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FIRE FIGHTER'S GUIDE FOR PROMOTION

THE LONDON FIRE DEPARTMENT



FIRE CHIEF - R. MORLEY

PREFACE

The statements contained herein are basic facts, that should provide a guide for study to those preparing for promotion.

Persons responsible for preparing examinations may use these statements, in question form, to compile, Essay Type, True and False Type, Multiple Choice Type or Completion Type examination papers.

The Company Officers will find this book helpful in preparing the In-service Training Program for his men.

It is the purpose of this book to provide a guide for study, for Fire Fighters anxious to increase their knowledge of the Fire Fighting profession.

It is not the intent of this book to provide all of the questions and answers that may appear on any examinations.

"THIRD EDITION"

The information contained herein has been compiled by Fire Chief R. Morley with the assistance of his Director of Training, Division Chief H. Wright.
Included in this book are sample questions that could be used on examination papers, also, the London Fire Department's Promotional Policy.

LONDON FIRE DEPARTMENT

Fire Chief	**Raymond Morley**
Deputy Fire Chief	**Earl Fenwick**
Director of Training	**Herbert Wright**
Captain Instructor	**Robert Barr**

"ROPES"

1. Rope is made from different fibres, three kinds of rope are: MANILA, SISAL, and HEMP.
2. Manila rope is made from the ABACA PLANT or the WILD BANANA of the PHILIPPINE ISLANDS.
3. The London Fire Department uses MANILA rope.
4. Rope is made by TWISTING the FIBRES together to make a YARN.
5. The YARNS are twisted together to make a STRAND.
6. The STRANDS are twisted together to form the ROPE.
7. REVERSING the twist in every step of the making of a rope LOCKS it together.
8. The TWIST in the one direction offers equal RESISTANCE to the TWIST in the opposite direction, which BALANCES the rope and keeps it in proper SHAPE.
9. The DIRECTION of the TWIST in a rope, is INDICATED by the terms "LEFT HAND", "RIGHT HAND" or "WITH THE SUN".
10. NEW rope being put into SERVICE should be HUNG from a tower for several DAYS, with sufficient WEIGHT attached to STRETCH it ready for use.
11. THREE strand rope laid up in a "RIGHT HAND" direction forms a "HAWSER LAID" rope.
12. FOUR strand rope laid up in a "RIGHT HAND" direction, forms a "SHROUD LAID" rope.
13. Most of the rope used in the Fire Service is THREE STRAND, or "HAWSER LAID" rope.
14. ROPE is usually describe by giving its DIAMETER in INCHES.
15. To calculate the BREAKING STRENGTH of a rope, MULTIPLY the SAFE WORKING LOAD by FIVE.
16. To calculate the SAFE WORKING LOAD of a rope, DIVIDE the BREAKING STRENGTH by FIVE.
17. The SAFE WORKING LOAD (SWL) of a ONE-HALF INCH manila rope is 530 POUNDS.
18. The SWL of a FIVE-EIGTHS manila rope is 880 POUNDS.
19. The SWL of a THREE-QUARTERS INCH manila rope is 1080 POUNDS.
20. A rope should be CHECKED after EVERY TIME it is used.
21. An examination of a rope should be made along ITS ENTIRE LENGTH every SIX MONTHS.
22. Check a rope for BROKEN or CUT fibres.
23. A rope should be checked for MILDEW, or DECAY.
24. The STRANDS of a rope should be SEPARATED at THREE FOOT intervals and examined for damage.
25. Rope should be kept in a DRY TRUCK COMPARTMENT and should NOT be placed alongside of tools with SHARP EDGES.
26. When a KNOT is tied in a rope, the WEAKEST part of the rope is at the KNOT.
27. Rope should be REPLACED every FIVE YEARS.
28. Check your rope EVERY TIME you use it.
29. After being used at a fire, WASH, STRETCH and DRY your ropes.

"ROPES" (continued)

30. Check your rope for pieces of GLASS or other SHARP OBJECTS.
31. When HAULING tools aloft, with a rope, use a HOSE ROLLER.
32. Do not DRAG a rope along the ground or through CHEMICALS.
33. The DECREASE in the TENSILE strength of a rope according to various knots is:

REEF KNOT	50%	CLOVE HITCH	35%
BOWLINE	40%	SHORT SPLICE	20%

34. The SWL of the various sized ropes used is:

¼" rope SWL	120 Pounds	Breaking Strength	600 Pounds
⅜" rope SWL	270 Pounds	Breaking Strength	1,350 Pounds
½" rope SWL	530 Pounds	Breaking Strength	2,650 Pounds
⅝" rope SWL	880 Pounds	Breaking Strength	4,400 Pounds
¾" rope SWL	1,080 Pounds	Breaking Strength	5,400 Pounds
1" rope SWL	1,800 Pounds	Breaking Strength	9,000 Pounds

"BREATHING APPARATUS"

1. Two common types of Breathing Apparatus are:
   FILTER TYPE (All Service)
   SELF-CONTAINED.
2. Two kinds of SELF-CONTAINED Breathing Apparatus are: the DEMAND TYPE and the OXYGEN GENERATING TYPE.
3. The main chemical in the FILTER TYPE is called HOPCALITE.
4. The PURPOSE of the HOPCALITE in the FILTER CANISTER is to change CARBON-MONOXIDE to CARBON-DIOXIDE.
5. Hopcalite is known as a CATALYST.
6. The CATALYST in the OXYGEN GENERATING type apparatus is POTASSIUM SUPEROXIDE.
7. POTASSIUM SUPEROXIDE is known as a CATALYST and produces OXYGEN when the MOISTURE from your BREATH comes in contact with it.
8. A DEMAND TYPE breathing apparatus is said to be an OPEN SYSTEM, because the EXHALATION of your breath is VENTED to the OUTSIDE.
9. The OXYGEN GENERATING type breathing apparatus is said to be a CLOSED SYSTEM because your EXHALED air remains in the SYSTEM and is not vented to the outside.
10. The FILTER TYPE breathing apparatus will NOT afford PROTECTION to the wearer if the ATMOSPHERE contains LESS than 16% OXYGEN.
11. The SELF-CONTAINED type breathing apparatus WILL afford PROTECTION in ANY ATMOSPHERE, excepting atmospheres containing HIGH concentrations of AMMONIA or HYDROGEN CYANIDE.
12. The RATED TIME LIMIT for the FILTER TYPE breathing apparatus is TWO HOURS.
13. The RATED TIME LIMIT for the DEMAND TYPE apparatus is approximately THIRTY MINUTES.
14. The RATED TIME LIMIT for the OXYGEN GENERATING type apparatus is FORTY-FIVE MINUTES.
15. The RATED TIME LIMITS of any breathing apparatus can be AFFECTED by many factors, the DEMAND of the wearer, ATMOSPHERIC conditions and FAULTY equipment.
16. The CYLINDERS of the DEMAND type apparatus contain 1980 PSI and 2216 PSI of FILTERED PURE AIR.
17. The CYLINDERS of the DEMAND TYPE apparatus should should be given a HYDROSTATIC TEST every FIVE YEARS.
18. The THREE main valves on the DEMAND TYPE apparatus are:
    the TANK VALVE or MAIN LINE VALVE.
    the DEMAND VALVE.
    the EMERGENCY BY-PASS VALVE.
19. The London Fire Department has TWO SELF-CONTAINED, BG 174 DRAGER breathing apparatus.

"BREATHING APPARATUS" (continued)

20. The DRAGER BG 174 apparatus is a CLOSED SYSTEM, the BREATHING AIR is constantly circulated by the power of the lungs.
21. The DRAGER APPARATUS employs the COMBINED USE of a REGENERATING CARTRIDGE and a COMPRESSED OXYGEN SUPPLY.
22. The COMPRESSED OXYGEN SUPPLY in the DRAGER APPARATUS supplies a CONSTANT DOSAGE at the rate of 1.5 LITRES PER MINUTE.
23. When the DRAGER BG 174 is put into use the CIRCUIT is automatically FLUSHED with approximately 6 LITRES OF OXYGEN.
24. The PARTS of the Drager BG 174 are:
    the CARRYING FRAME,
    the CARRYING HARNESS,
    the OXYGEN DISTRIBUTOR,
    the PRESSURE GAUGE LINE,
    the VALVE BOX,
    the BREATHING BAG,
    the BREATHING TUBES,
    the PROTECTIVE CASING,
    the OXYGEN CYLINDER,
    the REGENERATING CARTRIDGE.
25. The REGENERATING CARTRIDGE or OXYGEN CYLINDER has a CAPACITY of 400 LITRES.
26. The REGENERATING CARTRIDGE contains RECHARGEABLE SODA-LIME.
27. The regenerating cartridge has a TIME LIMIT of FOUR HOURS.
28. When handling any PRESSURIZED CYLINDERS care should be taken not to break the neck of the bottle, if so they will take off like a rocket.

"FIRE HOSE"

1. FIRE HOSE is one of the most ESSENTIAL items on any Fire Department.
2. Fire hose should NOT BE USED for any other PURPOSE than FIRE FIGHTING.
3. Fire hose should be TESTED ANNUALLY at a pressure of 250 PSI for THREE MINUTES.
4. UNLINED LINEN hose has no rubber lining and is used mainly for STANDPIPE INSTALLATIONS.
5. Rubber lined hose is available in either SINGLE JACKET or DOUBLE JACKET, and is used in the FIRE SERVICE.
6. Rubber lined, rubber covered, REINFORCED hose is used for DRAFTING LEADS at is will NOT COLLAPSE when pulling a VACUUM.
7. All fire hose purchased by a Fire Department MUST be UNDERWRITER TESTED.
8. The MOST COMMON sized hose used in the FIRE SERVICE is 2½" hose.
9. For most HOUSE FIRES or where MANOUVERABILITY is required, the 1½" hose is an EFFECTIVE offensive WEAPON.
10. For LARGE STREAM APPLIANCES the 3" and 3½" hose REDUCES the amount of FRICTION LOSS.
11. For VERY SMALL fires the BOOSTER is effective.
12. Hose needs GOOD CARE, after use it should be WASHED to get rid of any GRIT or DIRT PARTICLES.
13. Hose should be THOROUGHLY DRIED before being placed on the truck.
14. Care should be taken to PREVENT SULPHURIC ACID or the contents of a SOD ACID EXTINGUISHER from getting on the hose.
15. ACID will DESTROY the COTTON FABRIC.
16. Mechanical INJURY to fire hose may be caused by: DRAGGING, CUTS, SNAGS, and ABRASIONS, these are common injuries to fire hose.
17. NO TRAFFIC should be ALLOWED to cross over FIRE
18. When a vehicle crosses over fire hose, examination of the LINING will show that the LINING has been SEPARATED from the JACKET.
19. Hose can be DAMAGED by subjecting it to EXCESSIVE HEAT.

