**BASIC TECHNOLOGY JSS 2**

**FIRST TERM**

**SCHEME OF WORK**

**WEEK TOPIC**

1. First Aids and Materials
2. Rescue Operations
3. Materials and their common uses (Wood and Metals)
4. Materials and their common uses(Ceramics, Plastics and Rubber)
5. Geometrical Construction; Lines
6. Geometrical Construction II Angles

8. Geometrical Construction III Triangles

9. Geometrical Construction IVCircle

10. Construction of Tangent to a Circle.

11. Revision

12. Examination

**REFERENCE MATERIALS**

1. MELROSE, Basic Science and Technology, Book 2
2. NERDC, Basic Technology for JSS, Book 2

**WEEK ONE**

**TOPIC: FIRST AIDS**

Definition of First Aid:

First aid refers to the immediate medical care provided as promptly as possible to individuals who sustain injuries or suddenly fall ill. It is administered either before medical professionals arrive or during the transportation of the injured person to a medical facility.

Aims and Objectives of First Aid:

1. Preservation of Life: The primary objective of first aid is to preserve life. Swift intervention can be critical in preventing fatalities.

2. Prevention of Further Injury: First aid aims to prevent the aggravation of injuries, minimizing their severity.

3. Alleviation of Pain: Providing relief from pain is another goal of first aid, where feasible, to enhance the well-being of the injured person.

Common Accidents Requiring First Aid:

Accidents can occur in various settings, including domestic and workplace environments. These incidents may involve:

1. Suffocation: Proper ventilation in confined spaces is crucial to prevent suffocation.

2. Cuts: Cuts can result from contact with sharp objects like knives, broken glass, or scissors, and require immediate attention.

3. Bruises: Occurring due to blunt force, bruises involve bleeding beneath the skin without breaking it.

4. Fire Accidents: Fires caused by flammable materials or electrical malfunctions can be catastrophic and necessitate prompt first aid.

5. Electric Shocks: Electric shocks, stemming from exposed wires or mishandling electrical appliances, pose significant risks.

Contents of a First Aid Box:

A well-equipped first aid box contains essential supplies for providing preliminary medical care. It should be clearly labeled, often featuring a prominent red cross. Contents typically include:

a) Cotton wool

b) Safety pins

c) Vaseline

d) Razor blade

e) Clinical thermometer

f) Assorted bandages

g) Antiseptic cream

h) Embrocating (ointment)

i) Scissors

j) Antiseptic fluid (e.g., Dettol or Savlon) for cleaning wounds and cuts.

Applications of Simple First Aid:

First aid is vital in various accident scenarios:

1. Cuts with Bleeding:Stop bleeding by applying cotton wool and iodine, followed by penicillin ointment and a plaster.

2. Snakebites or Scorpion Stings: Use a rope above the bite area and make one or two incisions with a razor blade to allow poison drainage.

3. Respiratory Problems: Place the victim face up, gently press the abdomen to expel water from the mouth and nose. Consider mouth-to-mouth resuscitation if necessary.

4. High Fever: Lower the patient's temperature by removing clothing and applying a wet towel.

5. Dog Bites: Clean with Savlon, apply iodine or TBC, and dress the wound with a bandage before seeking anti-rabies treatment.

6. Broken Arms: Clean and dress wounds if present, immobilize with a splint (using a ruler or stick), and seek medical attention.

7. Burns from Hot Objects or Hot Palm Oil: Clean gently with Savlon, apply gentian violet (G.V. Paint) or dermacin cream, and provide antibiotics.

8. Electric Shock: Turn off the power source, allow the victim to rest, and consider providing milk if necessary.

9. Febrile Convulsion: Administer a tepid sponge bath, protect the tongue with a spoon covered in bandage, and refrain from administering any medication.

10. Epilepsy:Clear the surroundings of hazards, place the person on their side until consciousness is regained.

**FIRST AID MATERIALS AND THEIR USES**

|  |  |  |
| --- | --- | --- |
| **S/N** | **MATERIALS** | **USES** |
| 1 | Aspirin or paracetamol | They are used for pain relief. |
| 2 | Plaster | It is used to cover a small wound. |
| 3 | Cotton wool | It is used to drain blood and apply chemicals like hydrogen peroxide on wound. |
| 4 | Gauze bandage | It is used with a cotton wool to cover a wound. |
| 5 | Cofta tabs or cough mixture | These are drugs for treating cough. |
| 6 | Antacid tabs or Mist mag | These are drugs for stopping stomach pains. |
| 7 | Nerve/ bone (Embrocation) | These are drugs used to relief pains in the nerves, joints and bone. |
| 8 | Robb or Mentholatum | These are ointments used to rob the body against cold and bone pain. |
| 9 | Penicillin ointment | It is also used to rub the surface of fresh wound or injury. |
| 10 | Thermometer | It is used for measuring temperature. |
| 11 | Iodine lotion | It is used for treating wounds. |
| 12 | Dettol or Hydrogen peroxide | It is used for treating wounds |
| 13 | Spirit | It is used to clean the surface of wounds. |
| 14 | Injection powder | It is used for treating wounds. |

**EVALUATION**

1. Mention eight (8) materials found in a first aid box and state their uses.
2. State the uses of the following: (a) penicillin ointment (b) cotton wool

**WEEKEND ASSIGNMENT**

1. \_\_\_\_ is a simple initial treatment given to a patient before the arrival of the doctor. (a) First aid (b) Infection (c) Immunization (d) Injection
2. The following are materials in the first aid box except \_\_\_\_ (a) hanger (b) aspirin (c) spirit (d) thermometer
3. Which of the following is the sign on the first aid box? (a) + (b) X (c) - (d) ÷
4. \_\_\_\_\_ is applied on a fresh wound (a) Spirit (b) Hydrogen Peroxide (c) Injection powder (d) Mist Mag
5. Mouth to mouth resuscitation is used for \_\_\_ problem (a) snake bite (b) respiratory (c) high fever (d) bleeding

**THEORY**

1. State five materials in the first aid box and their uses.
2. Discuss how to give first aid treatment to (a) bleeding from cut (b) respiratory problem.

