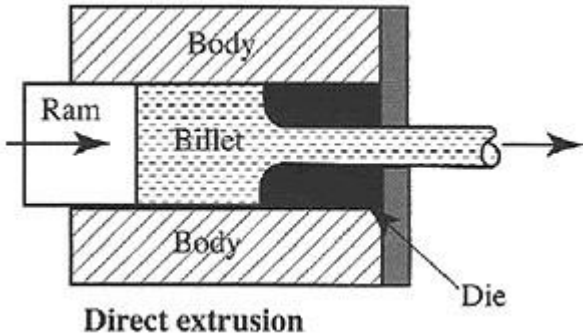
WINTER– 18 EXAMINATION

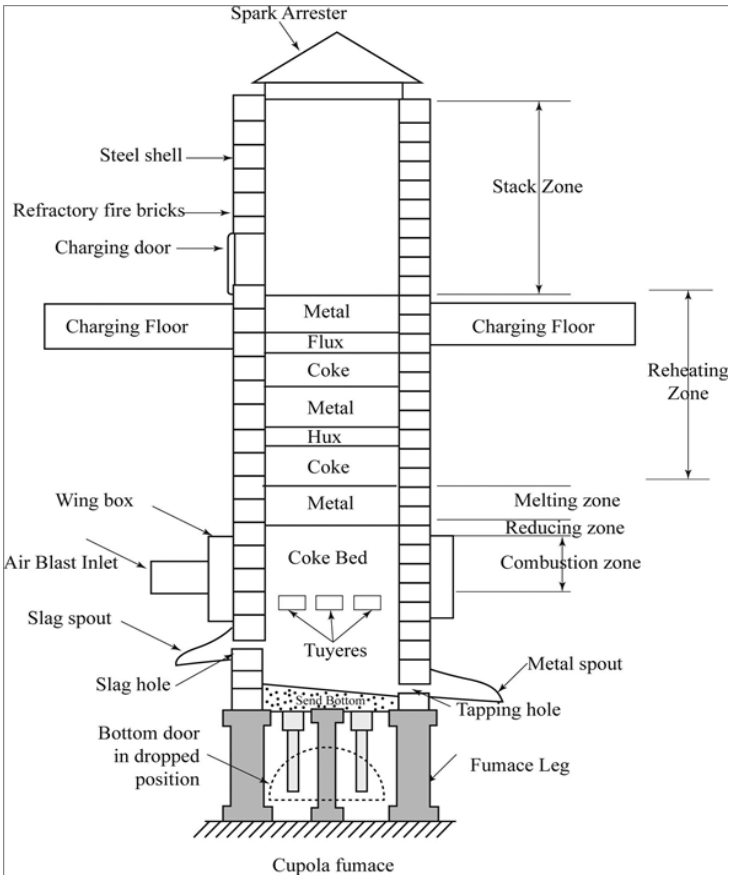
Subject Name: **Model Answer** Subject Code: 17402

Important Instructions to examiners:

1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills.
4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q. No.	Sub Q. N.	Answer	Marking Scheme
1		**Attempt any FIVE of the following**	
	a Ans	**Enlist any Eight applications of rolling** **Applications of rolling** 1. Pipes 2. Tanks. 3. Railway cars. 4. Bicycle frames. 5. Ships. 6. Engineering and military equipments. 7. Automobile and truck wheel frames and body parts. 8. Bars. 9. Structural sections. 10. Channels production.	**(any 8 points ½ mark each)**
	b Ans	**Explain direct extrusion with neat sketch** **Direct Extrusion:** • This is a hot worked process. • This is where the ram pushes the metal into the other side through a nozzle. • This usually requires more force and is used with more ductile materials. • With application of ram pressure, the metal first plastically fills the cylinder shape, and it is then forced out through the die opening until a small amount	**2 marks for explanation** **&** **2 marks for sketch)**

		remains in the container. It is then sawed off next to the die and the butt end removed.  **Direct extrusion**	
	C Ans	**Enlist any four merits and demerits of cold rolling** **Merits of Cold Rolling:** [1] No heating is required. [2] Strength, fatigue and wear properties are improved through strain hardening. [3] Superior dimensional control is achieved, so little, if any, secondary machining is required [4] Better surface finish is obtained [5] Products possess better reproducibility and interchangeability [6] Directional properties can be imparted [7] Contamination problems are minimized. **Demerits of Cold Rolling:** [1] Higher forces are required to initiate and complete the deformation. [2] Less ductility is available. [3] Intermediate anneals may be required to compensate for the loss of ductility that accompanies strain hardening [4] Heavier and more powerful equipment is required. [5] Metal surfaces must be clean and scale-free. [6] Imparted directional properties may be detrimental. [7] Undesirable residual stresses may be produced.	**½ Mark each for any four correct merits** **&** **½ Mark each for any four correct demerits**
	D Ans	**Explain the term tool signature related to the lathe machine** **Tool Signature related to lathe machine:** The shape of a tool used in lathe machine is specified in a special sequence and this special sequence is called tool signature. The tool signature as given below: (i) Back rake angle. (ii) Side rake angle. (iii) Clearance or End Relief angle. (iv) Side Relief angle. (v) End cutting edge angle. (vi) Side cutting edge angle.	**02 marks for definition,** **&** **02 marks for explanation.**