"FIRE HOSE" (continued)

20. Hose can be DAMAGED by MILDEW or MOLD, which is caused by IMPROPER DRYING.

21. Hose can be DAMAGED by FREEZING.

22. Hose can be DAMAGED by coming in contact with CHEMICALS.

23. Hose can be DAMAGED by SHARP EDGES.

24. Hose should be CHANGED on the trucks every MONTH.

25. There are TWO types of COUPLINGS in common use, they are the PIN LUG and the ROCKER LUG type couplings.

26. A COUPLING having an OUTSIDE THREAD is called a MALE COUPLING.

27. A COUPLING having an INSIDE THREAD is called a FEMALE COUPLING.

28. A SIAMESE ADAPTOR has TWO FEMALE ENDS and ONE MALE END. It is used to JOIN two 2½" lines into ONE 2½" line.

29. A WYE ADAPTOR has ONE FEMALE END and TWO MALE ENDS. It is used to SEPARATE one 2½" LINE into TWO 2½" LINES.

30. A REDUCING ADAPTOR reduces ONE 2½" LINE into ONE 1½" LINE.

31. A MULTIPLE REDUCING ADAPTOR reduces ONE 2½" line down into TWO or more 1½" lines.

"HAND LADDERS"

1. Ladders are designed with either a SOLID or a TRUSSED beam.
2. The RUNGS are set in the CENTRE of a SOLID BEAMED ladder.
3. TRUSSED LADDERS are designed to increase the STRENGTH of the ladder.
4. Long hand ladders are usually TRUSSED BEAM construction in order that the WEIGHT is REDUCED.
5. The rungs of a TRUSSED LADDER are set either into the BEAMS of the ladder or into the RUNG BLOCKS.
6. The RUNG BEAM is the name of the beam into which the RUNGS are inserted and runs PARALLEL to the trussed beam.
7. Some TRUSSED LADDERS have the rungs inserted in the CENTRE of the RUNG BLOCKS.
8. Ladders are constructed of WOOD, ALUMINUM ALLOY and STEEL ALLOY.
9. Fire Department ladders are classified as to their use and construction as STRAIGHT or WALL LADDERS, EXTENSION, ROOF, ATTIC and AERIAL LADDERS.
10. Very FEW straight ladders are OVER 30 FEET long.
11. Some of the longer EXTENSION LADDERS have POLES, these are called TORMENTOR POLES.
12. A ladder known as a BANGOR LADDER has POLES or TORMENTORS.
13. TORMENTOR POLES are used to ASSIST in the RAISING of a ladder and also give it STABILITY when it is in USE.
14. EVERY ladder should be CAPABLE of withstanding a TEST LOAD.
15. A ladder should withstand a DEAD WEIGHT of ONE MAN every FIVE FEET.
16. A ladder should withstand a LIVE WEIGHT of 200 POUNDS every TEN FEET.
17. Each RUNG of a ladder should be TESTED SEPARATELY.
18. A DEAD WEIGHT of 400 POUNDS should be attached at the CENTRE OF EACH RUNG.
19. The cardinal rule for the maintenance of a ladder is to INSPECT the ladder after it has been USED.
20. When CLIMBING a ladder, the CORRECT SPACING between climbers is TEN FEET.
21. When POSITIONING a ladder for CLIMBING an agle of 70 DEGREES is desirable.
22. A THUMB RULE for determining the position of the BUTT of a ladder from the BASE of a BUILDING is: DIVIDE the extended or WORKING LENGTH of the ladder by FOUR and ADD TWO for CORNICE.

23. One of the easiest methods of PLACING the BUTT of a ladder the PROPER DISTANCE from the BASE of a building for CLIMBING, place the ladder in position, then stand with your FEET between the rungs, EXTEND your arms straight out from your shoulders, your hands should rest on a rung. If this is so then the ladder is at the PROPER ANGLE for climbing.
24. When placing a ladder into a WINDOW put the TOP of the ladder INSIDE the opening, to the LEFT or RIGHT.
25. It is DESIRABLE to have SIX MEN to raise a 50 or 55 FOOT BANGOR LADDER.
26. When working off either side of a WALL LADDER, a LEG LOCK should be APPLIED.
27. A ladder can be ANCHORED into a window with a KELLY HOOK or a LADDER STRAP.
28. For safety, the FLY ROPE or HALYARD should be TIED OFF using the APPROVED SAFETY HITCH.
29. The LADDER LOAD on a 12 to 16 foot ladder is ONE MAN.
30. The LADDER LOAD on a 18 to 24 foot ladder is TWO MEN.
31. The LADDER LOAD on a 28 to 40 foot ladder is THREE MEN.
32. The LADDER LOAD on a 45 to 55 foot ladder is FOUR MEN.
33. Ladders are used for gaining access to UPPER FLOORS.
34. Ladders are used for ADVANCING hose lines ALOFT.
35. Ladders are used for RESCUE from UPPER FLOORS.
36. Ladders can be used for BRIDGING GAPS.
37. Ladders provide a fire fighter with a VANTAGE POINT from which he can DIRECT a FIRE STREAM.
38. Ladders can be used to MAKE an IMPROVISED STRETCHER.
39. Ladders can be used to make a SUBSTITUTE CELLAR NOZZLE.
40. Ladders can be used to SUPPORT an AERIAL LADDER if it is being used at a LOW ANGLE TO THE HORIZONTAL.

"VENTILATION"

1. VENTILATION is the CONTROLLED REMOVAL of SMOKE, HEAT, and GASES.
2. When VENTILATING we must CONTROL the REPLACEMENT of the heat, smoke and gases with FRESH AIR.
3. The REASONS for ventilation are:
   Aids in LIFE SAVING and RESCUE.
   Reduces the DANGER of BACKDRAFT.
   Reduces SMOKE damage.
   LESSENS the DANGER of MUSHROOMING.
   Lessens the DANGER to EXPOSURES.
   Permits PROMPT SALVAGE operations.
   Makes Firefighting EASIER.
4. The NATURAL methods of ventilation are: VERTICAL and HORIZONTAL.
5. Ventilation can be accomplished by the use of MECHANICAL SMOKE EJECTORS.
6. Ventilation can be carried out by using FOG NOZZLES in the openings, such as doors and windows.
7. Ventilation should be CARRIED OUT on the ORDERS of the OFFICER IN CHARGE.
8. Ventilation should be carried out from TOP to BOTTOM.
9. When opening WINDOWS for ventilation, open the LEE SIDE FIRST.
10. Ventilation should be closely co-ordinated with FORCIBLE ENTRY.
11. When ventilating CHARGED LINES should be ready to ADVANCE or to PROTECT EXPOSURES.
12. Situations that may require the use of mechanical ventilation are:
    When the TYPE of CONSTRUCTION is not SUITABLE to natural methods.
    Where the FIRE is BELOW the STREET LEVEL.
    When the FIRE is extinguished and NO AIR currents EXIST.
13. A SMOKE EJECTOR will move from 5,000 to 12,000 cubic feet of air per MINUTE.
14. Under certain conditions a SMOKE EJECTOR may INCREASE the danger of a BACKDRAFT.
15. TWO indications that VENTILATING is required are: the SMOKE CONDITION and the HEAT CONDITION.
16. When making DRAFT HOLES for ventilation, make the hole OVER THE FIRE.
17. A HOLE made in a roof for ventilation, if made at the OPPOSITE end away from the FIRE, will have a tendency to PULL the fire.
18. When making a ROOF OPENING, make the opening LARGE ENOUGH, as near the fire as possible, and KEEP your back to the wind.
19. Ventilating crews should wear BREATHING APPARATUS.
20. The floors ABOVE the fire will CONTAIN the GASES OF COMBUSTION and they may be SUPER-HEATED.
21. When MEN are ALOFT ventilating, they should always KNOW an ESCAPE ROUTE.

"FIRE STREAM TABLES"

1. One Imperial gallon of fresh water CONTAINS 277.25 CUBIC INCHES.
2. To CONVERT U.S. GALLONS to Imperial gallons, MULTIPLY by .833.
3. A column of water ONE FOOT HIGH and having a cross sectional area of ONE SQUARE INCH, weighs .433 POUNDS.
4. To find the PRESSURE at any given point from an ELEVATED TANK or RESERVOIR, MULTIPLY the vertical distance in feet, from the point in question to the WATER LEVEL in the tank by .433.
5. ONE INCH of Mercury is equal to 1.133 FEET of water.
6. TWO INCHES of Mercury may be taken as ONE P.S.I.
7. If the GALLONS PER MINUTE flowing through a pipe or hose line is DOUBLED, the FRICTION LOSS will be increased nearly FOUR TIMES.
8. The approximate FRICTION LOSS in 2½" rubber lined hose can be found by using the FORMULA of $30^2 + 0$.
9. The discharge in gallons per minute flowing from any nozzle can be found by using the formula $24.7D^2$ x SQUARE ROOT OF THE NOZZLE PRESSURE.
10. ATMOSPHERIC PRESSURE at sea level is said to be 14.7 PSI.
11. FRICTION LOSS is said to be the RESISTANCE TO THE FLOW OF MOTION.
12. The RATE OF SPEED at which water passes through the nozzle is called NOZZLE VELOCITY.
13. A NOZZLE operated under PRESSURE should be OPENED and CLOSED SLOWLY.
14. By opening and closing the nozzle slowly the NOZZLE REACTION or KICK-BACK is reduced.
15. THREE kinds of PRESSURE that a Fire Fighter should be familiar with and understand are: STATIC, RESIDUAL and FLOW.
16. Static pressure is POTENTIAL ENERGY, produced by water at rest, not in motion.
17. Residual pressure is the REMAINDER or what is left, after water has been set in motion. This pressure can be READ on the LOW PRESSURE SIDE of the pump on the INTAKE GAUGE.
18. Flow pressure is the WORKING PRESSURE, a good example is the NOZZLE PRESSURE of a hose line.
19. A FIRE STREAM is a stream of water AFTER IT LEAVES the nozzle until it REACHES its INTENDED POINT OF USE.
20. FIVE different kinds of FIRE STREAMS are: SOLID, MASTER, BROKEN, FOG, and WATER CURTAINS.
21. A SOLID FIRE STREAM is used where GPM are a factor but most important is REACH.

"FIRE STREAM TABLES" (continued)

22. MASTER STREAMS are used where REACH is a factor but most important is the GALLONS PER MINUTE flowing.
23. BROKEN FIRE STREAMS are used to protect exposures mainly.
24. FOG STREAMS are used where HEAT ABSORPTION is required also where CONVERSION TO STEAM is desired.
25. WATER CURTAINS are used to protect EXPOSURES, ususually these will be found as PERMANENT INSTALLATIONS on theatre stages.
26. The EXPANSION RATE of water when CONVERTED to steam is ONE to 1,700. That is ONE CUBIC FOOT of water, when converted to steam will produce 1,700 CUBIC FEET OF STEAM.
27. When using a STRAIGHT STREAM, 60% of that stream is said to be RUN-OFF.
28. To INCREASE the discharge or gallons per minute from a nozzle, it is necessary to INCREASE the PRESSURE AT THE NOZZLE.
29. We can INCREASE the GPM DISCHARGE from a nozzle, maintaining the same pressure, if we INCREASE the SIZE of the NOZZLE TIP.
30. A FIRE STREAM has both VERTICAL and HORIZONTAL distance or REACH.
31. To CALCULATE the REACH OF A STREAM use the formula, NP ÷ 2 + 26 (+ 5 for each ⅛" over ¾").
32. The GREATER the PRESSURE the GREATER the REACH from a NOZZLE.
33. The more CYLINDRICAL THE STREAM when it leaves the nozzle the GREATER THE REACH.
34. The GREATER the nozzle SIZE, with the same NOZZLE PRESSURE, the GREATER will be the REACH from the nozzle.
35. A FIRE STREAM used from the STREET LEVEL will not be EFFECTIVE ABOVE the THIRD FLOOR.
36. A FIRE STREAM is most EFFECTIVE working at an ANGLE of 45 DEGREES or under.
37. Forces of nature which tend to DESTROY a FIRE STREAM are: GRAVITY, WIND VELOCITY and FRICTION WITH THE AIR.
38. A THUMB RULE for determining the REACH of a FIRE STREAM is, ONE FOOT of reach for EVERY POUND of NOZZLE PRESSURE.
39. When LAYING HOSE LINES, a SHORT LAY is any line laid up to SIX LENGTHS.
40. A MEDIUM LAY is any line containing from SEVEN to TWELVE LENGTHS.
41. A LONG LAY is any line containing from THIRTEEN LENGTHS and OVER.
42. A FOG STREAM is said to be a STREAM OF WATER SEPARATED into FINELY DIVIDED PARTICLES.
43. FOG STREAMS are produced by the use of IMPINGING, SWIRLING, and PERIPHERY type NOZZLES.