Week Two: Rescue Operations

Meaning of Rescue Operations:

Rescue operations are organized and responsive efforts aimed at saving individuals or groups from perilous situations or preventing injuries during accidents. Trained professionals such as firefighters, police, military personnel, first responders, and ambulance crews carry out these operations.

Objectives of Rescue Operations:

1. Saving Lives: The primary objective of rescue operations is to preserve and protect lives.

2. Injury Prevention: Another crucial goal is to prevent injuries and mitigate harm during hazardous situations or accidents.

Types of Rescue Operations:

1. Air-Sea Rescue (ASR): Coordinated efforts to search and rescue individuals involved in emergency water landings, as well as survivors of shipwrecks or boat mishaps.

2. Combat Search and Rescue (CSAR): Operations conducted during wartime within or near combat zones to locate and rescue military personnel.

3. Mine Rescue: Specialized operations aimed at rescuing miners and others trapped or injured in underground mines following accidents.

4. Cave Rescue: Involves the rescue of people who are trapped, lost, or injured in caves or wilderness areas.

5. Surface-Water Rescue: The rescue of individuals afloat on the surface of bodies of water.

6. Vehicle Extrication: The process of safely removing individuals from vehicles involved in motor accidents.

7. Confined Space Rescue:Involves rescuing and recovering victims trapped in confined spaces such as tanks, sewers, and underground vaults.

8. Urban Search and Rescue:Focused on locating, extricating, and providing initial medical care to victims trapped in collapsed buildings or trenches.

Evaluation Questions:

1. What do rescue operations entail?

2. Define "vehicle extrication."

Rescue Operation Situations:

1. Fire outbreaks

2. Shipwrecks or boat mishaps

3. Plane crashes

4. Mine accidents

5. Bomb blasts

6. Road accidents

7. Collapsed buildings

8. Drowning incidents

9. Natural disasters such as earthquakes and landslides

Tools and Equipment Used in Rescue Operations:

1. Helicopters

2. Search and rescue dogs

3. Mounted search and rescue horses

4. Hydraulic cutting and spreading tools, commonly known as the "jaws of life," for extricating individuals from wrecked vehicles

5. Heavy rescue vehicles

6. Ladders

7. Airbags

8. Ambulances

9. High lift jacks

10. Fire extinguishers

11. Stretchers

Evaluation Questions:

1. List five situations that require rescue operations.

2. Enumerate ten tools used in rescue operations.

General Evaluation:

1. Explain Air-Sea Rescue (ASR).

2. Identify four types of professionals trained to assist in rescue operations.

Weekend Assignment:

1. What type of rescue operation is suitable for someone trapped in a vault? (a) Cave rescue (b) Confined space rescue (c) Surface-water rescue (d) ASR

2. What term is used to describe the rescue of people trapped in a collapsed building? (a) CSAR (b) Mine rescue (c) Urban search and rescue (d) Confined space rescue

3. What is used to extricate individuals from wrecked vehicles? (a) Helicopters (b) Rescue dogs (c) Ambulances (d) Hydraulic cutting and spreading tools

4. Which of the following does not typically require rescue operations? (a) Collapsed building (b) Fire outbreak (c) Phone calls (d) Natural disasters

5. What does ASR stand for? (a) Air-Sea Rescue (b) Combat Search and Rescue (c) Cave Rescue (d) Rapid Response Service

Theory:

1. (a) Define rescue operations.

(b) Explain the concept of "vehicle extrication."

2. Describe the roles of the following in rescue operations:

(a) Rescue dogs

(b) Ambulances

**WEEK THREE**

**TOPIC**: **Materials and their common uses (Wood and Metals)**

**CONTENT**

* Uses of Wood
* Uses of Metal

**Uses of Wood:**

**Wood finds extensive application across various industries and processes in today's world:**

**1**. Housing: Wood serves as a fundamental material forconstructing home components like doors, windows, and roofing.

2. Industrial Building: Many industrial structures incorporate wood into their construction.

3. Joinery: Wood is a favored choice for crafting staircases in modern buildings.

4. Packaging: Wood is indispensable in packaging technology, used for creating crates, pallets, and packaging for electronic equipment.

5. Furniture: Wood is a primary material for crafting a wide range of furniture, including chairs, beds, wardrobes, tables, and bookcases.

6. Transportation: Wood plays a vital role in transportation, being used in railway infrastructure, train wagons, and the bodies of lorries.

7. Bridges and Poles: Wooden bridges, particularly in farming areas and rural roads, are common. Additionally, some electric poles and railway sleepers are made from wood.

8. Pulp and Paper: Wood serves as the source material for pulp and paper production, used in creating exercise books, textbooks, magazines, and more.

9. Medicine: Wooden artificial limbs are often used as replacements for amputated arms and legs.

10. Clothing: Wooden heels and, in some cases, shoe soles are utilized in footwear production. Additionally, rayon stockings may contain wood-derived materials.

11. Tool Making: Handles for a variety of tools such as hammers, pickaxes, felling axes, and screwdrivers are commonly crafted from wood.

Evaluation:

1. Name five industries that use wood and specify the processes for which they employ wood..

2. State the processes they are used for in (1) above**.**

**USES OF WOOD**

|  |  |  |
| --- | --- | --- |
| **S/N** | **SOFTWOOD** | **USES** |
| 1 | Cedar | In the building industry for roofing and garages, doors and partitions. |
| 2 | Pine | Railway sleepers, heavy gate posts, decorative panel stairways. Pattern making joinery. |
| 3 | Spruce | Aircraft industry, ship masts, interior joinery, ladders, packing cases. |

|  |  |  |
| --- | --- | --- |
| **S/N** | **HARDWOOD** | **USES** |
| 1 | Afromosia | Ship building, good quality furniture. |
| 2 | Agba | Joinery and furniture. |
| 3 | Balsa | Model making, life rafts life belts. Insulation (noise or heat). |
| 4 | Beech | Furniture mallets, kitchen utensils e.g. bread boards, rolling pins. |
| 5 | Ekki | Pier piles, dock, gates, bridge building. |
| 6 | Iroko | Joinery |
| 7 | Mahogamy | Cabinet making, ship building, panelled, carving, wood turnery. veneers |
| 8 | Oak | Furniture making , boat building , veneer, plywood |
| 9 | Obeche | Interior joinery, furniture, model making. |
| 10 | Teak | Ship building , furniture, laboratory benches, veneers |

**EVALUATION**

1. Describe the purposes for which the following woods are used :(a) mahogany (b) oak (c) balsa.
2. Mention three soft wood and their uses.