		(vii) Nose radius. A typical tool signature of single point cutting tool is 0-7-6-8-15-16-0.8. Here this tool signature indicates that the tool has 0, 7, 6, 8, 15, 16 degree back rake, side rake, end relief, side relief, end cutting edge, side cutting edge angle and 0.8 mm nose radius.	
	E Ans	Draw a neat sketch of cupola furnac eand label all parts on it  	**(Neat sketch for 2 marks with appropriate labeling 2 marks)**
	F Ans	**Enlist any eight types of patterns** **The various types of patterns are commonly used are** i) Solid or Single piece pattern. ii) Split pattern iii) Gated pattern iv) Match Plate pattern. v) Cope and drag pattern vi) Loose piece pattern vii) Sweep pattern viii) Skeleton Pattern ix) Segmental Pattern. x) Shell Pattern xi) Follow board Pattern xii) Legged up Pattern xiii) Master Pattern	**½ Mark each for any eight correct types**

	G Ans	**Explain any two and properties of plastics with an example** **Plastics can be divided into two major categories:** **[1] Thermoset or thermosetting plastics.** Once cooled and hardened, these plastics retain their shapes and cannot return to their original form. They are hard and durable. Thermosets can be used for auto parts, aircraft parts and tires. Examples include polyurethanes, polyesters, epoxy resins and phenolic resins. [2] **Thermoplastics.** Less rigid than thermosets, thermoplastics can soften upon heating and return to their original form. They are easily molded and extruded into films, fibers and packaging. Examples include polyethylene (PE), polypropylene (PP) and polyvinyl chloride (PVC). **OR** Properties of plastics: 1. Easy to work and shape, 2. Have a low production cost 3. Possess low density, 4. Tend to be waterproof, 5. Good electrical insulators, 6. Acceptable acoustic insulation, 7. Good thermal insulation, but most cannot withstand very high temperatures, 8. Resistant to corrosion and many chemical factors; **(** as the question is not clear any answer from above is acceptable and given appropriate marks)**	**1 Mark for correct description and 1 Mark for example** **1 Mark for correct description and 1 Mark for example** **01 mark each for any four properties**
2		**Attempt any FOUR of the Following**	
	a Ans	Differentiate between open and closed die forging | Sr. No.	Open die forging	Close die forging
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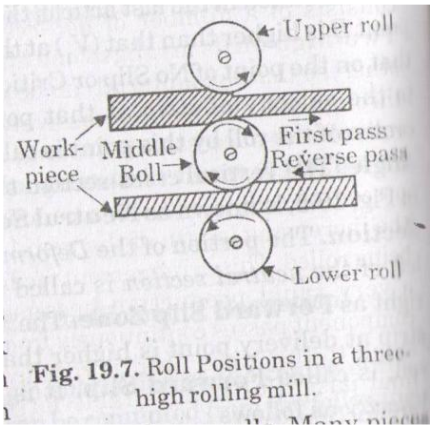
1)	It is the simplest forging process.	It is the complex forging process.
2)	This process requires simple and inexpensive dies.	This process requires complex and expensive dies.
3)	It is useful only for small scale production.	It is useful for small scale as well as large scale production.
4)	It is very difficult to hold close tolerances.	It is very easy to maintain close tolerances.
5)	Relatively poor utilization of materials.	Relatively good utilization of materials.
6)	This process requires highly skilled operator.	This process does not require highly skilled operator.		**(any 4 points 1 mark each)**

	B Ans	**Explain three high rolling mill with neat sketch** **Three Roll High Mill** -It consist of three horizontal rolls, positioned directly one over the other. The direction of rotation of the upper and lower rolls are the same , but the intermediate roll rotates in a direction apposite to both of these .All the three rolls continuously revolve in the same fixed directions and are never reversed. The work piece is fed in one direction between the upper and middle rolls and in the reverse direction between the middle and lower rolls. Many pieces may be passed through the rolls simultaneously. This results in a higher rat of production than the Two High Mill. This mill may be used for blooming, billet rolling or finished rolling  **Fig. 19.7.** Roll Positions in a three-high rolling mill.	**(2 marks for explanation and 2 marks for sketch)**
	C Ans	**Enlist any four merits and applications of indirect extrusion** **Merits** 1. 25 to 30% reduction of friction, allowing extrusion of larger billets, 2. An increased ability to extrude smaller cross-sections 3. Less tendency for extrusions to crack as no heat formation takes place from friction 4. Container liner lasts longer, due to less wear 5. More uniform use of billet ensures that extrusion defects & coarse grained peripherals zones are less. 6. Lesser time is required **Applications** i) Tubes, ii) pipes, rods, iii) aircraft parts iv) Chanel section, I-section, Z-section v) To produce variety of cross sectional shapes such as circular, square, hexagonal, rectangular	**½ Mark each for any 4 correct merits** **And** **½ Mark each for any 4 correct applications**
	D Ans	**Define (i) Piercing (ii) Lancing** **Piercing:** Piercing is the operation of production of hole in a sheet metal by the punch and the die. The material punched out to form the hole constitutes the waste. The punch point diameter in the case of piercing in less than or equal to the work material thickness. The punch governs the size of the hole and the clearance provided on the die.	**(2 marks for each definition)**

The spacing of hole on the plate is actuated by the stop. The stripper plate attached to the die body prevents the sheet metal from being lifted along with the punch after shearing operation.