44. The REQUIREMENTS of a good SOLID STREAM are:
    1. It must not lose its CONTINUITY by breaking into SHOWERS or SPRAY.
    2. It must SHOOT 9/10ths of its entire MASS through a 15" CIRCLE and ¾ through a 10" CIRCLE at a GIVEN POINT.

45. A Fire Stream MUST HAVE:
    good flow CAPACITY.
    effective REACH.
    proper PENETRATION.
    effective DEFLECTION.
    proper SHAPE.
    the RIGHT SIZE.

46. In producing FIRE STREAMS various different sized TIPS are used on the NOZZLES, such as, ½", ⅝", ¾", 1", 1-⅛", 1-¼" and 1-½".

"PUMPS"

1. THREE of the MOST COMMON types of PUMPS are the PISTON PUMP, the ROTARY PUMP and the CENTRIFUGAL PUMP.
2. The ROTARY and the PISTON PUMPS are SELF PRIMING at draft.
3. The ROTARY PUMP and the PISTON PUMP are said to be POSITIVE DISPLACEMENT pumps.
4. The CENTRIFUGAL PUMP is NON-POSITIVE DISPLACEMENT and therefore is NOT SELF PRIMING at draft.
5. A CENTRIFUGAL PUMP requires a PRIMING DEVICE.
6. The EXHAUST PRIMER, operating on the VENTURI PRINCIPLE is used on some Centrifugal Pumps.
7. Some Centrifugal pumps are equipped with a ROTARY GEAR PRIMER.
8. Some of the different types of ROTARY GEAR PUMPS are: the CLOVER LEAF,
   EIGHT TOOTH,
   ROTARY VANE.
9. CENTRIFUGAL PUMPS are either, SINGLE STAGE or TWO STAGE or MULTI-STAGE pumps.
10. PISTON PUMPS are either SINGLE or DOUBLE ACTION PUMPS.
11. The CHURN VALVE on the ROTARY PUMP by-passes water from the LOW PRESSURE SIDE to the HIGH PRESSURE SIDE, this is done to PREVENT STALLING.
12. To change the STAGES of a CENTRIFUGAL PUMP a TRANSFER VALVE, or CHANGE-OVER VALVE is used.
13. The CHANGE-OVER or TRANSFER VALVE changes the pumping stage from PRESSURE to CAPACITY, or vice versa.
14. The SERIES POSITION is the PRESSURE POSITION on a Centrifugal Pump.
15. If a Centrifugal Pump is being operated in the PARALLEL POSITION this is the VOLUME POSITION of the pump, or CAPACITY.
16. PUMPING is nothing more than creating PRESSURE DIFFERENTIALS.
17. When a pump is required to take water from below the intake it is called LIFT PUMPING or DRAFTING.
18. When DRAFTING with a Centrifugal pump, a PRIMING DEVICE is used to create a PARTIAL VACUUM within the PUMP and the SUCTION LEADS.
19. When the air is EVACUATED from within the PUMP and the PUMP SUCTION LEADS, atmospheric pressure on the surface of the water PUSHES the water into the PUMP.
20. The most COMMON GAUGES found on the OPERATOR'S PANEL of a PUMPER are: INTAKE GAUGE PUMP PRESSURE GAUGE, Individual Line PRESSURE GAUGES, TACHOMETER GAUGE TEMPERATURE GAUGE.
21. The TACHOMETER GAUGE indicates the ENGINE SPEED.
22. NEGATIVE PRESSURE shown on a COMPOUND GAUGE is read in INCHES OF MERCURY.

"PUMPS" (continued)

23. To determine the required PUMP PRESSURE for a certain HOSE LAY you must know the NOZZLE PRESSURE required and the FRICTION LOSS in the layout.
24. When taking a line of HOSE ALOFT, you must ADD FIVE POUNDS for each FLOOR, this is to COMPENSATE for the BACK-PRESSURE created by the WEIGHT of the water due to its HEIGHT.
25. When HOSE LINES are taken ALOFT, the PUMP OPERATOR must always make allowances for the BACK-PRESSURE.
26. FRICTION LOSS depends on the SIZE of the HOSE and the AMOUNT of WATER being DISCHARGED from the NOZZLE.
27. If a PUMP OPERATOR should increase the amount of WATER FLOWING through a HOSE LINE he will INCREASE the FRICTION LOSS in that line, DOUBLE the FLOW and he will increase his FRICTION LOSS by APPROXIMATELY FOUR TIMES.
28. If you are discharging 200 GALLONS PER MINUTE through a 8⅛" hose line the FRICTION LOSS will be approximately 14 PSI. If you double the GPM from 200 to 400 the FRICTION LOSS will be increased to 52 PSI, almost four times as great.
29. To compensate for the SURGE of pressure coming back to the pump when hose lines are SHUT OFF, a pump is EQUIPPED with a GOVERNOR or a PRESSURE RELIEF VALVE.
30. Some things that will cause a pump to go into VACUUM, that is to lose its water are:
    WATER MAINS too SMALL,
    WATER MAINS too LONG,
    INSUFFICIENT FLOW PRESSURE,
    Other PUMPS on the SAME MAIN,
    OBSTRUCTION IN THE MAIN or the PUMP INTAKE.
31. The EFFECTS of having a PUMP go into VACUUM are:
    the PUMPER cannot SUPPLY WATER,
    UNNECESSARY LOAD IMPOSED ON THE PUMP,
    AIR will be DRAWN INTO THE HOSE LINES.
    WATER MAINS will COLLAPSE,
    DAMAGE will be done to the PUMP DUE TO CAVITATION.
32. When a PUMPER is hooked to a HYDRANT, the STATIC PRESSURE is read and WATER is started to FLOW from the PUMPER. If a DROP in the PRESSURE READING of 40% OCCURS, NO MORE lines can be taken off of the pumper, of that same SIZE AND CALIBRE.
33. If the DROP in the STATIC PRESSURE, after water is FLOWING is 20% then ONE MORE line, of the same SIZE and CALIBRE may be taken off of that pump.
34. If the PRESSURE drop is 10%, TWO MORE lines of the same SIZE can be taken off of that pump.
35. If the PRESSURE DROP is only 7%, then THREE MORE lines of the same SIZE may be taken off of that pump.
36. When you are PUMPING from a HYDRANT do NOT ALLOW the INTAKE PRESSURE on the LOW SIDE to become LESS than FIVE POUNDS.
37. When working from a HYDRANT an INTAKE PRESSURE of TEN POUNDS is more DESIRABLE.

"PUMPS" (continued)

38. The TIP FACTOR for a ONE INCH tip is FIVE.

39. The TIP FACTOR for a ONE & ONE QUARTER INCH tip is TWO.

40. The TIP FACTOR for a ONE & ONE HALF INCH tip is ONE.

41. If you have your PUMPER in the PROPER GEAR for pumping, then the TACHOMETER and the SPEEDOMETER will both ADVANCE when you INCREASE the RPM's.

42. Pump OPERATORS should always WATCH THOSE GAUGES.

"BACKDRAFT"

1. Carbon Dioxide is HEAVIER than AIR.
2. Carbon Monoxide is about the SAME GRAVITY as AIR, but SLIGHTLY LIGHTER.
3. Carbon Dioxide and Carbon Monoxide are TWO GENERAL gases of COMBUSTION.
4. CARBON DIOXIDE is NOT FLAMMABLE.
5. CARBON MONOXIDE is FLAMMABLE and will EXPLODE when mixed with AIR at the right TEMPERATURE.
6. The IGNITION TEMPERATURE of CARBON MONOXIDE is 1204 DEGREES Fh.
7. The IGNITION TEMPERATURE of CARBON PARTICLES is 412 DEGREES Fh.
8. GASES when HEATED, become buoyant and will EXPAND and RISE.
9. A SMOULDERING FIRE produces CARBON MONOXIDE, which is brought about by the LACK OF OXYGEN.
10. A BACK-DRAFT is the RAPID, almost INSTANTANEOUS COMBUSTION of FLAMMABLE GASES.
11. When the PRESSURE builds up in a FAIRLY TIGHT structure, PUFFS of SMOKE can be seen EMITTING from the OPENINGS, this is called SPACE BREATHING.
12. BACK-DRAFTS can be CONTROLLED by PROMPT and CONTROLLED VENTILATION.
13. RELEASING the built up GASES and HEAT will REDUCE the PRESSURE within the building and may PREVENT a BACK-DRAFT.
14. Some of the WARNING SIGNS of an impending BACK-DRAFT are:
    Unusually THICK BLACK SMOKE,
    Outside WALLS are HOT to TOUCH,
    WINDOWS will be HOT and DISCOLORED,
    WINDOWS can be HEARD RATTLING from THREE to FIVE FEET away,
    ROOF SHINGLES may be FLAPPING,
    FLAMES may NOT be VISIBLE, or they have a SICKLY YELLOW HUE,
    FLAMES seem to have LOST their LIVELINESS,
    SOUNDS may APPEAR MUFFLED or DISTANT,
    SWIRLING SMOKE that is CLOSE to the FLOOR may all of a SUDDEN RUSH and CLEAR.
15. If you are IN a building where a BACK-DRAFT is EVIDENT, take the following safety PRECAUTIONS:
    CLEAR the building if POSSIBLE,
    If ON A LADDER stay BELOW the OPENING,
    LAY FLAT on the FLOOR and Cover as much of your BODY as possible,
    DO NOT face a wall, HEAT may BOUNCE back INTO your FACE,
    AFTER the initial BLAST has gone, GET CLEAR of the BUILDING as QUICKLY as possible.
16. A Back-draft may OCCUR TWICE in the SAME BUILDING, as another SECTION of the building may HAVE the same CONDITIONS.