**USES OF FERROUS METALS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NAME** | **MELTING POINT** | **COMPOSITION** | **PROPERTIES** | **USES** |
| Cast iron | 1240 | Mixture of carbon and iron carbon content is between 1.5-5% | Vary with carbon content. Brittle with hard skin | Suitable for moving parts of machinery because of the ability of one piece to slide on another due to carbon content. |
| Wrought Iron | 2000 | 99% iron with small amount of impunities | Malleable and ductile. Elastic can be shaped easily when red hot (forged) | Engine blocks haulage gear, vices, crane, hooks and chains |
| High carbon steel (Tool steel, cast steel) | Varies | 99% iron with small amounts of impunities. The carbon content is between 0.1-0.5% | Malleable and ductile. Elastic. Not very hard. Can be shaped easily when red hot(forged) | Haulage gear, crane hooks and chains, anchor chains, general constructional work, nuts, bolts, screws, non-cuttingtool, steel sheets. |
| Low carbon steel (mild steel) | Varies | Mixture of carbon and steel | Forges and machines well | All kinds of cutting tools. Steel sheets |

**USES OF NON-FERROUS METALS**

|  |  |
| --- | --- |
| ALUMINUM | It is used for making aircraft, electrical cables, and aluminium, foil, engine parts tubes boxes, kitchen and cooking utensils. |
| ZINC | It is used for making roofing sheets containers, galvanizing and protective, cooling on sheet, sheet and base for many alloys (e.g. brass). |
| TIN | It is used as base for many alloys e.g. bronze, protective coating on copper wire and tin plate sheets. |
| COPPER | It is used in making many copper alloys, soldering bits, decorative purposes, wire, electrical point, boiler tubes, rivets, boxes, bowland pipes. |
| LEAD | It is used for making battery elements, water piping base for many alloys and sheeting for roofing. |

**EVALUATION**

1. Mention three uses each of the following non-ferrous metals. (a) zinc (b)aluminium.
2. State three ferrous metals and their uses

**USES OF ALLOYS OF NON-FERROUS METALS**

* 1. DURALUMIN: It is made of 95% aluminium, 4%copper and 1% manganese. It is used to build aircraft bodies, door and window frames, vehicle parts etc.
  2. BRASS: It is made of 35%zinc 65% copper. We use brass to make decorative items, ammunition, plumbing fittings, electrical appliances, etc.
  3. BRONZE: It is made of 10% tin and 90% copper. It is used in carving, statues, plaques, ornaments, ship propellers, gears and some machine parts.

**GENERAL EVALUATION**

1. Differentiate between hard and soft wood
2. Mention 5 uses of wood

**WEEKEND ASSIGNMENT**

1. The following are hard wood except (a) Balsa (b) Beech (c) Spruce (d) Iroko.
2. The type of hard wood used in making veneer and plywood is called (a) Iroko (b) Oak (c) Teak (d) mahogany.
3. The type of metal that is suitable for moving parts of machinery is (a) cast Iron (b) wrought iron (c) aluminium (d) low carbon steel.
4. The temperature at which wrought iron turns liquid is (a)12400C (b) 2000oC (c)1500oC (d) It varies.
5. Aluminium is used for making cooking utensils because a) it is malleable (b) it is a good conductor of heat (c) It is light (d) it is a good conductor of electricity.

**THEORY**

1. Mention five (5) industries that use wood and their processes.
2. In tabular form state the melting point, composition and uses of the following metal

(a) Cast iron (b) High carbon steel

**WEEK FOUR**

**Topic: Materials and Their Common Uses (Ceramics, Plastics, and Rubber)**

Ceramics:

Ceramics encompass solid objects made from clay, mud, or cement. This category includes clay and clay products, glass and glass products, as well as cements and plasters.

Uses of Ceramics:

1. Ceramics excel in withstanding high temperatures, making them indispensable in furnace construction.

2. Their ability to bear heavy loads makes ceramics like bricks and cement blocks ideal for building structures, particularly load-bearing walls.

3. Ceramics resist corrosion and chemical attacks, rendering them suitable for storing chemicals and water.

4. The malleability and decorability of ceramics make them valuable in sculpture and artistic endeavors.

5. Ceramics' excellent electrical insulation properties find use in high-tension voltage insulation and as insulators for power lines.

6. Their durability is exemplified by artifacts like the Benin heads, showcasing ceramics' long-lasting nature.

Evaluation:

1. Elaborate on why ceramics are preferred for furnace construction.

2. Identify three common ceramics and describe their properties.

Uses of Glass:

1. Glass is employed in the manufacturing of bottles.

2. Tumblers, mugs, and drinking glasses are common glassware products.

3. Glass finds its place in creating elegant flower vases.

4. Bulbs for lighting often have glass envelopes.

5. Glass is instrumental in producing eyeglasses, magnifying glasses, and binoculars.

6. Its transparency and durability make glass an essential material for mirrors, windscreens of vehicles, television screens, and computer displays.

Rubber:

Rubber, in its raw form known as latex, is naturally tough and hard. To make it more pliable and versatile, specific chemicals are added, and the mixture is processed until it becomes workable. There are two main types of rubber: natural rubber and synthetic rubber.

Natural Rubber:

This variety is derived from the latex of rubber trees. Natural rubber, however, deteriorates with age and exposure to sunlight. To enhance its properties, a process called vulcanizing is employed. This involves adding sulfur and carbon particles to the rubber and heating it. Vulcanized rubber exhibits increased hardness and heat resistance compared to ordinary rubber.