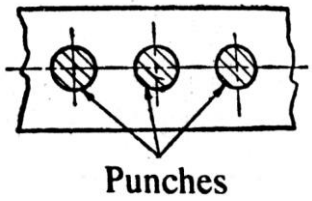


Figure: Piercing operation

Lancing: Lancing is the operation of cutting a sheet metal through part of its length and then bending the cut portion.
The operation is illustrated in the figure.

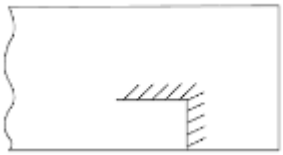


Figure: Lancing operation

E Ans

Differentiate between bending and drawing

Sr. No	Bending	Drawing
1	Bending is metal working process by which a straight length is transformed into a curved length.	Drawing is the process of forming a flat sheet(blank) in hallow shapes (cups, shells etc) by means of punch and die.
2	Load applied is tensile load.	Load applied is compressive load.
3	Applied load is essential to maintain	Applied load is not essential to maintain.
4	In bending, the outer fibers stretch more than the inner fibers getting shrunk.	In materials the compressive strength is higher than tensile strength.
5	Spring back in bending is to be compensate as bend geometry get affected by the spring back directly.	For drawing deeper cups it is necessary to consider excess wrinkling of the edges.
6.	corrugations, flanges are some of the products of bending.	Utensils, pressure vessels, gas cylinders, cans, shell; kitchen sinks etc. are some of the products of deep drawing.

(1 mark each for any 4 points)

f Ans

Give detailed classification of press machines

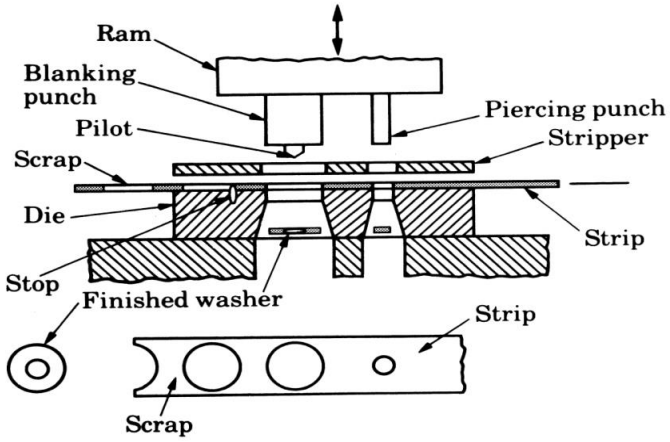
A) According to source of power:

a) Mechanical press
b) Hydraulic press

B) According to number of slides:

a) Single action press

(1 marks for each detailed 4 classification)

		b) Double action press c) Triple action press **C) According to type of frame:** a) Open frame press b) Closed frame press c) Inclinable d) Adjustable e) Pillar **D) According to operation**: a) Punching b) Blanking c) Drawing d) Bending	
3		**Attempt any TWO of the following**	
	a Ans	Draw a neat sketch of progressive die. Explain its working principle with its applications  **Figure: Progressive Die** In progressive die, two or more operations are performed simultaneously at a single stroke of the press by mounting separate sets of dies and punches at two or more different stations. The metal is progressed from one station to the other till the complete part is obtained. The sheet metal is fed in to the first die where a hole is pierced by the piercing die set in the first cutting stroke of the ram. Plate is then advanced in the next station and the correct spacing is obtained by the stop. In the second cutting stroke of the ram, pilot enters in to the pierced hole and correctly locates it. While the blanking punch descends and shears the plate to form a washer. By the time the blanking operation is performed, the hole for the next washer is also pieced at the first station. Thus although two strokes are required to complete a washer, each piece of washer is discharged on every strokes of the ram due to the continuity on operation. **Applications:** washers making, automobile body parts, perforated sheets	**03 marks for sketch,** **03 marks for explanation,** **02 marks for applications (any two 1 mark each)**
	b Ans	**Explain color coding used during pattern design** **Color codes used in pattern making:-** **Patterns are coated with different coolers and shades in order to :-** [1] Identify the core prints, loose pieces etc. [2] Identify quickly the main body of the pattern and different parts of the pattern to	**02 marks for explanation,**