"AERIAL LADDERS"

1. The OPERATOR of an AERIAL LADDER should be FAMILIAR with the CONTROLS.
   He SHOULD KNOW:
   Where each CONTROL is LOCATED,
   What each CONTROL DOES,
   HOW each CONTROL OPERATES,
   WHEN each CONTROL should be USED,
   WHAT ATTENTION the AERIAL NEEDS.
2. FOUR mechanical SAFETY FACTORS that MUST be considered by AERIAL LADDER OPERATORS are:
   IMOBILIZING the VEHICLE to PREVENT MOVEMENT when the AERIAL LADDER is being USED,
   PREVENTING the VEHICLE from CAPSIZING due to IMPROPER WEIGHT and LOAD DISTRIBUTION,
   PREVENTING the LADDER or its SUPPORTS from DAMAGE due to OVERLOAD,
   UNWARRANTED MOVEMENT of the LADDER when it is IN USE.
3. THREE things should be DONE BEFORE the AERIAL LADDER IS RAISED,
   AFTER engaging the HYDRAULIC SYSTEM,
   SET the BRAKE,
   PLACE the WHEEL CHOCKS,
   POSITION the STABILIZING JACKS or OUTRIGGERS.
4. After the SAFETY FACTORS have been adhered to, the OPERATIONS are as follows:
   ELEVATE the ladder to the PROPER ANGLE,
   ROTATE the ladder to the TARGET,
   EXTEND the FLIES to the OBJECTIVE,
   LOWER the ladder to POSITION.
5. When the ladder is in the DESIRED POSITION the LADDER LOCKS or the DOGS should be LOCKED.
6. When ARRIVING at the FIRE SCENE the AERIAL should be POSITIONED to provide the MAXIMUM STABILITY and the EFFECTIVE REACH.
7. When setting the JACKS or OUTRIGGERS a SLIGHT OUTWARD CANT is preferable to an INWARD CANT.
8. When LOWERING the ladder into a BUILDING, the ladder should be LOWERED to within a FEW INCHES of the object to which it is lowered to rest.
9. The WEIGHT of the ladder will bring the ladder TO REST on the supporting structure. This PRESERVES the MAXIMUM load carrying CAPACITY of the ladder, as ALL TRUSSING is in TENSION.
10. If an AERIAL LADDER is lowered into a building WITH PRESSURE the LOAD CAPACITY is REDUCED.
11. If an EXTENDED AERIAL is to be used with the TOP end UNSUPPORTED it is being used in the CANTILEVER POSITION.
12. If the extended aerial is to be used for an EXTENDED PERIOD of TIME, the LADDER LOCK VALVE should be CLOSED.
13. EACH of the OPERATIONS of the AERIAL LADDER should be carried out SEPARATELY.

14. When an Aerial Ladder becomes COATED with ICE, or it is being USED in HIGH WINDS, the order "RIG FOR SAFETY" should be given.
15. By rigging for safety the GUY ROPES EASE some of the STRAIN on the ladder.
16. If an AERIAL LADDER comes in contact with ENERGIZED ELECTRICAL wires all men should JUMP CLEAR from the vehicle, being careful NOT TO TOUCH the vehicle and the GROUND at the SAME TIME.
17. A man ALOFT on an AERIAL is SAFE, LIKE A BIRD ON A WIRE, as long as he is not in DIRECT CONTACT with the WIRES.
18. When operating an AERIAL LADDER as a WATER TOWER, it should NOT BE USED at its fully EXTENDED HEIGHT.
19. A 100 foot AERIAL LADDER being used as a WATER TOWER should NOT be EXTENDED MORE than EIGHTY FEET.
20. The ANGLE OF ELEVATION on the ladder DEPENDS on the HEIGHT to which it will be EXTENDED and the LOAD that will be imposed.
21. When using an AERIAL LADDER as a WATER TOWER the ANGLE OF ELEVATION should not be LESS than 70 DEGREES and not OVER 75 DEGREES.
22. A THUMB RULE to guide the OPERATOR when using an AERIAL as a WATER TOWER using a STRAIGHT TIP is 75 - 80 - 80, 75 degrees of angle, 80 feet of height and 80 pounds nozzle pressure.
23. When the ladder is being USED and RAISED in LINE with the truck chassis it has its GREATEST STABILITY.
24. When the truck is at an ANGLE of about 15 DEGREES, so that the ladder is SLIGHTLY OUT OF LINE with the CHASSIS the vehicle is said to have FAIR STABILITY.
25. If an AERIAL LADDER is used FULLY EXTENDED in the CANTILEVER position, with a LIVE LOAD, it has its LEAST STABILITY.
26. When an AERIAL LADDER is in the CANTILEVER position the STRAIN is INCREASED as the OUTER END is LOADED.
27. When an AERIAL LADDER is in the NEAR VERTICAL position and the TOP END is SUPPORTED by a structure the LEAST STRAIN is ENCOUNTERED.
28. When the TOP end is SUPPORTED by a structure and the LOAD IMPOSED on the CENTRE of the LADDER the load will DEFLECT the BEAMS if an IMPROPER ANGLE of ELEVATION is used.
29. If the ANGLE is more to the VERTICAL the BEAMS SUPPORT the LOAD.
30. THREE things that should be AVOIDED when operating an Aerial Ladder are:
    WHIPPING the LADDER.
    IMPROPER ANGLES.
    IMPROPER LOADS.

"ELEVATED PLATFORMS"

1. Our ELEVATED PLATFORM is known as the SKY KING, by SNORKEL.
2. Our ELEVATED PLATFORM has a MAXIMUM REACH of 85 FEET.
3. The MAIN COMPONENTS are:
   the TURNTABLE,
   the ELEVATING BOOMS,
   the OPERATING PLATFORM.
4. The MECHANICAL LEVELING SYSTEM operated on the principle of the PARALLELOGRAM.
5. This PARALLELOGRAM PRINCIPLE keeps the OPERATING PLATFORM level at all times, regardless of BOOM MOVEMENT.
6. AUTOMATIC STOPS prevent OVER-LIFTING either of the BOOM SECTIONS.
7. Retractable OUTRIGGER STABILIZERS located on BOTH SIDES of the main frame enable the PLATFORM to be LEVELED and STABILIZED.
8. Power to operate the HYDRAULIC SYSTEM is obtained from the truck POWER TAKE-OFF.
9. Power may also be obtained from an OPTIONAL POWER PAK that is equipped with a 20 HORSEPOWER GASOLINE ENGINE.
10. The HYDRAULIC SYSTEM actuates the TURNTABLE ROTATION MOTOR, the BOOM OPERATING CYLINDERS and the OUTRIGGER CYLINDERS.
11. The HYDRAULIC FLUID is distributed through the system by STEEL TUBING and FLEXIBLE HOSES.
12. The SNORKEL is provided with TWO CONTROL STATIONS, one on the OPERATING PLATFORM or BASKET and one at GROUND LEVEL at the REAR of the VEHICLE.
13. Only ASSIGNED OPERATORS should be permitted to OPERATE this equipment.
14. ASSIGNED OPERATORS MUST be thoroughly FAMILIAR with the OPERATING INSTRUCTIONS and the equipment's CAPABILITIES and LIMITATIONS.
15. ALL SAFETY precautions MUST be STRICTLY ADHERED TO at all times.
16. The SNORKEL is equipped with a 1050 IGPM SINGLE STAGE CENTRIFUGAL PUMP.
17. The RATED LOAD CAPACITY of our SNORKEL is:
    with an ALUMINUM PLATFORM — 900 POUNDS.
    with a STEEL PLATFORM — 700 POUNDS.
18. The LOAD CAPACITY of the Platform is DECREASED in DIRECT PROPORTION with the NOZZLE REACTION when the water system is used.
19. If the vehicle is on a SLOPING SURFACE the OUTRIGGERS on the LOW SIDE should be put down and SET FIRST.
20. The STABILIZING OUTRIGGERS should never be OVER-EXTENDED, this can make them very DIFFICULT to RETRACT.

"ELEVATED PLATFORMS" (continued)

21. If the OUTRIGGER STROKE is too SHORT to permit the LEGS to set firmly on the ground, suitable BLOCKS should be PROVIDED.
22. Operating on SOFT TERRAIN, PADS should be provided under the OUTRIGGERS and they should have a BEARING AREA of approximately 18 SQUARE INCHES.
23. If OUTRIGGER LEG or LEGS are set on a CURB the FULCRUM POINT will be SHORTENED and the LOAD CAPACITY will be REDUCED by about 300 POUNDS.
24. OUTRIGGERS must be SET prior to attempting to RAISE the BOOMS.
25. ALL CONTROLS should be OPERATED SMOOTHLY and with EXTREME CAUTION.
26. If it is necessary to operate on UNEVEN TERRAIN, then the vehicle STABILIZATION becomes more of a PROBLEM.
27. ALWAYS OPERATE the equipment with the vehicle POINTED UPHILL.
28. KEEP the LOWER BOOM "back" or "lowered" slightly, (5 to 10 Degrees).
29. AVOID LOADING the Platform to its MAXIMUM rated CAPACITY.
30. AVOID ERRATIC or FAST MOVEMENTS, this will REDUCE the danger of imposing SHOCK LOADS.
31. OPERATION should be RESTRICTED to the HIGH SIDE of the TURNTABLE if you are operating on UNEVEN GROUND.
32. The GROUND STATION OPERATING CONTROLS are at the very REAR of the vehicle.
33. At the GROUND STATION CONTROL there are FIVE operating LEVERS. THREE of which are used to POSITION THE PLATFORM and the other TWO POSITION the OUTRIGGERS.
34. The PUSH-PULL CONTROL at the bottom left, labeled PLATFORM CONTROL SHUT-OFF allows the GROUND CONTROL OPERATOR to DEACTIVATE the PLATFORM CONTROLS for safety purposes.
35. The three position MASTER SWITCH selects the POWER SOURCE for energizing the platform ELECTRICAL CIRCUIT and COMMUNICATIONS system.
36. The MASTER SWITCH has TWO POSITIONS. In the TRUCK position, power is taken from the truck MOTOR, in the AUX position power is coming from the AUXILIARY MOTOR or the POWER PAK.
37. The AERIAL PLATFORM should be THOROUGHLY CHECKED for OIL LEAKS.
38. The Snorkel SHOULD ALWAYS be POSITIONED to PROVIDE MAXIMUM STABILITY at a FIRE.
39. The GROUND CONTROL OPERATOR should keep a CONTINUOUS WATCH of the PLATFORM'S POSITION.

40. The GROUND CONTROL OPERATOR should WARN the PLATFORM OPERATOR if he is:
near OBSTRUCTIONS or HAZARDS that he may not be AWARE of.
nearing a POSITION with the PLATFORM that will JEOPARDIZE the VEHICLE STABILITY.

41. The GROUND CONTROL OPERATOR should ASSUME CONTROL from the GROUND CONTROL STATION if it is OBVIOUS that the PLATFORM OPERATOR has LOST CONTROL.

42. The Snorkel's CHAUFFEUR MUST at all times when driving, KEEP IN MIND the overall HEIGHT and OVERHANG of the BOOMS beyond the front of the vehicle.

43. NEVER ALLOW unauthorized PERSONS ALOFT in the platform, nor allow them to OPERATE the VEHICLE.

44. ALWAYS LOOK in the DIRECTION you are MOVING THE PLATFORM.

"INCENDIARY FIRES"

1. An INCENDIARY FIRE causes HIGH TEMPERATURES and changes or destroys the PHYSICAL CHARACTERTISTICS of the MATERIAL which are burned or AFFECTED by the FIRE.

