, extrusion (forward or backward), punching, thread rolling and others.	Apply	CO 9
13	Define Cross forging?	Preliminary working of forging stock in alternate planes, usually on flat dies, to develop mechanical properties, particularly in the center portions of heavy sections.	Apply	CO 9
14	What is Die set?	The assembly of the upper and lower die shoes (punch and die holders), usually including the guide pins, guide pin bushings, and heel blocks.	Understand	CO 8
15	What is Hammer forging?	The mechanical forming of metal by means of a hammer. The action of the hammer is that of an	Understand	CO 8

		instantaneous application of pressure in the form of a sudden blow.		
16	Define Impression?	A cavity, or series of cavities (multiple), machined into a forging die to produce a desired configuration in the workpiece during forging.	Understand	CO 8
17	What is Mandrel?	A blunt-ended tool or rod used to retain or enlarge the cavity in a hollow metal product during forging.	Understand	CO 8
18	Define precision type forging	In precision type forging operation, the volume of the metal stock and the dies are controlled very tightly. Such operations are called as precision forging which is a modern technique of forging. Metal parts of better strength, high quality details, and complex shape can be easily produced by the forging operation.	Apply	CO 9
19	What is reduction ratio in forging?	Forging reduction is generally considered to be the amount of cross- sectional reduction taking place during drawing out of a bar or billet. The original cross-section divided by the final cross-section is the forging ratio (say 3:1)	Apply	CO 9
20	What is stock in forging?	Forging reduction: ratio of the cross- sectional area before and after forging; sometimes refers to percentage reduction in thickness. Forging stock: wrought rod, bar, etc. used as the raw material or stock in forging	Understand	CO 8
21	What is blocking in forging?	A forging operation often used to impart an intermediate shape in the finishing impression of the dies. Blocking can ensure proper "working" of the material and contribute to great die life. BLOW. The impact or force delivered by one workstroke of the forging equipment.	Understand	CO 8
22	What is closed die forging?	Closed Die Forging is a forging process in which dies move towards each other and covers the workpiece in whole or in part. The heated raw material, which is approximately the shape or size of the final forged part, is placed in the bottom die	Understand	CO 8
23	What is no draft forging?	No-draft forging. A forged shape with extremely close tolerances and little or no draft .....As applied to open die forging, draft is the amount of relative movement of the dies toward each other through the metal in one application of power.....More,requiring a minimum of machining to produce the final part.	Apply	CO 9

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