Synthetic Rubber:

Synthetic rubber is produced synthetically from chemicals, belonging to the family of plastics. Examples include butyl rubber and neoprene. Synthetic rubbers offer superior qualities compared to natural rubber. They are resistant to sunlight, temperature variations, and chemical degradation. Synthetic rubber products encompass hoses, pipes, belts, tires, tubes, footwear, rainwear, and various mountings.

Uses of Rubber:

1. Rubber's elasticity makes it suitable for manufacturing items like catapults.

2. Its waterproof nature finds application in producing sandals and gloves.

3. Rubber's insulating properties make it an ideal covering for electrical wires that supply power to appliances like irons and kettles.

4. Rubber's shock-absorbing capabilities make it a key component in car bumpers, tires, and tubes, serving to cushion impacts.

Evaluation:

1. Differentiate between natural rubber and synthetic rubber.

2. List five examples of products made from rubber.

Weekend Assignment:

1. All solid objects made from clay, mud, or cement are called \_\_\_\_(a) plastics (b) rubber (c) semiconductors (d) ceramics.

2. The art of using clay to make various objects is called \_\_\_\_ (a) plastics (b) rubber (c) semiconductors (d) pottery.

3. Which of the following is not a rubber product? (a) tires (b) pipes (c) footwear (d) sculpture.

4. One of the differences between plastic and rubber is that RUBBER is more \_\_\_\_\_ (a) cheaper (b) available (c) elastic (d) tougher.

5. Properties of rubber can be improved through the process called (a) extrusion (b) vulcanization (c) injection molding (d) compression molding.

Theory:

1. Enumerate three properties of rubber.

2. List three advantageous qualities of ceramics.

**WEEK FIVE**

**TOPIC: GEOMETRICAL CONSTRUCTION: LINES**

**CONTENT**

* Definition of Lines
* Types of Lines
* Dividing a Given Line into Equal Parts

**LINES**: A line is a long narrow mark made on a surface. A line may be straight, crooked or curved.

**Properties of lines**

1. A line has position and length.
2. A line does not have width or thickness.
3. A straight line is the shortest distance between two points.
4. A line that has more than one curve is called a crooked line.
5. Two or more lines always having equal distance apart are parallel lines.
6. A line following a circular path is a curve.

**EVALUATION**

* 1. Define a line
  2. State three properties of line.

**TYPES OF LINES**

**Thick continuous line:** This is a thick and solid line used to show visible outlines of an object.

They are also used as border lines (15mm from paper margin).

**Thin continuous line:** This is a thin and solid line used for dimension lines, **lines**, projection lines, leader lines, hatching or section lines etc.

**Short dashes:** The dashes are about 3mm long and spaced about 1mmfrom each other.

These are approximate values and will depend on how large the drawing might be. They are used to represent/show hidden details.

**Thin continuous chain line:** These are thin lines made of long and short dashes. The long dashes can be about 19-38mm long while the short dashes may be about 1.5mm long. The length will vary with the size of the drawing and the length of centre line needed. They are used for centre lines

**Thick continuous chain with arrow head:** They are thick lines made of either long and short dashes or equal sized dashes. Arrow heads are drawn on their ends to show the direction in which the section was taken. They are used for cutting and viewing planes.

**Thick irregular solid lines:** These are thick solid lines drawn freehand. They are either short break or long break lines used to show the part of an object that has been removed. The long break lines are drawn as thin solid lines with **Z** symbol inserted in several places along its length.

**or**

**Continuous irregular wavy lines:** They are thin lines drawn freehand and are used to indicate the limit of partial views.

**Phantom lines:** These are thin dashes lines drawn with one long dash followed by two short dashes. They are used to show alternate positions of moving parts. The original position is drawn with visible (thin continuous) lines while its rotated or new position is shown with phantom lines.

**TYPES OF LINES**

**Thick continuous line:** - this is used for all visible outlines. It should be the most prominent on drawing.

1. **Thin continuous line:** - This is used for constructing projections, extensions, hatching and leader lines.
2. **Short dashes**: This is used to show hidden details.
3. **Thick continuous wavy or irregular line):** - it is used for irregular boundary or short break lines.
4. **Thin ruled line and zigzags: -** This is used for long break lines.
5. **Arrow head** – it is used for dimension.
6. **Thin long chain line:** - It is used for centre lines.
7. **Thick long chain line:** - It is used for cutting viewing lines.
8. **Thin continuous wavy line:-** It is used for limits of partial views.

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**EVALUATION**

* + 1. Mention five types of lines and state their uses.
    2. When do we use thin continuous lines?

### Division of a straight line into equal parts

A line can be divided into a number of equal parts. For example, a given line can be divided into halves, fourths, eights etc.

#### Procedure 1

1. Draw the given line AB.
2. Draw AC any convenient acute angle and set off from A.
3. Divide the line into the number of the required parts using a pair of divider or a scale rule and a pencil.
4. Now join the points on the inclined to the line to be divided from the extreme with parallel lines.

**Procedure 2**

1. Draw the given line, AB.
2. Draw a line AC to meet it at any convenient angle.
3. Join CB.
4. Divide AC into the required number of parts using your ruler. Label the points 1,2,3,4…
5. From the points 1, 2, 3…. Draw lines parallel to CB to meet AB. These parallel lines intersect AB at the required points; this divides AB into equal segments.

**ACTIVITY**

Divide a straight line 70mm long into 5 equal parts.

**GENERAL EVALUATION**

1. How can horizontal and vertical line be drawn?
2. List the information required in title block.

WEEKEND ASSIGNMENT

1. Identify this line. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (a) thin continuous line (b) ruled zigzag line (c) arrow head line. (d) short dashes.
2. The type of line used in showing visible outline is (a) thin continuous line (b) thick continuous line (c) thin ruled zigzag line (d)thick continuous wavy line.
3. The shortest distance between two points is \_\_\_\_\_\_\_ (a) curve (b) straight line (c) crooked line (d) parallel line
4. Which of the following is not a property of a line? (a)It has position and length (b)It has width and thickness (c)It has virtually no thickness (d) It may be a straight line or curved line.
5. The line that is used in showing hidden details is \_\_\_\_\_\_\_\_\_\_ (a) thin continuous (b) thick continuous (c) arrow hand (d) short dashes

THEORY

* 1. (a) Define a line.