		form the main body of a casting. [3] Identify the surfaces to be machined or not to be machined. [4] Indicate the type of metal to be cast. 1) Red:- Surfaces to be machined 2) Black:- Surfaces to be left un-machined. 3) Yellow:- Core Prints 4) Red strips on yellow base:- Seats for loose pieces 5) Black strips on yellow base:- Stop offs 6) Clear or No color:- Parting surface	**1 mark each for color codes**
	c Ans	**Enlist any four defects occurred after casting. State its causes and remedies** **Casting Defects, causes and remedies:-** **[1] Blow holes:** It is smooth sound cavities produced in a casting due to entrapped bubbles of gases, steam. **Causes:-** i) Excessive moisture in the sand. ii) low permeability of sand iii) Sand grains are too fine iv) Sand is rammed too hard v) Venting is insufficient ***Remedies:-*** i) Moisture content of the sand must be well. ii) Sand of proper grain size should be used. iii) Ramming should not be too hard. iv) Vent holes should be provided. **[2] Mis-run and cold shut:-** When molten metal fails to fill the entire cavity of the mould, incomplete casting is obtained. This defeat is called mis-run and imperfect fusion of two stream of molten metal in the mould cavity results in a discontinuity called cold-shut. **Causes:-** i) Too thin sections and wall thickness. ii) Improper gating systems. iii) Damaged pattern. iv) Slow and intermediate pouring. v) Pour fluidity of metal. vi) Improper ally composition. ***Remedies:-*** i) Use hotter metals ii) Frequent inspection and replacement of pattern. iii) Proper design of gating and raiser iv) Use of chills and padding. **[3] Drop: -** This is an irregular deformation of the casting produced when a portion of the sand drops into the molten metal. **Causes:-** i) It is caused due to low strength ii) soft ramming iii) Insufficient reinforcement of hanging section ***Remedies:*** i) These can be controlled by adopting proper moulding, gating and	**½ Mark each for any 4 correct defects** **&** **1 Mark each for any 3 correct causes** **1 Mark each for any 3 correct remedies**

melting techniques.

[4] Dirt: - Presence of particles of dirt and sand in the casting.

Causes:-

i) improper handling of mould
ii) Presence of sand slag particles in molten metal

Remedies:-

i) Proper handling of mould
ii) Adopting proper moulding, gating and melting techniques.
iii) Proper design of gating and raiser
iv) Use of chills and padding

[5] Shifts: - It is a misalignment of top and bottom parts of mould at parting line. This results in mismatch of the casting, incorrect dimension, incorrect location of holes.

Causes:-

i) misalignment of pattern parts, due to worn or damaged patterns
ii) misalignment of moulding box or flask equipment

Remedies:-

i) ensuring proper alignment of the pattern, moulding boxes
ii) correct mounting of pattern on pattern plates etc

[6] Fins and flash: - It is a thin metal projection on casting.

Causes:-

i) incorrect assembly of moulds and cores
ii) Improper clamping of the mould
iii) excessive rapping of the pattern
iv) insufficient weight on the top part of the mould

Remedies:-

i)These can be controlled by adopting proper moulding, gating and melting techniques.
ii) insufficient weight should be placed on the top part of the mould

[7] Swell: - It is un-intentional enlargement found on the casting surface due to liquid metal pressure.

Causes:-

i) improper ramming
ii) low strength of mould
iii) Pouring the metal too rapidly

Remedies:-

i) Proper ramming of sand
ii) uniform flow of molten metal into the mould

[8] Run-out: - This defect occurs when molten metal leaks out to the mould during pouring. It results in incomplete casting.

Causes:-

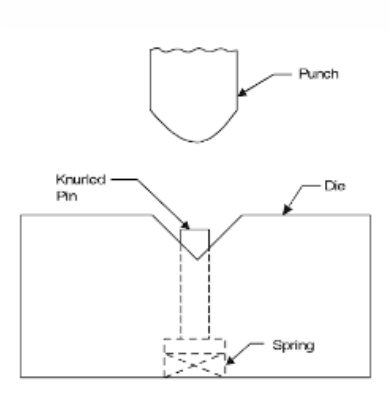
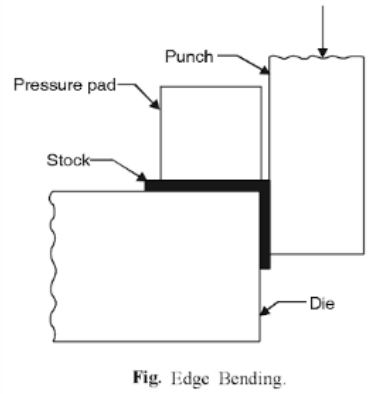
i) defective moulding boxes
ii) inadequate mould weights
iii) excessive pouring pressure

Remedies:-

i) The corrective measures taken in respect of the above reasons will prevent this defect.

