

MINISTRY OF SCIENCE AND TECHNOLOGY

**DEPARTMENT OF
TECHNICAL AND VOCATIONAL EDUCATION**

SAMPLE QUESTIONS

ME - 01012

WORKSHOP TECHNOLOGY

A.G.T.I (First Year)

Mechanical Engineering

AGTI (Second Semester)
Workshop Technology (ME 02012)
Chapter One
Engineering Materials

1. * State the following statements are true or false.
 - (a) Pig iron is weak and brittle and is not used for structural purposes.
 - (b) Cast Iron is used in industry because of its low cost, good casting characteristic, high compressive strength.
 - (c) White iron has a characteristic white color because it contains no graphite.
 - (d) The α brasses containing up to about 37 percent zinc.
 - (e) The α - β brasses containing between 40 and 44 percent zinc.
 - (f) The purpose of annealing is to relieve internal stress.
 - (g) Bronzes are alloys of copper and zinc.
 - (h) Copper plating is the coating of a metal article with brass.
 - (i) Red lead may be used instead of Prussian Blue.
 - (j) For some ductile material and for tests at high temperatures the straining rate is important.
 - (k) The Brinell test is used for testing the hardness of materials.
 - (l) Higher percentage of chromium harden the iron by increasing the percentages of combined carbon.
 - (m) Normalizing produces a homogenous structure consisting either of finely laminated pearlite or sorbite.
2. * Fill in the blank with correct words.
 - (a) Gun metal is an alloy of _____.
 - (b) _____ test consists of pressing an indenter into the specimen by means of a standard load.
 - (c) The tensile test is a very old established test and is probably the most _____ of any.
 - (d) Only two are of any great importance, namely the Izod and _____.
 - (e) The Vickers Diamond Test consists of pressing _____ into the specimen by means of a standard load.
 - (f) _____ is weak and is not used for structural purpose .
 - (g) The principal types of cast iron are gray, white, malleable, _____ and various alloy irons.
 - (h) In Brinell hardness test, for very hard materials, which would give a Brinell number greater than about 500 – 600 a _____ ball has to be used.
 - (i) Brass is _____ of copper and zinc.
 - (j) Bronze is alloy of _____.
 - (k) _____ process is used in the manufacturing of spring wire.
 - (l) White iron has a characteristic of _____.
 - (m) The _____ materials used in engineering are nearly all alloys.
 - (n) These malleablized castings, known as _____ consist almost entirely or graphite and ferrite.
 - (o) Normalized steel is usually stronger and harder and may be more machinable than _____ steel.
 - (p) The bend test is much used for testing _____.
 - (q) Nickel amount up to 5 percent is added to cast iron primarily for its effect on _____.
3. * What is the bending tests?
4. * What is the ductility tests?

- 5.* Distinguish between the tensile test and impact test.
- 6.* Name the commercial testing of materials and describe Brinell Test.
- 7.* Draw the sketch of equilibrium diagram and write the short note for the following.
(a) annealing, (b) normalizing.
- 8.* What is the elementary properties of the following ferrous metals?
(a) Pig iron, (b) cast iron, (c) gray cast iron, (d) white cast iron.
- 9.* Describe the types of heat treatment of steel and explain any three.
- 10.* Explain about the groups of non-ferrous metal alloys and copper.
- 11.* Explain about the Izod testing of materials with neat sketches.
- 12.* Define the terms of heat treatment and describe the heat treating methods and explain any three of them.
- 13.* Discuss the tensile test with neat sketch.
- 14.* Explain about the ductility test with neat sketch.
- 15.* Distinguish between Pig Iron and Cast Iron.
- 16.* What are the types of ferrous metal and explain about the gray cast iron?
- 17.* Define the following terms.
(a) tempering, (b) cast iron, (c) copper, (d) bronzing, (e) hardening, (f) annealing, (g) hardening.
- 18.* Name the types of liquid heating baths and discuss any one of them.
- 19.* Describe the contributing factors in the following.
(a) the material testing methods, (b) the chief heat treatments, (c) the typical alloys to produce alloyed cast iron, (d) the non-ferrous metal alloys.
- 20.* Describe the principle types of cast iron and write notes on any three of them.