1. Draw a line AB of 60mm and divide the line into 8 equal parts.
   1. Draw line AB equals to 10cm and divide into proportions 3:5:4.

**WEEK SIX AND SEVEN**

**TOPIC: . Geometrical Construction**

**ANGLES**

**CONTENT**

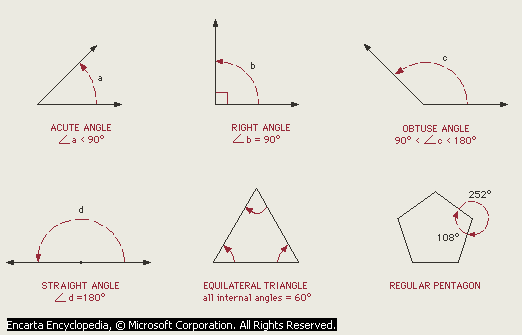
DEFINITION OF ANGLES

TYPES OF ANGLES

BISECTION AND CONSTRUCTION OF ANGLES.

ANGLES

An angle is formed when two straight lines intersect or meet at a point.



The sum of angle at the centre of a complete circle is 3600.

**TYPES OF ANGLES**

1. Acute angles: - These are angles that are less than 900.
2. Right angle: - This is an angle that is equal to 900.
3. Obtuse angles: - These are angles that are greater than 900 but less than 1800.
4. Reflex angles: - These are angles that are greater than 1800 but less than 3600.
5. Complementary angles: - These are angles that sum up to 900.
6. Supplementary angles: - These are angles that sum up to 1800.

**EVALUATION**

1. Define an angle.
2. Mention five types of angle and describe them.

**CONSTRUCTION OF ANGLES**

The following are several ways of constructing or drawing angles:

* Using a setsquare
* Using a combination of setsquares
* Using a protractor
* Using a pair of compasses

**HOW TO CONSTRUCT ANGLES USING SETSQUARE**

Standard angles are angles 300,450, 600 and 900. These angles can be drawn by simply using a setsquare. The method is simply choosing the appropriate setsquare that has the angle that is to be drawn. Thus 300-600 setsquare is used to draw 300, 600 and 900. Similarly, the 45-45 setsquare is used to draw 450 and 900.

**EVALUATION**

With the aid of a set square construct the following angle: i)900 ii) 600 iii)450

**COMBINATION OF SETSQUARES**

Setsquares can be combined to construct the following angles:

1. To construct 750, combine 450 and 600 setsquares

**180**0**- (60**0 **+ 45**0**)= 75**0

1. To construct 1350, combine 450 and 900

**45**0**+ 90**0 **= 135**0

1. To construct 1050, combine 600 and 450

**45**0**+ 60**0 **= 135**0

**EVALUATION**

1. Combine the sets-square to construct angles750 and 1350.
2. Construct angle 60o

**HOW TO DRAW AN ANGLE USING A PROTRACTOR**

Procedure

1. Place the protractor on the line from which the angle is to be formed. The baseline marked O at one end and, 180 marked at the other end.
2. Set the centre of the protractor to start from where the vertex of the angle will be.
3. Mark the required degree of the angles to be drawn.
4. Use a straight line to join the marked point at the angle to the point vertex of the angle

**EVALUATION**

1. Measure the following angles using your protractor

a) 880 b)1700 c)2750 d) 3000 e)150

1. Construct angle 30o

**How to construct Angles Using a Pair of Compasses**

**600**

Procedure

1. Draw a straight line and mark the centre O.
2. From O, using a convenient radius at point A draw an arc (almost a quadrant).
3. With same radius draw another arc to intersect the first arc at C.
4. Draw a line from O through the point of intersection.

The angle formed is 60**0**

**900**

Procedure

* 1. Draw a straight line and mark the centre O.
  2. From O draw a semicircle to touch the straight line at A and B.
  3. From A, with longer radius, draw an arc at the centre up.
  4. From B, with longer radius, draw an arc at the centre up to intersect at C.
  5. Draw a line from O through C.

The angle COA and COB is 90**0**

**BISECTION OF ANGLES**

**To bisect a given angle**

1. Draw a given angle ABC.
2. With centre B and any convenient radius draw an arc to cut AB to D and BC at E.
3. With centre A1 and any small radius an arc.
4. With centre E and the same radius draw an arc to intersect the previous one at F.
5. Join BD, BD bisects angle ABC, i.e. angle ABD= DBC.
6. Use a protractor to check angles ABF and CBF.

The following angles can be constructed by bisection:

* 30**0** can be constructed by bisecting 60**0**
* 15**0** can be constructed by bisecting 30**0**
* 12.5**0** can be constructed by bisecting 15**0**
* 45**0** can be constructed by bisecting 90**0**
* 22.5**0** can be constructed by bisecting 45**0**

WEEKEND ASSIGNMENT

1. The angle that FC makes when constructed perpendicular with line AB is \_\_\_\_\_\_\_ (a) 1800 (b) 2700 (c) 900 (d) 1200
2. The line FC is called \_\_\_\_\_\_\_\_\_\_ (a) vertical (b) perpendicular (c) Horizontal (d) incline
3. Which of the following drawing materials cannot be used to construct a straight line? (a) Compass (b) protractor (c) Ruler (d) pencils
4. Angles that sum up to 1800 is called \_\_\_\_\_\_\_\_\_\_ (a) supplementary (b) complementary (c) Reflex (d) obtuse
5. The line for all visible outlines is called \_\_\_\_\_\_\_\_\_\_\_\_ (a) Thin continuous line (b) Thick continuous line (c) short dashes (d) Zig – Zag lines.

THEORY

1. With the aid of a protractor measure the following angles

(a)150 (b)700 (c)1500 (d)2200 (e)3000.