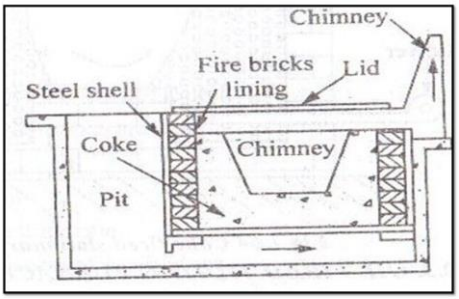
[9] Warpage: - This is unintentional and undesirable deformation of casting produced

		during solidification of metal. **Causes:-** i) inadequate and improper gating, runners and risers ii) continuous large flat surface on casting, indicate a poor design ***Remedies:-*** i) This defect can be eliminated by modifying the casting design and proper directional solidification. **[10] Hot tears (Hot Cracks):-** These are internal or external cracks resulting immediately after the solidification of metal. **Causes:-** i) abrupt changes in section ii) poor design iii) incorrect pouring temperature ***Remedies:-*** i) abrupt change in section should be avoided ii) Pouring temperature should be correct iii) there should be even rate of cooling **[11] Core shift** **[12] Sand wash** **[13] Shrinkage** **[14] Core blow** **[15] Scabs** **[16] Pour short** **[17] Metal penetration** **[18] Rough surface finish** **[19] Crush**	
4		**Attempt any Four of the following**	
	a Ans	**Explain U Bending and edge bending with neat sketches** **U Bending:-** If a U shaped die and punch are used, the bending is called U-bending. In U-bending, a U-shaped punch forces the metal sheet or a flat strip into a wedge-shaped die. The bent angle may acute 90^o or obtuse. **Edge Bending:-**in edge bending or cantilever bending a flat punch forces the stock against the vertical face of the die. The bend axis is parallel to the edge of the die and the stock is subjected to cantilever loading. To prevent the movement of the stock during bending, it is held down by a pressure pad before punch contacts it. The die is called wiping die	**1 mark each for explanation** **&** **1 Mark each for sketch**

		 Figure:- U Bending  Fig. Edge Bending. Figure:- Edge Bending	
	b Ans	**Explain any two properties of molding sand** **Properties of moulding sand:-** **[1] Refractoriness:-**It is the property of sand which enables it to withstand high temperatures of molten metal without fusing. Refractoriness is measured by the sinter point of the sand rather than its melting point. **[2] Permeability:-** It is also known as Porosity ,which allows gases & steam to escape through the sand mould. If the gases and water vapors evolved by the moulding sand they will form gas holes and pores in the casting. **[3] Flowability :-** It is also known as plasticity due to which sand flows during ramming to all portions of mould. Flowability increases as clay and water content increases. High flowability is required to get compacted to a uniform density and to obtain good impression of the pattern in the mould **[4] Adhesiveness:-** It is the property due to which sand particles adheres to the surfaces of other materials. i.e sand partcles should cling to the sides of the moulding boxes. **[5] Cohesiveness:-** It is the property of sand due to which rammed sand particles bind together firmly so that the pattern is withdrawn from mould without damaging the mould surfaces. **[6] Collapsibility:-** It is the property of sand due to which it automatically collapses after solidification of the casting to allow a free contraction of metal. This avoids the tearing or cracking of the contracting metal	**02 marks each**
	c Ans	**Explain pit molding with neat sketch** **Pit moulding: -** moulds of large jobs are generally prepared in a pit dug in the foundry floor which facilitates in lifting the pattern and casting the mould easily. Since a pit	**02 for sketch,**

which functions as a drag cannot rolled over, the sand under the pattern may be rammed by bedded-in. the pattern may be suspended in correct location as the sand is rammed under it.
A bed of coke is laid on the bottom of the pit, covered with straw and then a layer of sand, which is rammed and leveled. The coke bed is connected with atmosphere by vertical vent pipes in the corner of the pit to provide an outlet for the gases generated. If the floor is lightly damp, the inside surface of the pit are lined with tar-paper, bricks, or wooden planks.

CRUCIBLE - PIT FURNACE



&

02 marks for explanation

d Ans

Differentiate between MIG and TIG Welding

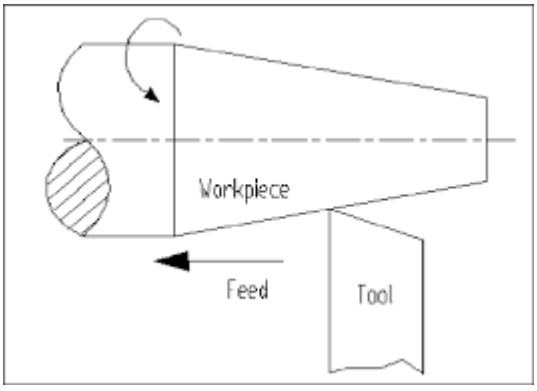
MIG	**TIG**
1. This process utilizes a consumable electrode.	TIG is an inert gas shielded arc welding process using non-consumable electrode.
2. In this process the filler metal is transferred from the electrode to the joint.	No fluxes are used in TIG welding.
3.The consumable Electrode is continuously feed at a constant rate through the feed roller	It does not require electrode feed.
4. Normally DC arc machines are used.	Both AC and DC power supply can be used.
5. MIG is comparatively faster process.	TIG is comparatively slower process.
6.It can be used for deep groove of plates and castings but This process is more suitable for thin sheets	Commonly used for welding of aluminium, magnesium and stainless steel material