Chapter Two Foundry

- 1.* State the following statements are true or false.
 - (a) The cupola furnace is constructed in the form of a hollow horizontal cylinder.
 - (b) The molder uses brushes for cleaning patterns and casting.
 - (c) Gated patterns may be made of wood or metal and are used for limited production of small casting.
 - (d) Split patterns are used on molding machines for quantity production of casting.
 - (e) The chemical composition of natural molding sand should be about 80% to 90% Silica.
 - (f) Crucible tongs are available for lifting crucibles.
 - (g) Riddles are used for cutting a passage way in the sand.
 - (h) Brush is a device used for drawing the pattern from the mold.
 - (i) Split patterns made in two parts.
 - (j) A pattern is made of plaster.
- 2.* Fill in the blanks with correct answers.
 - (a) The cupola is similar to a small _____.
 - (b) The Cupola furnace is constructed in the form of a _____.
 - (c) The product of the foundry is a _____.
 - (d) _____ molds are made of a special mixture of sand rammed in its damp state.
 - (e) Molds are divided into _____ classes.
 - (f) Green sand molds are made of sand in its green or _____.
 - (g) _____ molds are used to make large intricate castings.
 - (h) Cores are _____ of sand that form an opening or cavity in or through a casting.
 - (i) Furnaces are of the oil-fired, gas-fired or _____.
 - (j) The _____ foundry process involved in the production of a casting.
 - (k) Flaks are of two binds _____ and _____.
 - (l) Draw pin is used for _____ from the mold.
 - (m) Bellows are used by the molder to blow loose sand from the recesses of _____.
 - (n) The first charge of metal, pig iron, scrap and flux, which has been carefully _____ and proportioned.
 - (o) _____ and _____ are tools used to smooth, patch and finish molds.
 - (p) _____ is similar to a small blast furnace and is the best plane to melt scrapped castings.
 - (q) _____ are devices for supporting a core or holding it in place while the metal is being poured.
 - (r) Chaplets are holding _____ in place while the metal is being poured.
 - (s) The bulb sponges are used for _____ the sand at the parting line adjacent to the pattern.
 - (t) Several kinds of tongs are available in foundries for lifting _____.
 - (u) Riddle is used by the molder to remove the foreign matter from the _____.
 - (v) Many foundries have attempted unsuccessfully to produce _____ in cupola furnace.
 - (w) Bench rammer is a device the molder uses for packing the sand in the _____.
- 3.* List the tools and equipments for foundry shop.
- 4.* Describe the types of molding machines and patterns.

- 5.* How many classes of moulds are divided into and explain them?
- 6.* Discuss briefly the preparation of the Cupola furnace for melting.
- 7.* Explain about the molding making.
- 8.* Explain any four of the following terms.
(a) Bench reamer, (b) crucible tongs, (c) flasks, (d) trowels, slicks and lifters, (e) flat back pattern, (f) chaplets, (g) brushes, (h) bellows, (i) dust bags, (j) gated patterns, (k) split patterns, (l) core making, (m) loam mold, (n) green sand mold, (o) match plate patterns
- 9.* Describe the manufacturing of cast iron.
- 10.* Explain about green sand moulds and dry sand moulds.
- 11.* What qualities must have molding sand for green sand molding?

Chapter Three Welding

1. * State the following statements true or false.
 - (a) SMAW is a gas welding process.
 - (b) Oxygen cylinders are red colored .
 - (c) TIG and MIG weldings are used for non-ferrous metals and alloys.
 - (d) There are five basic weld joints.
 - (e) The carbon arc welding process is a process with the arc between a covered metal electrode and the work.
2. * Fill in the blanks with correct answers.
 - (a) Welding joint together in _____ main types of joint.
 - (b) Welding is _____ process used in making welds.
 - (c) The welding positions are defined by the _____.
 - (d) A filler metal is needed in welding of sheet about _____ thickness.
 - (e) The most important part of the welding system is the _____.
 - (f) Always used protective _____ while welding, chipping or grinding.
 - (g) Shield metal arc welding process is widely used today to weld _____.
 - (h) Braze welding relates to welding processes using _____ metal.
 - (i) A weldment is an assembly of _____ joined by welding.
 - (j) A neutral flame is produced when almost equal volumes of _____ and acetylene drawn from the cylinder burn at the tip of the nozzle.
 - (k) A _____ is an assembly of component parts joined by welding.
 - (l) The arc area is protected from the atmosphere by the _____.
 - (m) The arc welding group of processes is the most _____ and _____ used for metal joining.
 - (n) Welding rods are used as filler metal and fluxes are used for preventing _____.
 - (o) The _____ is held in the right hand and filler rod in the left hand.
3. * Define welding, weldment and joint.
4. * Name the five basic types of welding joints with sketches.
5. * Explain the three types of welding flame with neat sketches.
6. * State the disadvantages of $O_2-C_2H_2$ welding.
7. * Write down safety precautions in gas welding and oxy-acetylene gas cutting..
8. * Explain the steps in gas welding.
9. * Explain and sketch the contributing diagrams in the following.
 - (a) the basic five joints, (b) the seven basic groove weld, (c) the welding position groove weld plate, (d) the welding position fillet weld plate, (e) vertical welding, (f) resistance welding, (g) carbon arc welding, (h) metal arc welding, (i) solid state welding, (j) butt joint, (k) corner joint, (l) lap joint, (m) T-joint
10. * Define and sketch a diagram of the shield metal arc welding process and explain about the principle.
11. * Describe the arc welding procedures and steps in gas welding.
12. * Describe the commonly used arc welding processes.
13. * Describe basic welding joints and all welding positions and principles of operation of SMAW.
14. * Draw the neat sketches for application of fillet welds.
15. * Draw the seven basic groove welds.
16. * Describe the disadvantages of oxy-acetylene welding. Name the instruments used in oxy-acetylene welding and gas welding techniques.
17. * Describe the eight elements of welding symbols. Draw the standard location of elements of a welding symbol.