1. With the aid of compasses and a ruler construct angle 600 and 300

**WEEK EIGHT**

**TOPIC: TRIANGLES**

**CONTENT**

**Triangles**

**Types of triangles**

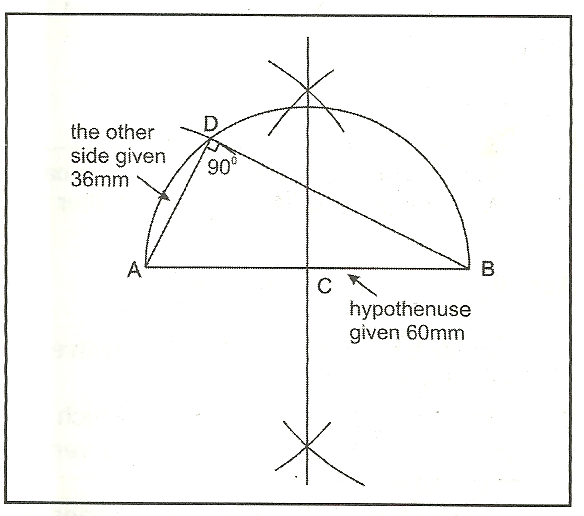
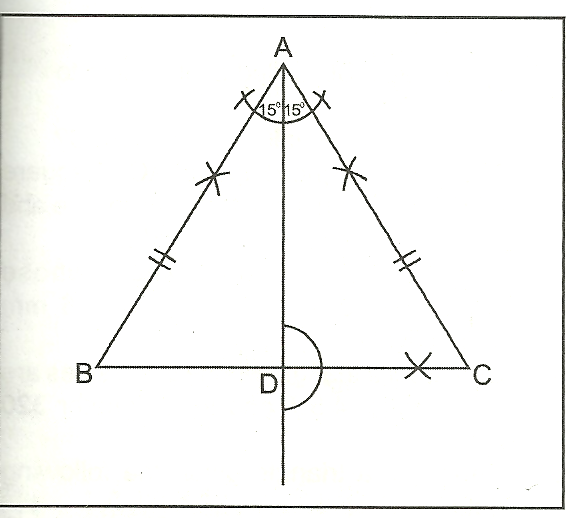
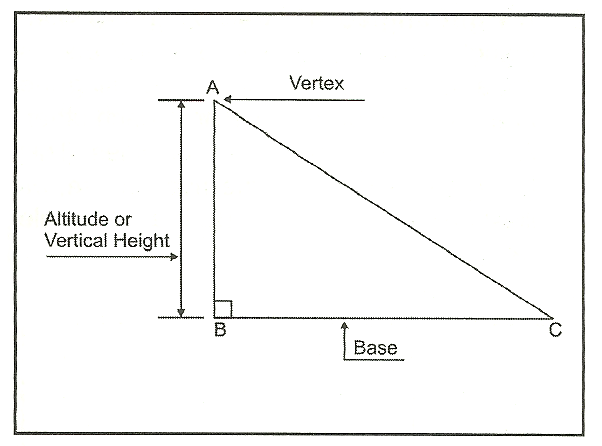
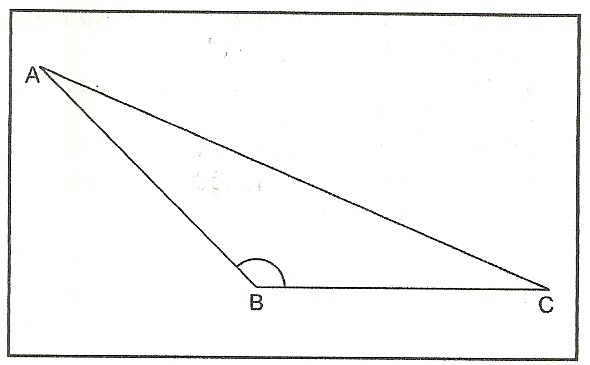
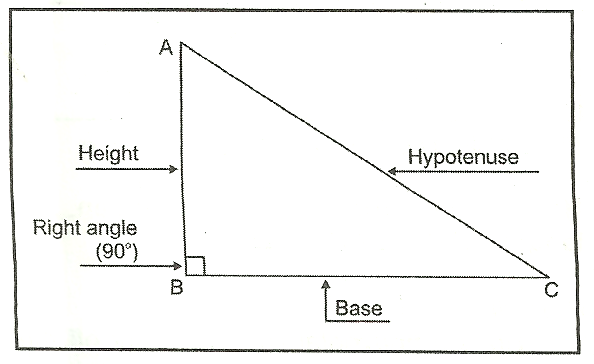
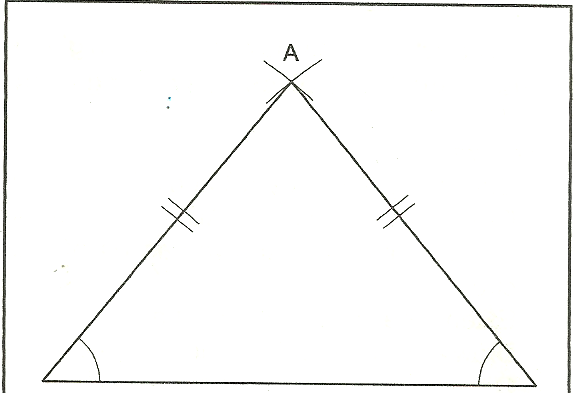
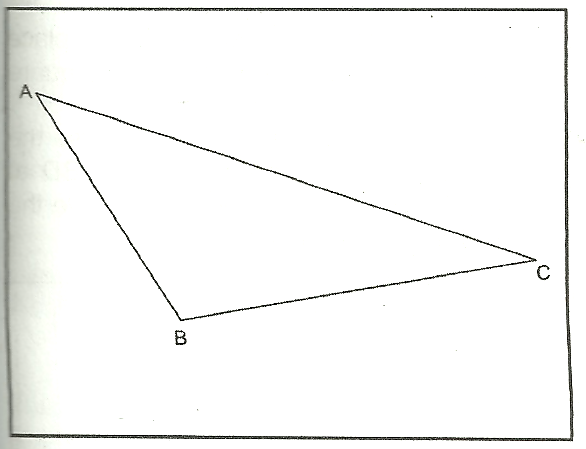
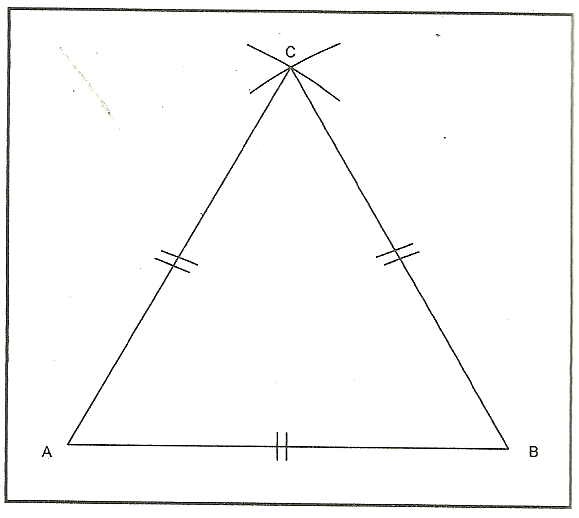
**Construction of triangles**