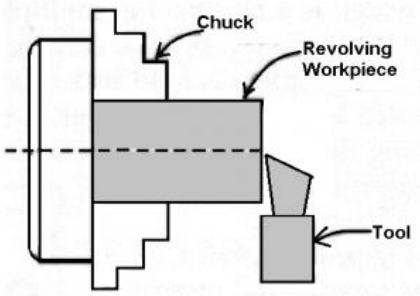
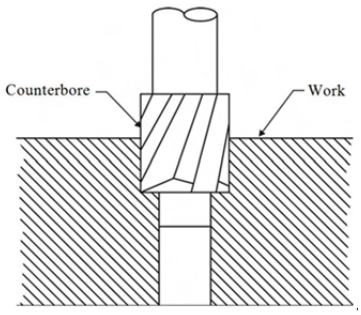
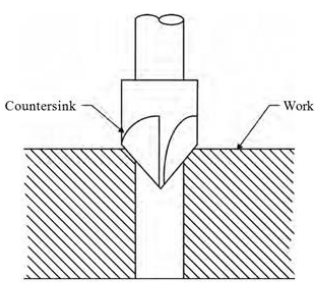
1 Mark each for any 4 correct points

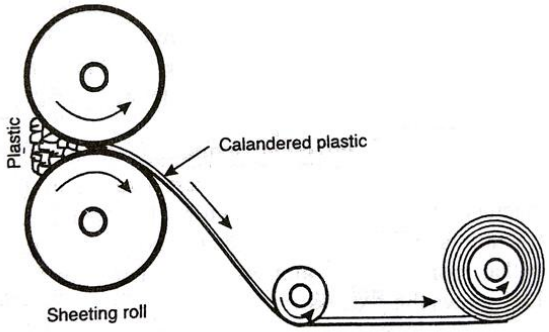
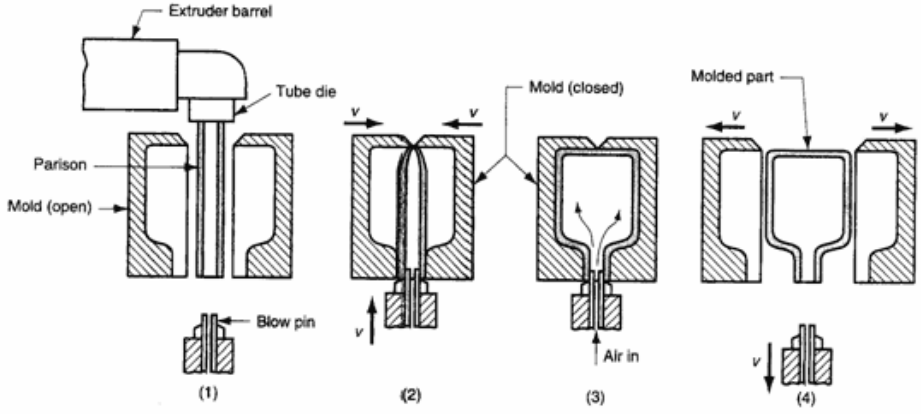
e Ans

Enlist any four applications of soldering and brazing
Applications of soldering and brazing:-
Soldering is widely used for
[1] sheet metal work
[2] radio and television work (joining wires)
[3] jewelry metalwork,

½ mark each for any 4 correct applications of soldering

		[4] in refrigeration **Brazing is used for** [1] electrical items, [2] radiators, [3] heat exchangers, [4] pipes & pipe fittings [5] tool tips.	**and** **½ mark each for any 4 correct applications of Brazing**
	f Ans	**Explain with neat sketch following lathe operations (i) Taper Turning (ii) Facing** **Taper Turning:-** A taper is defined as a uniform increase or decrease in diameter of a piece of work measured along its length. In a lathe machine, taper turning means to produce a conical surface by gradual reduction in diameter from a cylindrical job. A taper is generally turned in a lathe by feeding the tool at an angle to the axis of rotation of the workpiece. The angle formed by the path of the tool with the axis of the workpiece should correspond to the half taper angle. A taper can be turned by anyone of the following methods: **Methods of taper turning** - By a broad nose form tool - By setting over the tailstock Centre - By swiveling the compound rest - By taper turning attachment - By combining longitudinal and cross feed in lathe  **Figure :- Taper Turning** **Facing:-** In this operation, the work piece is held in the chuck and is rotated as before. The facing tool is fed from the centre of the work piece towards the outer surface or from the outer surface to the centre, with the help of a cross-slide. The carriage remains fixed in one position. The result is production of a flat circular section at one end of the cylinder.	**01 mark each for explanation and** **1 Mark each for sketch**