2. Every fire has a CAUSE and there is also a REASON for every fire.

3. The cause of a fire is defined as to that which occasions or EFFECTS a RESULT.

4. The REASON of a fire is defined as a MOTIVE leading to an ACTION.

5. The CAUSE of a fire may be ACCIDENTAL, a MALFUNCTION of EQUIPMENT or ARSON, as well as other causes.

6. The REASON for an INCENDIARY FIRE may be ONE of the MOTIVES for ARSON.

7. Incendiary fires are often STARTED with an ACCELERANT.

8. One of the MOST DIFFICULT crimes to PROVE is that of ARSON.

9. THREE FACTS must be LEGALLY PROVEN in order to CONVICT a person of the crime of arson, they are:
   THAT THERE WAS A FIRE,
   THAT the FIRE was of INCENDIARY ORIGIN,
   That the PERSON ACCUSED either set or procured the SETTING of the FIRE.

10. It is NOT NECESSARY to prove MOTIVE in order to CONVICT an arsonist.

11. It IS NECESSARY to prove INTENT, that is the burning was WILFUL and MALICIOUS.

12. A FIRE FIGHTER should be OBSERVANT and answer THREE important QUESTIONS,
    WHERE did the FIRE START?
    Was there EVIDENCE of an EXPLOSION?
    Was there MORE THAN ONE FIRE?

13. It is IMPORTANT that we KNOW the EXACT TIME and DATE of the ALARM.

14. Some information valuable to the investigator is:
    the COLOUR OF the SMOKE,
    were PETROLEUM PRODUCTS used as an ACCELERANT,
    was there any SIGNS of FORCED ENTRY, BEFORE the Fire Department arrived.

15. The FIRE CHIEF, or any FIRE FIGHTER is considered to be an EXPERT, and may GIVE EVIDENCE, they are considered experts by the KNOWLEDGE and EXPERIENCE they possess.

"FIRE SERVICE OFFICER"

1. An OFFICER should be SELECTED for the CONTENT of his EFFORT.
2. An OFFICER should be SELECTED for his SPECIALIZED ABILITIES.
3. An OFFICER should be SELECTED for his JUDGEMENT, KNOWLEDGE and EXPERIENCE.
4. When SELECTING an OFFICER, FACTS are better than OPINIONS, we must know:
   WHAT HE HAS DONE,
   HOW HE HAS DONE IT,
   WHAT CAN HE DO NOW.
5. LEADERSHIP is the ABILITY to MOTIVATE people to think, and DIRECT their EFFORTS.
6. Before a man can GIVE ORDERS, he must FIRST have LEARNED to TAKE ORDERS.
7. To DISCIPLINE OTHERS a man must practice SELF-DISCIPLINE, and RESTRAINT.
8. An ORGANIZATION is a PURPOSEFUL, SYSTEMATIC ARRANGEMENT of component PARTS.
9. WITHOUT ORGANIZATION there can be NO line of RESPONSIBILITY or AUTHORITY.
10. WORK should be APPORTIONED among the various INDIVIDUALS according to some LOGICAL PLAN.
11. The WORK can be DIVIDED into TWO CATAGORIES:
    FIRE FIGHTING and FIRE PREVENTION.
    ADMINISTRATION and RECORDS, and MAINTENANCE.
12. FIRE FIGHTING is an ACTIVE DEFENCE against fire.
13. FIRE PREVENTION is a PASSIVE DEFENCE against fire.
14. THREE top MANAGEMENT functions are:
    PLANNING, TRAINING and SUPERVISION.
15. AUTHORITY is the LEGAL or RIGHTFUL POWER to ACT or COMMAND.
16. Authority CONFERS the RIGHT of SUPERIORS to acquire CONFORMITY of SUBORDINATES to decisions.
17. RESPONSIBILITY is the OBLIGATION of a SUBORDINATE to PERFORM the duties ASSIGNED by superiors.
18. An OFFICER, to GIVE successful DIRECTION must IN-CULCATE a keen APPRECIATION of the TRADITIONS, HISTORY, and POLICIES of the FIRE SERVICE.
19. Good COORDINATION REMOVES critical PROBLEMS as they arise.
20. People COOPERATE as a result of UNDERSTANDING one anothers TASKS.
21. The OBJECT of DISCIPLINE is to INCREASE the EFFICIENCY of the UNIT.
22. A Fire Department MUST HAVE good PUBLIC RELATIONS to be SUCCESSFUL.
23. PUBLIC RELATIONS can be considered as the TOTAL EFFECT on the public of:
    WHAT WE DO,
    WHAT WE SAY and
    WHAT WE ARE.

24. He who would be FIRST IN PLACE must be FIRST IN MERIT.
25. There are THREE TYPES of OFFICERS, they are:
the EASY GOING TYPE,
the AUTOCRATIC TYPE and
the EFFECTIVE OFFICER.
26. The PURPOSE of DISCIPLINARY ACTION is to PREVENT a REPETITION of an OFFENCE.
27. A Fire Department's EFFICIENCY is IMPAIRED if there is NO DISCIPLINE.
28. There are FOUR main RESPONSIBILITIES of a Fire Department:
to PREVENT fires from STARTING,
to PREVENT LOSS OF LIFE and PROPERTY in case a FIRE DOES START,
to CONFINE a FIRE to its POINT or POINTS of ORIGIN,
to EXTINGUISH the FIRE.
29. THREE general TYPES of BUILDING CONSTRUCTION are:
FIRE RESISTIVE, BRICK and FRAME.
30. Some FACTS an Officer SHOULD KNOW when answering an alarm in his OWN DISTRICT are:
the TYPE of BUILDING involved,
the TYPE of OCCUPANCY.
31. Some TYPES of OCCUPANCIES are:
PUBLIC BUILDINGS,
INSTITUTIONAL BUILDINGS,
MERCANTILE BUILDINGS,
INDUSTRIAL BUILDINGS,
STORAGE BUILDINGS, and
MULTIPLE OCCUPANCIES.
32. A THUMB RULE to initiate a COURSE OF ACTION against a fire is:
LOCATE. - CONFINE. - EXTINGUISH.
33. THREE CONSIDERATIONS should be given when making an ATTACK on fire:
COVER the EXPOSURES,
COVER the avenues of ESCAPE,
STOP the SPREAD of FIRE.
34. A general RULE for SIZE-UP is:
CALL for HELP,
RESCUE,
LADDERING,
LAYING LINES,
FORCIBLE ENTRY,
VENTILATION,
SALVAGE and OVERHAUL.
35. A FOUR POINT RULE in ATTACKING a fire is:
OVER, UNDER, FRONT and REAR.
36. An old AXIOM of the Fire Service is: "SAVE THE STAIRS AND SAVE THE BUILDING!"
37. INTERIOR ACTIVITIES at a fire can be DIVIDED into

TWO CATEGORIES, they are:
SEARCH and REMOVAL OF OCCUPANTS, and
VENTILATION,
APPLICATION of WATER and EXTINGUISHMENT.

38. TWO principle FACTORS to be DECIDED upon when making ENTRY into a building are:
LOCATION of the FIRE, and
the PURPOSE of the ENTRY.
39. Some REASONS for ENTRY into a building are:
RESCUE, VENTILATION, SALVAGE and
EXTINGUISHMENT.
40. FOUR METHODS of fire SPREAD from point to point are:
CONVECTION, CONDUCTION, RADIATION and DIRECT FLAME CONTACT.
41. When ATTACKING a fire in a building it is ESSENTIAL that we PREVENT the UPWARD SPREAD of the fire, the VERTICAL SHAFTS should be COVERED by HOSE LINES.
42. When DECIDING the SIZE of your ATTACK LINES, consider:
SIZE of the FIRE,
SIZE of AREA INVOLVED,
MATERIALS INVOLVED,
CONSTRUCTION of the BUILDING,
EXPOSURES,
Available WATER SUPPLY.
43. The AMOUNT of HEAT GENERATION will depend upon the OXYGEN and the AMOUNT of COMBUSTIBLE MATERIAL involved.
44. The more RAPID the RISE in the TEMPERATURE, the MORE WATER application is NECESSARY.
45. The GREATER the HEAT, the MORE WATER needed to ABSORB the HEAT.
46. CARE must be taken NOT TO DESTROY the THERMAL BALANCE when applying water.
47. Have the hose lines SHUT DOWN when you have BLACKED OUT the fire.
48. The INDIRECT METHOD of applying WATER FOG is used when the FIRE is HARD TO REACH.
49. The DIRECT METHOD of water APPLICATION is best SUITED when the heat intensity is LOW.
50. The COMBINATION METHOD of applying WATER FOG is best when RAPID EXTINGUISHMENT is needed.
51. When ATTACKING FIRES it is WISE to have BACK-UP LINES available.
52. A FIRE that is FREE BURNING is said to be in the STEADY STATE.
53. RADIO FREQUENCIES are allocated by the DEPARTMENT OF TRANSPORT which is a FEDERAL AGENCY.
54. The LONDON FIRE DEPARTMENT operates on 154.37 Mcs. FREQUENCY.
55. The ONTARIO FIRE MARSHAL'S frequency is 154.07 Mcs.
56. The MIDDLESEX COUNTY fire frequency is 154.37 Mcs.

57. The EMERGENCY MEASURES ACT defines emergencies into TWO CATAGORIES:
NATURAL emergency,
NATIONAL emergency.
58. A NATIONAL EMERGENCY means, a REAL or APPREHENDED WAR, an INVASION or an INSURRECTION.
59. A NATURAL EMERGENCY is a FLOOD, TORNADO, HURRICANE.
60. The BODY RESPONSIBLE for setting FIRE INSURANCE RATES and STANDARDS in CANADA is the CANADIAN UNDERWRITER'S ASSOCIATION.
61. Legal AUTHORITY for FIRE INSPECTION in ONTARIO is set forth in the ONTARIO FIRE MARSHAL'S ACT, SECTION 19.
62. ANYONE who wilfully SETS FIRE to his OWN or ANOTHER PERSON'S property for FRAUDULENT or MALICIOUS purposes is GUILTY of an OFFENCE and can be charged with ARSON.
63. Some of the SPECIAL DIVISIONS of the FIRE MARSHAL'S OFFICE are:
ONTARIO FIRE COLLEGE,
ARSON INVESTIGATION DIVISION,
FIRE SERVICES DIVISION,
ENGINEERING DIVISION,
STATISTICS DIVISION.
64. City DEPARTMENTS that AID in some measure of FIRE PROTECTION are:
WATERWORKS,
POLICE,
PLANNING,
BUILDING INSPECTION,
HEALTH.
65. FACTORS that have CONTRIBUTED to the DOWNWARD TREND in FIRE LOSES are:
IMPROVED firefighting TECHNIQUES,
IMPROVED and more EQUIPMENT,
INCREASED fire prevention ACTIVITIES,
IMPROVED training PROGRAMS,
IMPROVED SALVAGE and OVERHAUL techniques,
Fire RESISTIVE BUILDINGS.
66. SECTION 13, Sub Section (b) gives the FIRE CHIEF the authority to CLOSE ANY PREMISES where he has reason to believe that there has been PREPARATIONS made to CAUSE a FIRE.
67. In DETERMINING the POINT OF ORIGIN of a FIRE, look for the GREATEST amount of CHARRING at the LOWEST POINT.
68. FOUR AGENCIES that ASSIST in some measure, toward FIRE PROTECTION are:
CANADIAN UNDERWRITER'S ASSOCIATION,
CANADIAN STANDARDS ASSOCIATION,
UNDERWRITER'S LABORATORIES OF CANADA,
NATIONAL RESEARCH COUNCIL OF CANADA.