**TRIANGLE**

A triangle is a plane figure bounded by three straight lines and having three angles. The sum of angles in a triangle is 1800

**TYPES OF TRIANGLES**

1. Scalene triangle: - This is a triangle that has none of its sides or angles equal.
2. Isosceles triangle: - This is a triangle that has two sides and two angles equal.
3. Equilateral triangle: - This is a triangle that has all the three sides and angles equal.
4. Right-angled triangle: - This is a triangle that one of its angles equal to 900 and the longest line facing the 900 is called **THE HYPOTENUSE**



**EVALUATION**

* 1. What is a triangle?
  2. List the types of triangles and describe them.

**TO CONSTRUCT A TRIANGLE GIVEN THE THREE SIDES**

**Procedure**

1. Draw the horizontal line and mark off the base of the triangle AB.
2. With center A and a radius equal to the length of a side of the triangle, strike an arc
3. With center B and a radius equal to the other side strike another arc to cut the previous one at C.
4. Join CA and CB to obtain the triangle ABC.

**EVALUATION**

Construct triangle ABC such that AB is 8cm BC 7cm and AC is 6cm

**TO CONSTRUCT A TRIANGLE GIVEN TWO SIDES AND THE INCLUDED ANGLE**

1. Draw a horizontal line and mark off one of the given sides AB
2. At A, construct the given included angle BAC with the aid of a protractor
3. With center A and radius equal to the other given side of the triangle cut AC at D.
4. Join DB to complete the required triangle ABD

**EVALUATION**

Construct triangle ABC such that line AB is 5cm, <ABC is 600 and line BC is 7cm

**TO CONSTRUCT AN EQUILATERAL TRIANGLE USING COMPASSES**

1. Draw a horizontal line and mark off base AB equal to the given side.
2. With centers A and B and a radius equal to the given side, strike arcs to intersect at C.
3. Join CA and CB to obtain the required equilateral triangle.

**EVALUATION**

* 1. Construct an equilateral triangle whose sides are 6cm long.
  2. Construct triangle ABC such that line AB is 5cm, <ABC is 600 and line BC is 7cm

**WEEKEND ASSIGNMENT**

1. Which of the following triangles has all its sides equal? (a) Equilateral (b) Scalene (c) Isosceles (d) Right-angled
2. Which of the following triangles has none of its side equal? (a) Equilateral (b) Scalene (c) Isosceles (d) Right-angled
3. Which of the following triangles has all two sides equal? (a) Equilateral (b) Scalene (c) Isosceles (d) Right-angled
4. What is the center rule formula used to construct a polygon as well as dividing a circle into equal parts? (a) 360 – N (b) 360 x N (c) 360/ N (d) 360 + N
5. The perpendicular distance from the vertex to the base of triangles is called \_\_\_\_\_\_(a) vetoed (b) Aptitude (c) Altitude (d) Interior

**THEORY**

1. Construct a rectangle of length 7cm and breadth 5cm with the aid of compass and ruler.
2. Construct a square with diagonal 5cm.

**WEEK NINE**

TOPIC: . GEOMETRICAL CONSTRUCTION IV

CIRCLE

CONTENT

**DEFINITION OF CIRCLE**

**PARTS OF A CIRCLE**

A circle is a plane figure bounded by a curved line called the circumference. All the points on the circumference of a circle are equidistant from a point called the centre.

**PARTS OF A CIRCLE**

1. **Diameter**

The diameter is a straight line drawn through the centre of a circle and meeting the circumference at both ends.

1. **Radius**

The radius is a straight line drawn from the centre of a circle to any point on the circumference of the circle. The length of the radius is always used to draw the circle.

1. **Segment**

The segment is an area of the circle bounded by an arc and a straight line called the chord.

1. **Chord**

The chord is a straight line which joins any two given points on the circumference of a circle.

1. **Sector**

The sector is part of the circle bounded by two radii and an arc.

1. **Quadrant**

The quadrant is the part of the circle bounded by two radii which are at right angles to each other, bounded by an arc. The quadrant, as the name, is ¼ of the circle.

1. **Tangent**

The tangent is usually formed outside the circle. When a straight line touched is formed. However, that line must be right angle to a radius

.

**EVALUATION**

* 1. Draw a circle 30mm and show the different parts.
  2. Explain each part of a circle

**HOW TO DRAW A CIRCLE GIVEN THE RADIUS**

**Procedure**

1. Draw the centre lines horizontally, and the other vertically, to intersect each other at E at 900.
2. The point of intersection is the centre. With the compass at centre E, pick the given radius into the compasses.
3. The point of intersection E, is the centre of the circle. Place the pinpoint of the compasses on the centre and swing the pencil round such that the pencil makes 3600 to give the circle.