		 Facing Operation	
5		**Attempt any TWO of the following**	
	a Ans	**Define the following terms (i) cutting speed of lathe machine (ii) Fed of lathe machine (iii) Rake angle of single point cutting tool (iv) Helix angle of drill bit** **(i) Cutting Speed of lathe machine :-** In Lathe, cutting speed is defined as the speed at which the metal is removed by a tool from the work piece. It is the circumferential speed of the work against the cutting tool. It is expressed in meters per minutes. **(ii) Feed of lathe machine :-** In lathe, it is the advancement of tool per revolution of job parallel to the surface being machined. It is given in mm/rev of the job. **(iii) Rake angle of single point cutting tool** It is the angle between the face of the tool and a line parallel to the base of the tool . **(iv) Helix Angle of drill bit** it is the angle between the leading edge of the land and the drill axis.	**02 mark each**
	b ans	**Explain following operations with neat sketches in drilling machine (i) Counter boring (ii) Counter Sinking** **i)Counterboring :-** Counterboring is the operation of enlarging the end of a hole with a hole cylindrically. Counterbores provide a shoulder to accommodate the heads of bolts, studs, and pins. The tool used for counterboring is called a counterbore. the cutting edges may have straight or spiral teeth. The cutting speed for countersinking is 25% less than that of drilling operation. **ii)Countersinking:-** Countersinking is the operation of producing a taper or cone shape surface at the entrance of a hole for the purpose of having the head of a flat head screw, aviation rivet or other similar fastener sit flush or below a surface. This cone shape is machined with tool called countersink. Countersinks are available as a single flute or multi flute. A variety of sizes and included angles of: 60°, 82°, 90°, 100°,110°, and 120° are available. The cutting speed for countersinking is 25% less than that of drilling operation.  Fig Counterboring Operation  Fig Countersinking Operation	**04 marks for each (02 marks for sketch, 02 marks explanation)**

	c Ans	**Explain following molding processes with neat sketch (i) Calendering (ii) Blow molding** **i) Calendaring Process:-** Calendaring is a process in which heat and pressure are applied to a fabric by passing it between heated rollers, imparting a flat, glossy, smooth surface. During calendaring process rolls of the materials are passed between several pairs of heated rollers, to give shiny surface. Luster (i.e. finishing) increases when the degree of heat and pressure is increased. Calendaring is applied to fabrics in which a smooth, flat surface is desirable, such as most cotton. Many linens and silks and various man made fabrics. Calendaring is also used for polymer materials. Extruded PVC Sheets are produced by this method.  **Fig Forming sheet by calendering** **ii) Blow moulding :-** In this process, a hot extruded tube of plastic, called a parison, is placed between two part open mould. The two halves of the mould move towards each other so that mould closes over the tube. The tube gets pinch off and welded the bottom by the closing moulds. The tube is then expanded by internal pressure, usually by hot air, which forces the tube against the walls of the mould. The component is cooled and the mould opens to release the component.  	**04 marks for each** **(02 marks for sketch,** **02 marks explanation)**
6	a Ans	**Enlist any four types of welding defects. State its causes and remedies** **[1] Porosity** **[2] Spatter** **[3] Undercut** **[4] Lack of penetration**	**½ mark each any four** **&**

		[5] Cracks **[6] Overlap** **[7] Lack of fusion** **[8] Inclusion** **[1] Porosity:-** The cause of these defects base metal composition variations, hydrogen embrittlement, shrinkage. Remedies:- Preheat , Maintain proper arc length ,Use low hydrogen electrode, Use recommended procedure for baking & storing electrodes , Clean joint surfaces & adjacent surfaces **[2] Spatter:-** Causes:- – Excessive arc current, Excessive long arc, Improper shielding gas, Electrodes coated with improper flux ingredients, Damp electrodes. Remedies:- Correct welding current for type & size electrode used, Correct proper arc length & use correct arc voltage, Spatter cure SC-07(Non-toxic, non- pollutant, water based inorganic anti–spatter flux), can easily be removed either by hair brush or by washing. **[3] Undercut:-** The reasons are non-uniform feed of the filler rod, improper position of the electrode or torch. Remedies:- Use prescribed welding current for electrode size, Adjust electrode angle to fill undercut area, Correct travel speed, arc length, etc. **[4] Lack of penetration:-** Cause: - Root gap too small, high welding speed , Low heat input , Too large electrode dia. Remedies:- Proper joint preparation, Proper heat input & welding speed, Use suitable size of electrode. **[5] Inclusion:-** **Causes:-** Inadequate cleaning of weld metal between passes, Rapid rate of welding, Too large electrode , improper current, Long arcs. **Remedies:-** Maintain proper current & heat input, Proper cleaning of weld. **[6] Cracks** **[7] Overlap** **[8] Lack of fusion**	**3 Marks each for causes and remedies**
	b Ans	**Explain spot welding with neat sketch** **Spot Welding** Spot welding is used to lap weld joints in thin metallic plates (up to 12.7 mm thick) for mechanical strength and not for tightness. The metallic plates are overlapped and held between two copper electrodes. A high current, depending upon plate thickness, at a very low volt-age (4-12 volts), is passed between the electrodes. The contact resistance of the plates causes to heat rapidly to a plastic state. Mechanical pressure is applied. Supply is cut-off for the metal to regain strength. The pressure is released. The process is repeated at another portion of the plates. Thus, spot joints at regular interval depending upon the strength required are obtained. The Electrodes are water cooled to avoid overheating and softening of the tips.	**02 mark for sketch, 02 marks for explanation**