- 18.* What is the meanings of the following terms and explain.
(a) GMAW, (b) PAW, (c) RW, (d) SSW, (e) TIG, (f) MIG
- 19.* What is the welding torch?
- 20.* Describe the desirable characteristics of covered electrodes.

Chapter Four Measuring Tools

- 1.* State the following statements are true or false.
 - (a) Vernier depth gauge is to measure depth of holes and slots.
 - (b) Slip gauges are made in four grades of accuracy.
- 2.* Fill in the blanks with correct answers.
 - (a) Vernier depth of gage is ideal for measuring depth of holes, _____ and _____.
 - (b) A vernier caliper can make accurate measurements to _____ inch.
 - (c) _____ can be used to measure both inside and outside measurements.
 - (d) Inaccuracy is caused by _____.
 - (e) The standard length of the 1/10 mm nonius is 19 mm and of the 1/20 nonius _____.
 - (f) _____ embody measure in the distance between two plane parallel surface.
 - (g) The metric micrometer collar is general marked with a scale containing _____ intervals.
 - (h) The _____ of the dial gauge can describe several revolutions.
 - (i) The maximum limit and the minimum limit difference between these two is known as _____.
- 3.* Explain briefly the dial gage.
- 4.* Write short notes on the three of followings.
 - (a) vernier caliper, (b) vernier height gage, (c) universal vernier bevel protractor, (d) fillet and radius gage, (e)
- 5.* Draw the section for set of vernier caliper with a 1/10 mm nonius in tenfold enlargement, for a measurement reading of 16.445 mm, 8.354 mm, 4.76 mm, 74.026 mm, 32.2 mm, 11.7 mm, 35.7 mm, 36.2 mm and 14.8 mm.
- 6.* Draw the section for set of vernier caliper with a 0.001 in nonius, for a measurement reading of 0.555 in, 1.436 in, 2.034 in, 0.437 in, 2.354 in.
- 7.* What measurement can be taken with vernier caliper?
- 8.* Why is a sine bar rule regarded as an adjustable angle measuring instrument? An angle of $17^{\circ} 28'$ has to be set with a sine bar rule of $l = 200$ mm. What end block combination must be used?
- 9.* You have an end block set of the following 26 parts.

Measurement series	Number of blocks	Sizes (mm)
1	9	1.001 – 1.009
2	4	1.01, 1.02, 1.03, 1.06
3	4	1.1, 1.2, 1.3, 1.6
4	4	1, 2, 3, 6
5	5	10, 20, 30, 60, 100

Make up the following measurements and use as few parts as possible.

- (a) 50.897 mm, (b) 16.545 mm, (c) 6.387 mm, (d) 38.45 mm, (e) 16.445 mm, (f) 74.02 mm, (g) 60.002 mm, (h) 100.13 mm
- 10.* You have the following set of end block.

Measurement series	Sizes (inch)	Number of blocks	Increment (inch)
1	0.1001 – 0.1009	9	0.0001
2	0.101-0.109	9	0.001
3	0.11-0.19	9	0.01
4	0.1-0.9	9	0.1
5	1-4	4	1
6	0.005	1	

Make up the following measurements.