69. The INVESTIGATION of fires is IMPORTANT as a PRIMARY MEANS of detecting INCENDIARISM and securing evidence for the conviction of ARSONISTS.
70. Reports of ALL FIRES occuring in a MUNICIPALITY must be REPORTED to the FIRE MARSHAL'S OFFICE within THREE DAYS after the fire.
71. THREE FACTORS should be CONSIDERED when evaluating fires, they are:
the CAUSE OF THE FIRE,
HOW THE FIRE WAS FOUGHT,
the TYPE OF OCCUPANCY.
72. On a FIRE REPORT under the HEADING of CAUSE OF FIRE, ONE of THREE things should be ENTERED:
CAUSE OF FIRE, IF KNOWN,
PROBABLE CAUSE, IF YOU HAVE A REASON,
UNKNOWN, IF CAUSE IS NOT ESTABLISHED.
73. In ONTARIO persons designated as STATUTORY ASSISTANCE to the FIRE MARSHAL are:
FIRE CHIEFS of established Fire Departments,
PERSONS assigned exclusively to the FIRE PREVENTION BUREAU,
MUNICIPAL CLERKS.
74. The TOTAL COST of MUNICIPAL fire PROTECTION includes:
VALUE of the PROPERTY DESTROYED,
INSURANCE PREMIUMS in excess of LOSSES paid,
LOSS OF TAXES,
LOSS OF WAGES to the COMMUNITY,
LOSSES due to INTERRUPTION of BUSINESS.
75. The FLASH POINT is that TEMPERATURE at which a FLAMMABLE LIQUID will give off VAPORS in sufficient QUANTITIES to FLASH or BURN on the APPROACH of a FLAME, and if the TEMPERATURE is BELOW 100 DEGREES Fh it is CLASSED as a VOLATILE SUBSTANCE.
76. FIRE involving TANK INSTALLATIONS can be EXTINGUISHED by:
STOPPING the FLOW of the FUEL by CLOSING the VALVE,
STOPPING the FLOW of the FUEL by REPLACING the fuel with WATER.
77. HORIZONTAL TANKS are NOT to be PLACED on UNPROTECTED STEEL supports.
78. When ATTACKING TANK FIRES, four KEY FEATURES should be CONSIDERED:
COMMAND,
FOG PATTERNS,
HOSE LINE OPERATIONS,
PROTECTION OF PERSONNEL.
79. An OFFICER IN CHARGE of the ATTACKING LINES, at a fire involving TANK INSTALLATIONS should, place himself BETWEEN THE LINES at the NOZZLES and DIRECT the MEN with his HANDS.

80. The OFFICER IN CHARGE of the ATTACKING LINES directs the attack by SIGNALLING and DIRECTING movements by his HANDS on the NOZZLEMEN'S SHOULDERS.
81. VERBAL ORDERS are NOT AUDIBLE because of the great NOISE created by the ESCAPING PRESSURE.
82. It is IMPORTANT that the PROPER FOG PATTERNS are maintained, the FOG PATTERNS should be OVERLAPPED for the MAXIMUM PROTECTION.
83. The NARROW FOG PATTERN is EFFECTIVE in driving HEAT AWAY and MOVING the flammable LIQUID on the ground FROM UNDER THE TANK.
84. The BOTTOM EDGE of the FOG PATTERN should be played near the EDGE of the LIQUID and kept WELL IN FRONT of the NOZZLEMEN.
85. In HANDLING HOSE LINES, as in any fire, the BACK MEN on the lines should keep the line LOW AND NEAR THE GROUND, so that the NOZZLEMEN will have better CONTROL over the NOZZLE.
86. A NOZZLE PRESSURE of 80 PSI for 2½" FOG LINES and 100 PSI for 1½" FOG LINES will allow maximum EASE OF HANDLING.
87. The ATTACK on a tank fire should be MADE AFTER the tank has been COOLED in order to REDUCE the INTERNAL VAPOR PRESSURE.
88. The OFFICER can tell when the INTERNAL VAPOR PRESSURE has been REDUCED by watching the INTENSITY of the FIRE coming out of the TANK VENT.
89. An ATTACK on a FLAMMABLE LIQUID fire should be made SLOWLY and DELIBERATELY.
90. Your ATTACK on a TANK FIRE should be made by APPROACHING from the SIDES OF THE TANK, NOT from the ENDS.
91. The ENDS OF A TANK are the WEAKEST part of the tank construction, and they MAY BLOW OUT.
92. DIRECT fire STREAMS on the TOP OF THE TANK, the water will run down the sides, keeping the TANK COOL.
93. The GREATEST DANGER when fighting a TANK FIRE is from a PRESSURE FAILURE of the tank, or, an INTERNAL VAPOR-AIR EXPLOSION.
94. The PRESSURE in the tank WILL DEPEND on how long the fire has been BURNING and the EXTENT that the tank has been EXPOSED to flame and heat, and the SIZE OF THE VENT.
95. When ATTACKING TANK FIRES, the HOSE CREWS should remain ON THEIR FEET, in a CROUCHED POSITION, so that they can RETREAT if necessary.
96. DO NOT extinguish the VENT FIRE too quickly, because FLAMMABLE VAPORS might still be FLOWING and RE-IGNITE with a flash of flame.
97. ALL tank INSTALLATIONS in the COMPANY DISTRICT should be PRE-PLANNED in order that the crews have first-hand KNOWLEDGE of the conditions.

98. When a fire INVOLVING FLAMMABLE LIQUIDS is considered TOO DANGEROUS or TOO USELESS to fight, HOSE HOLDERS and MONITORS should be used, LARGE stream APPLIANCES will protect the MEN and the EXPOSURES.

99. Tanks on UNPROTECTED STEEL SUPPORTS always pre--sent the DANGER OF COLLAPSE of the supports.

100. When fighting a fire at a tank installation, get in TOUCH with the PLANT MANAGER, he will OFFER very helpful ADVICE.

101. Tank installation requires that DIKES should be BUILT to prevent liquid from flowing to adjacent BUILDINGS or TANKS.

102. Vertical tanks are constructed with a WEAK, ROOF TO SHELL JOINT, which will act as an EMERGENCY VENT.

103. SIX RULES to follow when fighting TANK FIRES involving FLAMMABLE LIQUIDS ars:
APPROACH HORIZONTAL TANKS FROM THE SIDES, and place cooling water on the tanks and unprotected steel supports as soon as possible.
FLUSH THE FUEL from under the tanks and shut off the flow of fuel, if possible.
Use PORTABLE MONITORS or HOSEHOLDERS for tank fire that are too dangerous or too useless to fight.
PRE-PLAN each tank installation in your district.
Always wear FULL PROTECTIVE CLOTHING.
Carefully study, the FLAMMABLE LIQUIDS CODE.

104. PROPANE GAS is sometimes referred to as BOTTLED GAS or LPG.

105. PROPANE is extracted from NATURAL and REFINERY GASES.

106. PROPANE is normally a vapor gas at TEMPERATURES above its BOILING POINT, which is 44 DEGREES BELOW ZERO Fh.

107. PROPANE is COMPRESSED into a LIQUID STATE and will remain a liquid UNDER PRESSURE when STORED in proper PRESSURE CONTAINERS.

108. PRESSURES in Propane CONTAINERS will vary with the LIQUID GAS TEMPERATURE.
109. For each DEGREE of rise in TEMPERATURE, liquid PROPANE will have a correlating INCREASE OF PRESSURE.
110. As the TEMPERATURE RISES so does the CYLINDER PRESSURE in the Propane tank.
111. PROPANE CYLINDERS should ALWAYS be TRANSPORTED and STORED in an UPRIGHT POSITION.
112. PROPANE CYLINDERS are NEVER charged completely LIQUID FULL, a VAPOR SPACE must be maintained above the LIQUID LEVEL to allow for the LIQUID EXPANSION.
113. STANDARD CYINDERS are charged with 100 POUNDS, by weight of LIQUID GAS.
114. CYLINDERS lying HORIZONTAL allow LIQUID GAS to communicate with the RELIEF VALVE, and if the same were required to function due to abnormal pressure LIQUID GAS would emit from the valve. It would allow vapor to flow to vapor consuming appliances, BOTH THESE CONDITIONS WOULD BE UNSAFE.
115. PROPANE CYLINDERS should be kept in a DESIGNATED SAFE PLACE when not being used.
116. For EXTINGUISHMENT, DRY POWDER or CARBON DIOXIDE can be used.
117. Fires involving Propane installations should be fought the same as other tank fires, REMEMBER — COOL THE TANK to REDUCE internal vapor PRESSURE.
118. When attacking fire involving Propane, EXTREME CAUTION should be taken. use BACK-UP LINES, KEEP TANKS COOL, and ATTEMPT TO SHUT OFF THE FLOW OF FUEL.
119. EMERGENCIES involving LEAKS and SPILLS of LPG can be handled in the following manner, if NO FIRE is involved:
leave APPARATUS OUTSIDE VAPOR AREA
leave VEHICLES WHERE THEY ARE, do not attempt to start them,
PREVENT IGNITION of the VAPOR CLOUD,
PROTECT EXPOSURES,
get PEOPLE OUT of the VAPOR AREA,
get the FLOW OF FUEL SHUT OFF.
120. PLANNING is the process of TAKING TIME to analyze the problem of:
WHERE ARE YOU GOING,
HOW DO YOU INTEND TO GET THERE,
WHAT YOU INTEND TO ACCOMPLISH.
121. When the following OBJECTIVES have been REACHED by the officers making the pre-plan, the AIM has been ACCOMPLISHED:
to STRATEGICALLY POSITION available FIRE APPARATUS,
to PROVIDE adequate FIRE PROTECTION and LIFE SAFETY,
to MAKE the best USE of all available MANPOWER and FACILITIES.

122. In PREPARING for a pre-planning TRAINING SESSION, the following GUIDE may be of HELP to the OFFICER:
CASE LIST of similar PROBLEMS,
EXISTING ASSIGNMENTS,
LIFE SAFETY FACTORS,
BUILDING CONSTRUCTION,
ACCESSIBILITY and ENTRANCE,
VERTICAL OPENINGS,
EXPOSURES,
ROOFS, FIRE WALLS,
available WATER SUPPLY.

123. The following TYPES of CONSTRUCTION should be discussed:
FIRE RESISTIVE - BRICK - FRAME.

124. Some PRIVATE fire PROTECTION should be discussed, such as:
SPRINKLER SYSTEMS,
STANDPIPE SYSTEMS,
SMOKE and HEAT DETECTORS.

125. COMPANY OFFICERS should PRE-PLAN the following:
RESIDENTIAL BUILDINGS and AREAS,
EDUCATIONAL AREAS,
INSTITUTIONAL BUILDINGS,
HIGH VALUE DISTRICTS,
SUBURBAN AREAS, business areas and shopping malls,
WAREHOUSE BUILDINGS,
HIGH RISE APARTMENTS.

126. Some SPECIAL TARGET HAZARDS that should be PRE-PLANNED are:
LUMBER YARDS - HOSPITALS - CHEMICAL PLANTS
BULK OIL STORAGE - THEATRES - CHURCHES

127. A CONFLAGRATION is a SWEEPING FIRE that spreads OUT OF CONTROL and DESTROYS CITIES or LARGE AREAS of built up property.