**HOW TO CONSTRUCT A CIRCLE THROUGH A THREE POINTS WHICH ARE NOT ON A STRAIGHT LINE**

**Procedure**

1. Join the given points ABC with straight lines AB and BC.
2. Draw the perpendicular bisector of the two lines AB and BC to intersect at point D.
3. The point of intersection D is the centre of the circle. With point D as centre, set the pencil point of the compasses to any of the three given point A, B or C
4. Swing your compass through the three points to produce the circle.

**HOW TO DRAW A SERIES OF CIRCLES TOUCHING ONE ANOTHER ON THE TWO CONVERGING LINES**

**Procedure**

1. Copy the given converging lines AB and AC.
2. Bisect the angle between the converging lines BA and CA.
3. Draw a line from A to pass through D.
4. AE is the bisector, and the centre of the circles is located on the bisector.
5. Draw the largest circle by placing the point of the compasses somewhere on the bisector and adjust the pencil point, until the required radius is obtained.
6. Draw a tangent FG to the circle at point of intersection between the circumference of the circle and the bisector .
7. Bisect the angle IJA
8. Draw a line through point K to intersect main bisector AE at L.
9. Note that point L is the centre for smaller circle.
10. With centre L draw the smaller circle to touch the bigger circle tangentially.

**HOW TO FIND CENTRE OF A CIRCLE**

**Procedure**

1. Draw the given circle.
2. Draw any two chords AB and AC.
3. Bisect lines AB and AC. The bisecting lines will intersect at O.
4. O is the centre of the circle.

**EVALUATION**

* + - 1. Draw a circle of diameter 80 mm and determine its centre.
      2. Draw three circles of diameter 40mm touching each other

**WEEKEND ASSIGNMENT**

1. The part of the circle that is bounded by an arc or cord is (a) segment (b) sector (c) diameter (d) tangent.
2. A straight line drawn through the centre, meeting the circumference at both ends is called (a) sector (b)radius (c) diameter (d) tangent
3. A plane figure bounded by a curved line called circumference is called-------(a) triangle (b) circle (c) quadrilaterals (d) curved line
4. Any straight line drawn across the circle, meeting the circumference at both ends is called (a) chord (b) tangent (c) radius (d) diameter
5. Which of the following can be used to draw a circle? (a) protractor (b) French curve (c) compass (d) template

**THEORY**

1. Draw a circle of radius 35mm and divide it into 12 equal sizes.
2. Draw a circle and with shaded portion show (i) quadrant (ii) sector (iii) segment inside the circle.

**WEEK TEN**

**TOPIC: CONSTRUCTION OF TANGENT TO A CIRCLE**

**CONTENT**

* Construction Of Tangent To A Given Circle.

**HOW TO CONSTRUCT A TANGENT TO A CIRCLE AT A GIVEN POINT ON THE CIRCUMFERENCE**

**Procedure**

1. Draw the given circle with centre O
2. Indicate the given point P.
3. Draw a line from centre O to pass through point P to extend outside the circle.
4. With centre P and radius OP, draw an arc to cut the extended line at A.
5. Bisect line OA.
6. Join the bisecting points with a line BC
7. BC is the required tangent

**HOW TO CONSTRUCT A TANGENT TO A CIRCLE FROM A GIVEN POINT OUTSIDE THE CIRCLE**

**Procedure**

1. Draw the given circle with centre O.
2. Indicate the point P to centre O
3. Join point P to the centre O.
4. Construct a semicircle on OP to cut the circle at A.
5. A is point of tangency on the circle.
6. Draw a line to join P to A to give the required.

**HOW TO CONSTRUCT A CIRCLE OF A GIVEN RADIUS TO TOUCH A GIVEN STRAIGHT LINE AND CIRCLE**

**Procedure**

1. Draw the given straight line AB, and a circle O
2. Draw a line parallel to line AB at a distance equal to the radius of the required circle.
3. Take this length (radius of required circle R2 + radius of given circle R1.
4. With O as centre, draw an arc to cut the parallel line at C.
5. With centre C and radius CD, draw required circles.

**HOW TO CONSTRUCT A CIRCLE TO TOUCH THREE GIVEN LINES**

**Procedures**

1. Draw the three given lines.
2. Bisect the two angles.
3. The Bisecting lines should be extended to intersect at O.
4. O is the centre of the required circle.
5. Draw a line perpendicular to any side from centre O to give A.
6. With centre O and radius OA draw the required circle.

**HOW TO CONSTRUCT A CIRCLE OR AN ARC OF A GIVEN RADIUS TO TOUCH TWO GIVEN CONVERGING LINES**

**Procedure**

* Draw the given lines AB and AC
* Draw lines parallel to AB and AC at a distance equal to the radius R of the circle.
* Extend the lines to intersect at O.
* Draw a line perpendicular to AB or AC from O.
* With centre O, and radius OD draw the arc to touch the two converging lines.

**EVALUATION**

1. Draw a tangent to a circle of radius 40mm from a point ‘P ‘80mm outside the circle.
2. With the aid of compasses and a ruler construct angle 600 and 300

WEEKEND ASSIGNMENT

1. The angle that FC makes when constructed perpendicular with line AB is \_\_\_\_\_\_\_ (a) 1800 (b) 2700 (c) 900 (d) 1200
2. The line FC is called \_\_\_\_\_\_\_\_\_\_ (a) vertical (b) perpendicular (c) Horizontal (d) incline
3. Which of the following drawing materials cannot be used to construct a straight line? (a) Compass (b) protractor (c) Ruler (d) pencils
4. Angles that sum up to 1800 is called \_\_\_\_\_\_\_\_\_\_ (a) supplementary (b) complementary (c) Reflex (d) obtuse
5. The line for all visible outlines is called \_\_\_\_\_\_\_\_\_\_\_\_ (a) Thin continuous line (b) Thick continuous line (c) short dashes (d) Zig – Zag lines.

THEORY

* 1. Draw a tangent to a circle of radius 30mm from a point ‘P ‘70mm outside the circle.
  2. With the aid of compasses and a ruler construct angle 600 and 300.