(a) 2.8435 in, (b) 4.0083 in, (c) 5.5555 in, (d) 3.6329 in, (e) 1.6678 in, (f) 5.4763 in

- 11.* How to use the vernier caliper? How to read a vernier scale?
- 12.* Write down how to use the vernier caliper and care of slip gauges.
- 13.* What is the standard of length? Explain.
- 14.* How do you understand by the term measuring error?
- 15.* What is the difference between measuring and gauging?
- 16.* A real value of 20 mm is obtained from measurement. The minimum limit is 20.3 mm. What is the error?
- 17.* The nonius value of vernier caliper can be $1/10$ mm and $1/20$ mm. What is the reason for these different values?
- 18.* Draw the sections for the set of vernier calipers with $1/1000$ inch vernier scale in tenfold enlargement for the measurement reading of (a) 0.256 in, (b) 1.133 in
- 19.* Why is the measuring certainty of an universal bevel protractor 5 minutes.

Chapter Five Machine Tools

- 1.* Explain the followings.
 - (a) Types of machine tool, (b) general purpose of machine tools (the functions of machine tools), (c) the basic machine tools, (d) chief elements in metal cutting, (e) production machine tools, (f) special purpose machine tools, (g) machinability, (h) multi-purpose machine tools, (i) machinability.
- 2.* Explain about setting the shaper to machine a piece of work?
- 3.* Describe the formula to find the machining data of a shaper (or) a lathe (or) a milling machine (or) surface grinder.
- 4.* Define the cutting speed, feed.
- 5.* In a drilling operation using a twist drill, the rotational frequency of the drill is 5 per sec, the feed 0.25 mm/rev and the drill diameter 12 mm. Ten through holes are to be drilled on a metal plate of thickness 60 mm. Calculate (a) total machining time for the job, (b) rate of metal removal.
- 6.* A 3 in diameter by 10 in long bronze bar is turned down on a lathe at 0.025 in/rev and cutting speed of 80 fpm, if 2.5 hp were available and mechanical efficiency is 80%. Take specific cutting pressure for bronze bar 240000 and pressure angle 80° . Calculate (a) output horsepower, (b) depth of cut, (c) machined surface diameter, (d) chip width, (e) chip thickness, (f) chip cross sectional area, (g) rate of metal removal, (h) specific power consumption, (i) cutting time. $l_a = l_o = 3/8$ in
- 7.* A 16 teeth face milling cutter of 6 in diameter is set up a milling machine. Alloy steel is to be machined with a depth of cut 0.125 in and a feed of 0.005 in/tooth and the cutting speed is 80 fpm. The width of cut is 5 in. The specific power consumption is 0.7 hp/in³/min. Assume a tare hp of 0.45 and machined efficiency is 75%. Find (a) feed in inch per min, (b) rate of metal removal, (c) hp at the cutter, (d) motor hp, (e) if length to be cut is 9 in and two cut is needed with the same depth of cut, estimate the milling time.
- 8.* The mild steel block 11 cm by 20 cm is required to be shaped with depth of cut is 3.2 mm, feed is 1.8 mm/stroke, and cutting speed is 26 m/min. Take $\alpha = 230^\circ$, $l_o = l_a = 20$ mm, $b_1 = b_2 = 10$ mm. Calculate (a) cycle per min, (b) cutting time, (c) rate of metal removal.
- 9.* A mild steel plate of 180 mm by 300 mm is required to be shaped with a depth of cut 1/8 in, feed is 3 mm/stroke and cutting speed is 24 m/min. Take $\alpha = 260^\circ$, $l_o = 20$ mm, $l_a = 30$ mm, $b_1 = b_2 = 5$ mm. Calculate (a) cycle per min, (b) shaping time, (c) rate of metal removal.
- 10.* A mild steel bar of 2 in diameter is turned down at 1-7/8 in diameter at 90 rpm. Feed is 1/64 ipr and the specific cutting pressure is 165000. Calculate the chip width, chip thickness, chip cross-sectional area and cutting speed if the angle between the work axis and cutting surface is 60° .
- 11.* A 3 in diameter plain milling cutter has 18 teeth at a cutting speed of 80 ft/min and a feed of 0.005 in/tooth. Using this cutter with a cut 1/16 in deep and width of cut 4 in, calculate the speed in rpm, the feed in in/min, the volume of the metal removal, the horsepower at the cutting tool, and estimate the motor horsepower required with a unit horsepower 1.6 hp/in/min. Mechanical efficiency is 80% and tare horsepower 0.5 hp. How long will take time to complete the cut if the length of workpiece is 12 in length.
- 12.* Explain the differences between lathe, milling and shaping machine.
- 13.* Write a short note on the shaper and shaping process.
- 14.* What is the machine tool? Name the main parts of the shaper.