128. CONFLAGRATIONS, generally fall into ONE of the following catagories:
Fires STARTING in HAZARDOUS OCCUPANCIES in CONGESTED AREAS,
FIRES SPREADING in MORE than ONE DIRECTION, before effective RESISTANCE is ORGANIZED to bring them under CONTROL.
Fires OCCURING in extensive FOREST or BUSH AREAS,
Fires STARTING from EXPLOSIONS that SPREAD over a WIDE AREA.

129. CONFLAGRATIONS may occur for the following REASONS:
WINDS in excess of 30 MPH.
Inadequate WATER SUPPLY.
Inadequate FIRE FIGHTING FACILITIES.
Lack of EXPOSURE PROTECTION.

130. INFORMATION that is ESSENTIAL to effectively PRE-PLAN:
LOCATION of the STAIRWELLS,
LOCATION of the VERTICAL SHAFTS,
LOCATION of the SKYLIGHTS,
LOCATION of dangerous or FLAMMABLE MATERIALS,
LOCATION of the EXITS,
DANGER of WATER ABSORPTION in the STOCK.

131. PRE-FIRE PLANNING is a COURSE of ACTION against FIRE, that PREPARES us for:
Possible DYNAMIC and SPECTACULAR ACTION,
FLEXIBILITY,
Company TEAMWORK,
COORDINATING special ACTIVITIES,
Positive THINKING,
ANTICIPATE others ACTIONS,
ALLOWS for ALTERNATE PLANS.

132. For FIRES involving HIGHRISE BUILDINGS, it is IMPORTANT to have ADEQUATE RESPONSE on the FIRST ALARM.

133. For FIRES in HIGHRISE BUILDINGS there should be:
Adequate WATER SUPPLY to the STANDPIPE SYSTEM,
ENOUGH hose CREWS to operate on the FIRE FLOOR,
ENOUGH CREWS to accomplish EVACUATIONS from the UPPER FLOORS.

134. The SIAMESE CONNECTION should be PROVIDED with 150 PSI by the FIRST or the SECOND PUMPER company to arrive.

135. At alarms for HIGHRISE BUILDING fires, the FIRST COMPANY in will:
be an ATTACK FORCE, and initiate a HOLDING ACTION.
USE the fire STAIRWELLS,
proceed with their HIGHRISE KITS to,
the FLOOR BELOW the fire, and,
use STANDPIPE for INITIAL ATTACK, while,
PROTECTING the AVENUES of ESCAPE, and try to,
CONFINE the FIRE to its place of ORIGIN, and also,
SURPRESS the FIRE.

136. At alarms for HIGHRISE BUILDING FIRES, the SECOND and THIRD COMPANIES in, will:
ADVANCE with the PROPER EQUIPMENT, to the FIRE SUPPORT AREA on the FLOOR BELOW the FIRE AREA,
ASSIST with ATTACK LINES and relieve FIRST COMPANY men,
perform a SEARCH and RESCUE,
institute necessary VENTILATION PRACTICES.

137. At occurrences at HIGHRISE BUILDING, when RADIO COMMUNICATIONS have been properly ESTABLISHED, all MESSAGES will be RELAYED via the BASE CONTROL.

138. For HIGHRISE BUILDING alarms the initial RESPONSE will be:
One AERIAL UNIT,
TWO pumper companies,
ONE EMERGENCY VEHICLE,
a PLATOON/DISTRICT CHIEF.

139. EVACUATION from HIGHRISE BUILDINGS will be CARRIED OUT immediately; from the FIRE FLOOR,
TWO FLOORS above the FIRE FLOOR,
AFTER this the decision will be made by the SENIOR OFFICER in charge as to FURTHER EVACUATIONS.

140. If the HIGHRISE BUILDING is more than 300 FEET from the nearest FIRE HYDRANT preparations should be immediately made for a PUMPER RELAY.

141. HOSE CREWS will proceed to FIGHT the FIRE from the FLOOR BELOW.

142. Hose CREWS SENT to the FIREGROUND of a HIGHRISE BUILDING should carry EXTRA 1½" HOSE for STANDPIPE WORK.

143. DO NOT place too much RELIANCE on ELEVATORS, as they may be being USED BY OCCUPANTS of the building, or they may be OUT OF SERVICE.

144. For GAINING ACCESS to the UPPER FLOORS and for EVACUATING occupants USE the FIREPROOF STAIRWELLS.

145. CREWS fighting fires on the UPPER FLOORS should carry ALL THE TOOLS they might NEED, and not keep SENDING MEN for the TOOLS they FORGOT.

146. One of the MOST ESSENTIAL things to TAKE ALOFT is some good LONG ROPES.

147. The FUNDAMENTAL RULE for STANDPIPE OPERATIONS is to CONNECT to an OUTLET on the FLOOR BELOW the FIRE FLOOR.

148. The FIRST OFFICER arriving at a fire in a highrise building is RESPONSIBLE for LOCATING THE FIRE and BEGINNING OPERATIONS.

149. ALL OFFICERS should KNOW the LOCATION of the ANNUNCIATOR PANEL.

150. The OFFICER IN CHARGE should immediately get in CONTACT with the CUSTODIAN of the building.

151. STANDPIPE CONNECTIONS must be LOCATED so that no area is MORE THAN 30 FEET away from the NOZZLE at the end of 100 FEET OF HOSE.

152. One of the MOST IMPORTANT STEPS to be taken by the OFFICER IN CHARGE is to set up PROPER COMMUNICATIONS from the upper FIRE FLOOR and the TRUCKS BELOW.

153. FIVE PROBLEMS of the ATOMIC ENERGY industry are:
the SPREAD of CONTAMINATION,
the CONTAMINATION of FIRE DEPARTMENT EQUIPMENT,
ACCIDENTAL RELEASE of nuclear ENERGY,
the PRESENCE of RADIO ACTIVE material,

154. Firefighting PROCEDURE in fires involving RADIO ACTIVE materials are:
Call for RADIO MONITORING DEVICES,
CONFINE FIRE to one ROOM INVOLVED,
Use SELF-CONTAINED breathing apparatus,
Use FULL PROTECTIVE clothing,
Use WIDE ANGLE, LOW VELOCITY FOG,
Do not carry out SALVAGE WORK until monitoring official gives the go ahead.

155. When fighting fire in radio active material do not fight the fire on the LEE SIDE.

156. When fighting fires involving radio active materials stay BELOW WINDOW OPENINGS and use the building as much as possible for protection.

157. When fighting fires in radio active materials ALLOW NO SMOKING.

158. When fighting fires in radio active materials SET A TIME LIMIT on the CREWS fighting the fire.

159. If RESCUE OPERATIONS are necessary, take the following action:
Wear SELF-CONTAINED BREATHING APPARATUS,
Wear FULL PROTECTIVE CLOTHING,
Do not HANDLE OBJECTS,
Use the MINIMUM number of RESCUERS,
Use OLDER FIREFIGHTERS for the RESCUE OPERATION,
GO IN, RESCUE, and GET OUT,
ALL FIREFIGHTERS used in the operations should be SCRUBBED DOWN,
RESCUERS and the RESCUED stay in a SEPARATE AREA until they have been MONITORED.

160. Any person receiving CUTS and BRUISES should have MEDICAL ATTENTION.

161. Do not SMOKE, EAT or DRINK in the firefighting OPERATIONS.

162. TWO CLASSES of radiation HAZARDS are:
INTERNAL and EXTERNAL.

163. THREE most IMPORTANT FACTS to REMEMBER for self protection are:
TIME - DISTANCE - SHIELDING.

164. SPRINKLER SYSTEMS have proven to be 96% EFFECTIVE.

165. TWO principle CAUSES of UNSATISFACTORY sprinkler performance are:
a CLOSED VALVE in the water SUPPLY LINE,
INADEQUATE WATER delivery to the system.

166. UNSATISFACTORY sprinkler PERFORMANCE can be REDUCED by PLANNING sprinkler OPERATIONS.
167. Automatic sprinklers are designed to PUT WATER immediately ON A FIRE without HUMAN OPERATIONS.
168. First due companies should KNOW the BUILDINGS and the NATURE of the OCCUPANCIES.
169. First in companies should KNOW the LOCATION of the SPRINKLER CONTROL.
170. ONE of the FIRST engine COMPANIES SHOULD lay in to the SPRINKLER CONNECTION.
171. WATER SUPPLY to the SPRINKLER SYSTEM may be from:
the CITY MAINS,
an in-plant FIRE PUMP,
an elevated GRAVITY TANK.
172. When the WATER SUPPLYING sprinklers is LIMITED, DO NOT DIVERT the supply by using HEAVY LINES.
173. DO NOT COMPETE with the sprinkler system FOR WATER.
174. The OFFICER IN CHARGE should IMMEDIATELY send a man to the control valve to MAKE SURE the VALVE IS OPEN and not TAGGED FOR REPAIRS.
175. The CONTROL VALVE should be FULLY OPEN.
176. The CONTROL VALVE should SHUT OFF only on ORDERS from the OFFICER IN CHARGE.
177. TWO LINES should be STRETCHED from the PUMPER to the SPRINKLER SIAMESE CONNECTION.
178. The PUMPER should PUMP into the SIAMESE at 100 PSI.
179. TWO 2½" LINES can EFFECTIVELY SUPPLY 20 to 25 SPRINKLER HEADS.
180. An Officer should IMMEDIATELY DETERMINE the EXTENT and LOCATION of the FIRE.
181. In general, 1½" LINES are SUFFICIENT to BACK UP the sprinklers and search out HIDDEN FIRES.
182. SMALLER hose lines DIVERT LESS WATER away from the system.
183. HOSE STREAMS are only NEEDED to extinguish SMALL HIDDEN FIRES.
184. Some SPACES in BUILDINGS that should be CHECKED CAREFULLY are:
DUCTS,
CRAWL SPACES,
COCK LOFTS,
ATTICS.
185. As a GENERAL RULE it is much MORE EFFECTIVE to DISTRIBUTE WATER through the SPRINKLER SYSTEM.
186. TWO common TYPES of SPRINKLER SYSTEMS are:
the WET SYSTEM, and the DRY SYSTEM.
187. TWO TYPES of systems used in HIGH HAZARD AREAS are:
the PRE-ACTION SYSTEM and the DELUGE SYSTEM.

188. To DETERMINE the desired AIR PRESSURE in relationship to WATER PRESSURE at the DRY PIPE VALVE, DIVIDE the WATER PRESSURE by SIX and ADD 10 POUNDS.

189. A Fire Department REPORT should INCLUDE INFORMATION as to the NUMBER OF HEADS activated and the LOCATION OF THE HEADS.

190. The REPORT should also CONTAIN INFORMATION as to who RESTORED THE SYSTEM or if it was restored before the FIRE DEPARTMENT LEFT the scene.

191. The REPORT should STATE whether PUMPERS were USED to SUPPLEMENT the SYSTEM.

192. A DETECTION DEVICE is an EARLY WARNING SYSTEM.

193. FOUR TYPES of detection SYSTEMS are:
FIXED TEMPERATURE,
RATE OF RISE,
COMBINATION RATE OF RISE and FIXED TEMPERATURE,
SMOKE DETECTORS.