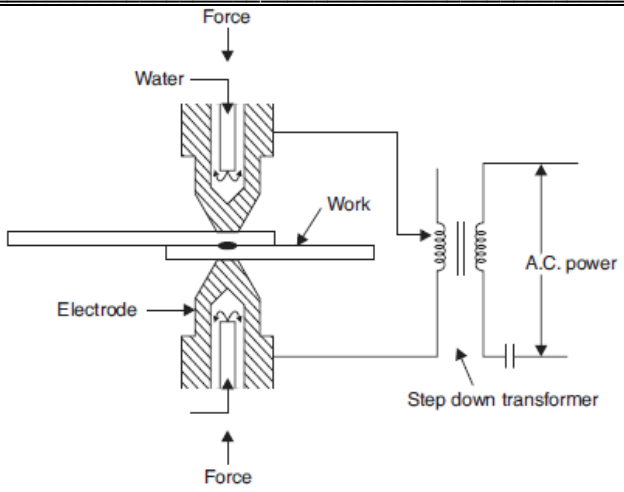


Fig. Spot welding process

c

Ans

Differentiate between gas welding and resistance welding

Gas Welding	Resistance Welding
1. It is method of fusion welding in which a flame produced by a combination of gases is employed to heat and melt the metal and filler rod of a joint.	Resistance welding processes are pressure welding processes in which heavy current is passed for short time through the area of interface of metals to be joined
2. Fluxes are used.	no fluxes are used
3. Comparatively cost is low.	Initial Equipment cost is high.
4. No force or pressure is to be applied during or after the process.	Force is normally applied before, during and after the flow of current to avoid arcing between the surfaces and to forge the weld metal during post heating.
6. Oxy-acetylene gas welding is particularly used for sheet metal work, for cutting metallic plates,	It is widely being used in electronic, electrical, aircraft, automobile and home appliances industries.
6.It takes long time for heating the job as compared to the arc welding.	It takes very short time to heat the job.
7.The gas welding processes are manual and also automated.	Normally all resistance welding process automatic.

Any four points, 01 mark each

d

Ans

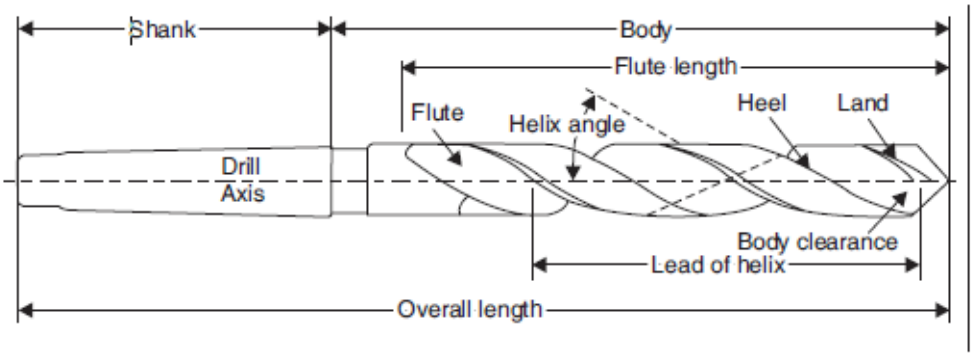
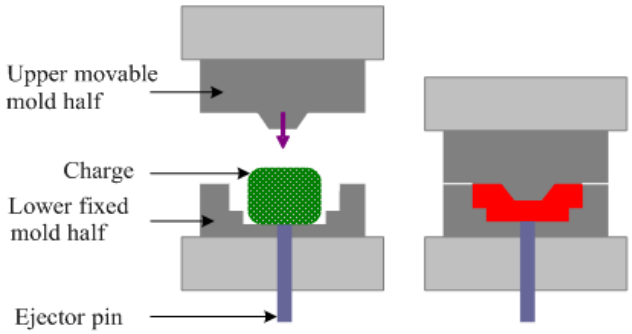


Fig Nomenclature of a standard twist drill

02 marks for sketch, 02 marks for labeling

	e Ans	State the functions of the following parts of lathe machine (i) Chuck (ii) Carriage (iii) Tool Post (iv) Tail Stock Chuck:- the function of chuck is to hold the job. CARRIAGE:- It supports, guides & feed the tool against the job during operation. Tool Post:- The function of tool post is to hold the cutting tool rigidly. Tailstock:-It supports the job between centers during operation.to drill the hole it holds the drill bit.	**01 mark each**
	f Ans	Explain Compression molding with neat sketch It is a closed molding process with high pressure application. In this method, as shown in figure , two matched metal molds are used . In compression molder, base plate is stationary while upper plate is movable. Reinforcement and matrix are placed in the metallic mold and the whole assembly is kept in between the compression molder. Heat and pressure is applied as per the requirement of composite for a definite period of time. The material placed in between the molding plates flows due to application of pressure and heat and acquires the shape of the mold cavity with high dimensional accuracy which depends upon mold design. Curing of the composite may carried out either at room temperature or at some elevated temperature. After curing, mold is opened and composite product is removed for further processing. **Compression Molding**  	**02 mark for sketch,** **02 marks for explanation**