Workshop
Chapter (6)
Estimation in Machine shop

1. (a) Estimate the machining time to turn a M.S bar of 3 cm dia. down to 2.5 cm for a length of 10 cm in a single cut. Assume cutting speed = 30 m/min and feed = 0.04 cm/rev. (MS = Mild Steel)
- (b) A M.S bolt 2 cm diameter is rotating at 500 rpm. How much machining time is required to make 45° chamfer by 0.5 cm. Assume feed as 0.2 mm/rev.

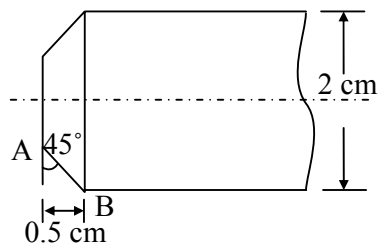
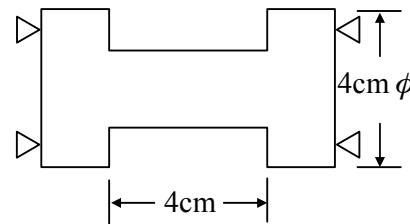


Fig (1-b)



(1-c)

- (c) Find the time required to face both ends of a component shown in fig (1-c) in one cut. Assume speed of rotation of both job as 100 rpm and cross feed as 0.03 cm/rev.
- (d) A component as shown in fig (1-d) is to be knurled on the surface. Find the time required for knurling it, if cutting speed is 20 m/min and feed is 0.03 cm/rev.

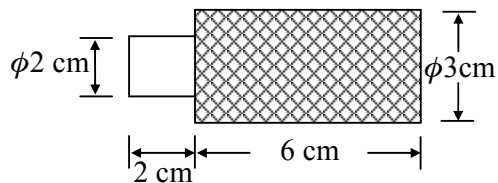


Fig (1-d)

2. (a) Calculate the time required for drilling a component as shown in fig (2-a) Assume the cutting speed as 22 m/min and feed as 0.02 cm/rev.

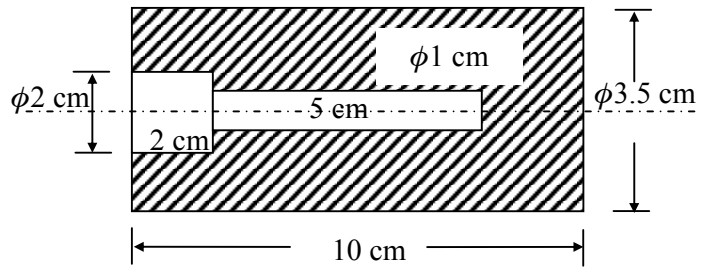
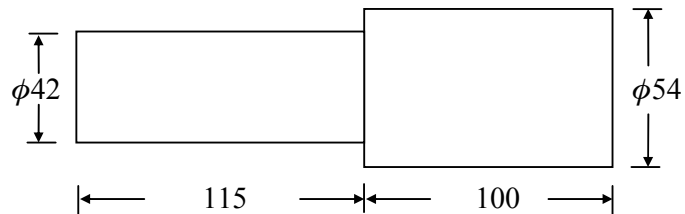


Fig (2-a)

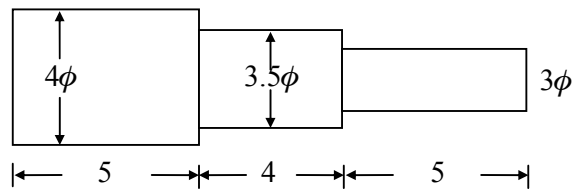
- (b) Find the time required to turn a 60 mm diameter rod to the dimensions shown in fig (2-b). Take cutting speed as 20 m/min, feed as 1.2 mm. All cuts are 3 mm deep.



all dimensions are in mm.

Fig (2-b)

3. (a) Calculate the time required to turn a stepped shaft of the dimensions shown in fig (3-a) from M.S stock of approximate length and 4 cm diameter. Neglect facing and setting up time. The depth of cut should not exceed 0.25 cm. Assume the cutting speed to be 20 m/min and feed to be 0.3 mm/rev for each cut.



all dimension are in cm.

Fig (3-a)

- (b) Find out the time for threading on a 3 cm diameter spindle for a length of 10 cm by single point tool. If 3 threads per cm are to be cut and speed of spindle is 66 rpm. Assume approach and overtake for the tool are 0.5 cm each.

4. (a) Estimate the time required for tapping a 2 cm diameter hole with a 3 mm pitch tap in a M.S plate up to a depth of 3 cm. Assume cutting speed as 10 m/min and also assume that return speed of tap is 2 times the cutting speed.
- (b) Estimate the time required to prepare a square prism on a milling machine from a round block 90 mm length 40 mm in diameter, feed 25 mm/min and set up and indexing time is 15 minutes. Added table travel = 10 mm.
5. (a) A 20×5 cm CI surface is to be faced on a milling machine with a cutter having a diameter of 10 cm and 16 teeth. If the cutting speed and feed are 50 m/min and 5 cm/min respectively determine the milling time, rpm of the cutter and feed per tooth.
- (b) A machine bed is to be planed in two cuts on a planing machine. If it takes 10 sec in forward stroke and 4 sec in return stroke, find out the time required to plane the bed of width 60 cm. Assume the feed as 2 mm/stroke tool clearance 5 cm.
6. (a) A CI rectangular block of $10 \text{ cm} \times 3 \text{ cm}$ is required to be shaped to reduce the thickness from 1.5 to 1.3 cm in one cut. Determine the time required for shaping it cutting speed is 20 m/min and feed is 0.2 mm/stroke and the cutting time ratio is $\frac{3}{5}$.
- (b) Find the time required for doing rough grinding of a 15 cm long steel shaft to reduce its dia from 4 to 3.8 cm, with the grinding wheel of 2 cm face width. Assume cutting speed as 15 m/min and depth of cut as 0.25 mm.
7. (a) Estimate the milling time to cut 60 tooth on a Gear blank 60 mm thick, feed 35 mm/min and take over all set up time as 10 minutes. Table travel is 10 mm.
- (b) You are required to cut 4 threads/cm on a steel shaft 3 cm in diameter and 10 cm long. Calculate time required for this, assuming the speed of thread cutting to be 33 m/min and no of cuts taken to be 4. Tool travel length is 0.7 cm.
- (c) Estimate the time for reaming a 2 cm hole having 3 cm depth to make it 2.05 cm dia hole. Assume the cutting speed as 10 m/min and feed as 0.03 cm/rev.
- (d) Find the time required to drill 6 holes in a casted flange each of 1 cm. depth, if the hole dia is $1\frac{1}{2}$ cm. Assume cutting speed as 20 m/min and feed as 0.02 cm/rev.

8. (a) Estimate the time required for cutting 3 mm pitch threads on a M.S bar of 2.8 cm dia and 8 cm long. Assume the cutting speed for threading at 15 m/min. For mild steel full depth of threads can be produced in 7 cuts.

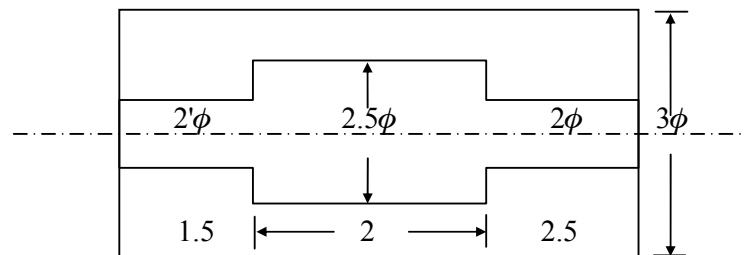
(iv) Estimate total time taken to turn a 10 cm long 2.5 cm diameter MS rod to a diameter of 2.3 cm in a single cut. Assuming cutting speed to be 25 m/min feed to be 0.1 mm/rev and the mounting time in self centring 3 jaw chuck to be 40 sec. Neglect time taken for setting up tools etc.

(v) A nickel-chrome steel rod of 5cm dia is to be reduced to 3.8 cm diameter for 30 cm length from one of its end. A fairly good finish is required on the machined surface. Calculate the time of machining the job on a centre lathe. Assume cutting speed as 30 m/min, depth of cuts should be 2 mm.

(vi) Tap of a CI table of size 30 cm × 80 cm is to be grounded by a wheel having 2 cm face width. If the feed is $\frac{1}{4}$ of the width of the wheel and table moves 8 m in one minute. Find out the time required for grinding in two cuts.

(vii) Find the time taken to prepare a job according to the dimensions shown in Fig 9 from a bar 3.5 cm diameter and 6 cm long. Assume following data.

- (I) Cutting speed for turning and boring = 20 m/min
- (ii) Cutting speed for drilling = 30 m/min
- (iii) Feed for turning and boring = 0.2 mm/rev
- (iv) Feed for drilling = 0.23 mm/rev
- (v) Depth of cut not to exceed = 3 mm



All dimensions are in cm.

Fig (9)

10. Find the machining time to complete the job as shown in Fig below from the basic raw material of 50 mm diameter and 100 mm length. Assume
- | | |
|----------------------------------|--------------|
| Cutting speed for turning | = 30 m/min |
| Feed | = 1 mm/rev |
| Depth of cut | = 2.5 mm |
| Cutting speed for thread cutting | = 9 m/min |
| Cutting speed for drilling | = 30 m/min |
| Feed for drilling | = 0.2 mm/rev |

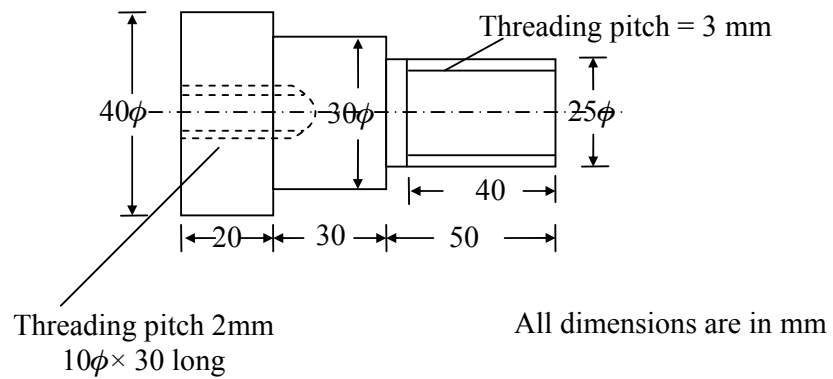


Fig (10)

11. A 30 mm dia 200 mm long rod of aluminium is to be machined on a lathe to make a component as shown below in Fig 11. Calculate the machining time. Assume cutting speed for turning 30 m/min and for threading as 10 m/min and feed as 3 mm/rev for turning and 1 mm/rev for facing.

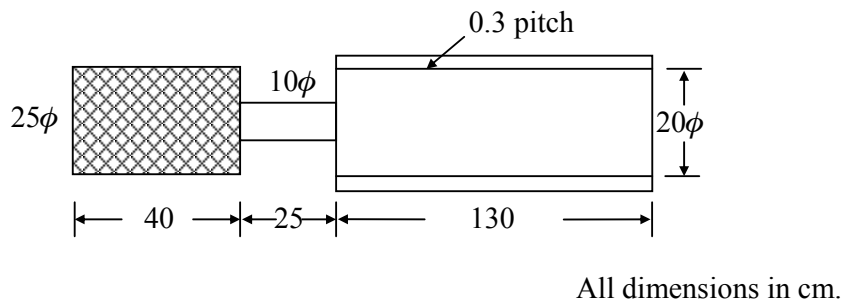
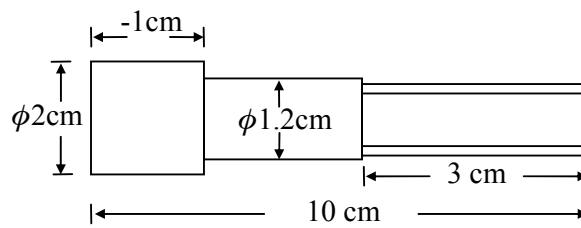


Fig (11)

12. A manufacturer desires to manufacture 100 bolts/day from mild steel bars of length 2 cm and dia as 25 mm. Assume

- (i) Feed for turning = 0.2 cm/rev
- (ii) Cutting speed for turning = 20 m/min
- (iii) Cutting speed for threading = 10 m/min
- (iv) depth of cut = maximum of 3 mm
- (v) pitch for threads = 2.5 mm
- (vi) No of cuts required for threading = 6

Calculate the machining time for 100 bolts.



Chapter Seven
Buffing and Metal Finishing

- 1.* Define the buffing and metal finishing.
- 2.* Describe the way to buff a wheel.
- 3.* Describe the way to buff spindle.
- 4.* What is meant by metal finishing?
- 5.* Write a note to describe how to clean old and greasy metal? (or) copper (or) brass (or) pewter.
- 6.* Write a short note on red lead. (or) enameling, (or) lacquering, (or) spraying, (or) painting (or) bronzing (or) coloring coppers (or) smoke finish on iron or steel (or) coloring iron or steel with heat (or) spot finishing (or) electroplating (or) burnishing (or) copper plating

Chapter Eight
Sheet Metal Work

- 1.* What is a sheet metal? How is it important on sheet metal work?
- 2.* What does sheet metal work?
- 3.* What is a pattern?
- 4.* Describe the way to cut sheet metal.

CHAPTER (9)
ESTIMATION IN SHEET METAL SHOP

1. A container open on one side of size $0.5 \times 0.5 \times 1$ m high is to be made from plates of 6 mm thickness. Take density of plate metal 8 gm/cc and joint are to be welded. Estimate the cost of containers from the following data.

Cost of plate Rs. 100/kg

Sheet metal scrap = 5% of material

Cost of labour = 10% of material cost

Cost of welding material = Rs 2 per m of weld.

2. (a) Cylindrical drums of size 1.5 m high and 1 m mean diameter are to be fabricated from sheet of 5 mm thickness by grooved seam joint and both the covers should be jointed with single seam joint. Calculate the material cost if sheet is available at RS 15 per m^3 .
- (b) 1000 pieces of a part shown below are to be manufactured from a sheet of $300 \text{ cm} \times 100 \text{ cm} \times 2 \text{ mm}$. Estimate the number of such sheets required assuming no wastage.

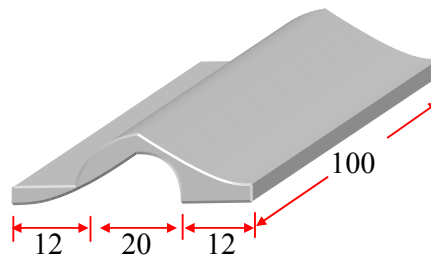


Figure 9.2 (b)

3. (a) The dimensions of steel tray made out of two ms. Sheets 24 gauge and size $3 \text{ m} \times 1 \text{ m}$ are show in Figure 9.3 (a). Calculate the total number of trays which can be formed by these two sheets and the cost of each tray, if:
- (a) $3 \text{ m} \times 1 \text{ m}$ sheet is available at Rs. 2500 each.
- (b) Labour cost is Re. 030 per tray, and
- (c) Overheads are 12% of material cost.

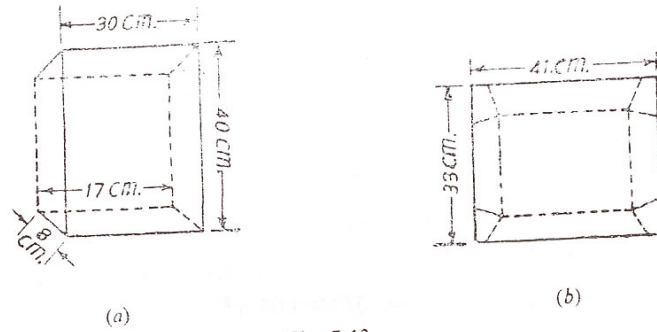


Figure 9.3 (a)

- (b) Estimate the cost of metal sheet for preparing a funnel of following size. Assume the wastage of metal as 10% and cost of the sheet as Rs. 10/m².
4. (a) Will it be possible to cut a rectangular blank of 50 cm × 60 cm from a mild steel plate of 0.3 cm thickness by using a press, being driven by gears at both ends and having a 15 cm dia. Pin.
 - (b) For making a steel component, 1 cm, thick it is required to be bent through 90°. If the inner radius is 8 cm calculate the length of the metal in the curved portion.
 5. (a) A press making 60 strokes per min. is used for making 30 blanks of 10 cm × 12 cm size from each strip. Calculate the time required for blanking each strip if only 60% of the strokes are utilized. If holes are also pierced on this pres, find out the total time for blanking and piercing for 200 components.
 - (b) A 2 m × 5 m sheet is available for cutting the 10 cm × 15 cm blanks. Show which of the following ways will give more number of blanks.
 - (i)When blanks are along the length of the sheet.
 - (ii)When blanks are across the length of the sheet.