194. A RISE in temperature of 15 to 20 DEGREES PER MINUTE is required to ACTIVATE a RATE OF RISE DEVICE.

195. THERMOSTATIC DEVICES are sub-divided into TWO TYPES:
the SPOT DEVICE and the CONTINUOUS LINE DEVICE.

196. The CONTINUOUS LINE DEVICE is one in which the THERMO-SENSITIVE ELEMENT is CONTINUOUS ALONG A LINE.

197. Some THERMO-DEVICES are capable of REPEATED OPERATION and DO NOT need REPLACEMENT unless DAMAGED or thrown OUT OF ADJUSTMENT.

198. The LAKE HURON PIPELINE supplying London's water system is 54 INCHES.

199. A 24 INCH PRIMARY MAIN runs from CLARKE ROAD, west to HYDE PARK SIDE ROAD, to the SPRINGBANK RESERVOIR.

200. From the RESERVOIR, running EAST on COMMISSIONERS ROAD a 36" MAIN runs PARALLEL to a 12" MAIN to WHARNCLIFFE ROAD SOUTH.

201. From WHARNCLIFFE ROAD SOUTH to WELLINGTON ROAD, on COMMISSIONERS ROAD there is a 36 INCH MAIN.

202. From WELLINGTON ROAD to POND MILLS ROAD, on COMMISSIONERS ROAD there is a 30 INCH MAIN.

203. The GRID SYSTEM is RINGED by large PRIMARY MAINS.

204. A GRID SYSTEM consists of PRIMARY mains, SECONDARY mains and DISTRIBUTOR mains.

205. The SMALLEST MAIN in the LONDON water SYSTEM is a 4 INCH MAIN.

206. London's WATER SYSTEM is supplied by a COMBINATION of GRAVITY and DIRECT PUMPING.

207. In the GRID SYSTEM the DISTRIBUTORS serving individual FIRE HYDRANTS and BLOCKS OF CONSUMERS should NOT BE LESS than SIX INCHES in diameter. However, in LONDON'S HIGH VALUE DISTRICT 29% of the GRID SYSTEM consists of FOUR INCH MAINS.

208. HYDRANTS should be SPACED so that at LEAST ONE will be NOT MORE than 300 to 500 FEET from the BUILDING to be PROTECTED.

209. A simple FORMULA to calculate the GALLONS PER MINUTE from a HYDRANT is: 140 TIMES THE SQUARE ROOT OF THE FLOW PRESSURE.

210. A WATER SYSTEM is considered to be ADEQUATE if it can deliver the FIRE FLOW for the NUMBER of HOURS SPECIFIED with consumption at the MAXIMUM DAILY RATE, if this DELIVERY IS POSSIBLE under certain EMERGENCY or UNUSUAL CONDITIONS, the SYSTEM is said to be a RELIABLE ONE.

211. The COURTS where a Fire Fighter is likely to APPEAR are:
the SUPREME COURT OF ONTARIO (Criminal or Civil)
the COUNTY COURT (Criminal or Civil)
the MAGISTRATE'S COURT (Criminal or Civil)

212. When TESTIFYING as a WITNESS, a Fire Fighter WILL ADDRESS the JUDGES of the various COURTS as follows:
in the SUPREME COURT as MY LORD or YOUR LORDSHIP,
in the COUNTY COURT as YOUR HONOUR,
in the MAGISTRATE'S COURT as YOUR WORSHIP.

213. A LIFE SAFETY SYSTEM is installed in a building to provide:
(a) EARLY DETECTION of a FIRE.
(b) Automatic EXTINGUISHMENT to LIMIT the size of the FIRE and the AMOUNT OF SMOKE generated.
(c) PROTECTION for the DISPERSEMENT of LETHAL SMOKE & GASES.
(d) An ALARM & COMMUNICATION SYSTEM which will notify the Fire Department, (remote station) also an ADDRESS SYSTEM to instruct the OCCUPANTS, and to allow the Fire Department COMMUNICATIONS with their crews.
(e) Automatic ELEVATOR CONTROL, to prevent elevators from stopping at floors where there may be FIRE or SMOKE.
(f) A building "FIRE SAFETY ORGANIZATION" and a "FIRE SAFETY PLAN".

"PROMOTION - POLICY, REQUIREMENTS AND EXAMINATION"

POLICY

A. The Fire Chief shall form a Promotion Board, consisting of:
   1. The Fire Chief as Chairman.
   2. The Deputy Fire Chief.
   3. The Director of Training.
   4. The Platoon Chief in-charge of candidate's Platoon.
   5. Personnel Officer, City of London.

B. The Board shall be responsible for:
   1. Adjudicating examinations.
   2. Interviewing candidates for promotion.
   3. Naming the successful candidate or candidates.
   4. Recommending the selection of Senior Officers up to and including the rank of Platoon Chief.

C. Promotional procedures:
   1. The guidelines for promotion on the London Fire Department may be altered at any time by the Fire Chief, if in his opinion the interests of the Department and the Municipality must be safeguarded. All promotions for the Fire Department are based on the recommendation of the Fire Chief and will be finalized when ratified by City Council.
   2. The Union's interests will be acknowledged in the promotional procedure and policies as it is stated in their contract.

D. Educational standards:
   1. Promotion to the lowest Officer rank will require that a candidate shall have completed two courses of the three phase program entitled "Firefighters Administrative Course" conducted at Fanshawe College. This shall be a requirement at the end of course year, 1975.
   2. Promotion to all Officer ranks shall require that a candidate shall have successfully completed two phases of the Firefighters Administrative Course conducted at Fanshawe College: and, in addition, candidates for the rank of District Chief must have successfully completed the Fire Administration Course conducted at the Ontario Fire College. This shall be a requirement for promotion at the end of the course year 1978.
   3. Promotion to all Officer ranks at the end of course year 1980, shall require that all candidates for promotion will have successfully completed the Fire Protection Technology Course at the Ontario Fire College and the Firefighters Administration Course conducted at Fanshawe College.

E. Experience required:
   1. Time in rank.
   2. Promotion to rank of Captain requires that all candidates must have spent 80 hours with the Fire Prevention Bureau performing the duties of a Fire Inspector.
   3. Promotion to the rank of Captain requires that candidates must have spent 80 hours with the Training Division performing the duties of a Training Instructor.

REQUIREMENTS:

Seniority as applied to Officers shall be determined by priority of appointment to the grade referred to, the Officer first appointed or first named in order of appointment being senior. In the case of several members being appointed on the same day, priority shall be determined by the order in which they are named.

1. Platoon Chief:
   Promotions to the rank and position of Platoon Chief shall be made by the Promotional Board, the Fire Chief shall make the final decision and make recommendation to the Board of Control. There shall be no examinations for promotion to the rank of Platoon Chief and only those holding the rank of District Chief will be eligible. All things being equal, the senior Disrict Chief shall be promoted to Platoon Chief.

REQUIREMENTS: (continued)

2. District Chief:
   Promotions to the rank of District Chief shall be based upon qualifying examinations and Employee Evaluation. Senior Captains shall be eligible to sit for the examinations and the depth of seniority on the Captain's seniority roll will be determined by the Fire Chief, based on the number of vacancies that are available to the rank of District Chief.

3. Captains:
   Promotion to the rank of Captain shall be based upon qualifying examinations and Employee Evaluation. Senior men shall be eligible to sit the examinations and the depth of seniority to be used will be the seniority roll. The depth of seniority that will be used will be determined by the Fire Chief based upon the number of positions vacant for the rank of Captain.

4. Firemen:
   Promotion for advancement from Probationary to Fourth Class, Fourth Class to Third Class, Third Class to Second Class, Second Class to First Class: shall be based upon qualifying examinations and Employee Evaluation. Examinations for the grade above that which is already held shall be given at least two months before the man is due for promotion.

Employee Evaluations:

Employee ratings (evaluations) shall be made on each member of the Department twice a year, namely in June and December. Captains shall rate all junior personnel in their respective station. District Chiefs shall rate the personnel in their district who are under their direct control. Platoon Chiefs will rate all District Chiefs and Captains that are on their Platoon.
The Promotional Board shall review a man's file prior to examinations, and on interviewing the candidate for promotion will assess the man's record and relate to him their findings and appraisal of the evaluation.

EXAMINATIONS:

The Fire Chief shall caused to be established an "Examining Board" for the purpose of examining probationary members of the Department, and for examining such members as may become eligible for promotion. Recommendations for promotion shall be based upon efficiency, as determined by the Examining Board, together with seniority of years of service.

A. Examinations:
   1. Written.
   2. Practical.
   3. Oral.
   4. Employee evaluation.

B. Qualifying Mark: For all grades, shall be an average of 65%.

C. Written Examinations: shall be of the following type:
   1. Essay type.
   2. Completion statement type.
   3. Multiple choice type.
   True and false type.

Note:

Captain's and District Chiefs: Written examinations for promotion to the officer rank shall include all of the above excepting the True and False type examination.

EXAMINATIONS: (continued)

D. Practical examinations:
   At the discretion of the Promotional Board, the practical examination for Officer rank may be a chalk board tactical examination or a fireground examination of basic fire department evolutions.

E. Examination questions:
   Shall be taken from the Oklahoma A & M Red Books, the official texts of the Ontario Fire College, and the following books:
   1. Officer's Guide Book.
   2. Underwriter's fire stream tables.
   3. All fireground library books.
   4. Any knowledge pertaining to our own equipment and apparatus.

F. Failure to qualify:
   A candidate for promotion who fails to attain an average mark of 65% shall be given the opportunity to sit again for examination to qualify for the rank above that which is already held. The senior man that qualifies shall be promoted. If more than one vacancy occurs the position shall be filled from the senior men that qualify. There shall be a limit to the number of times a man sits for qualifying examinations (THREE), and once he has qualified, his position on the seniority roll will determine when he is eligible for promotion to the rank above that which is already held.

The following pages contain sample questions that may be used on examination papers for promotion and re-classification, it is not the intent of this section to list all questions that may be used, the intent is only to provide a guide for study to those preparing themselves for promotion or re-classification.

OFFICERS:

QUESTION

1. What is the ignition temperature of Carbon Monoxide?

A. 1204 degrees Fh.

2. Give six reasons why ventilation is essential at fires?

A. Aids in life saving, - Reduces the danger of Backdraft, - Reduces smoke damage, - Permits fast entry for salvage, - Makes fire fighting safer and easier, - Lessens the danger to exposures.

3. What safety precautions can we take for protection when a backdraft takes place?

A. Clear the building if possible, - Stay below window openings, Do not stand in openings, - If caught in a backdraft lay flat on the floor and cover up as much as possible, - Do not stand facing a wall as the heat will bounce back at you.

4. What is the meaning of "Leadership"?

A. Leadership is the ability to motivate people to work with you and at same time gain their respect and confidence.

5. What is the purpose of discipline?

A. The purpose of discipline is to reform the offender, to prevent a repetition of an offence and increase the efficiency of the unit.

6. What factors should be considered when determining the Point of Entry into a building?

A. The location of the fire and the Purpose of the entry.

7. Explain the meaning of the word "Arson"?

A. Anyone who willfully sets fire to his own or another persons property for fraudulent or malicious purposes is guilty of an offence and can be charged with the crime of arson.

8. What three steps should be taken at a fire involving LPG?

A. 1. Evacuate the area.
2. Shut off the flow of fuel.
3. Prevent ignition of the vapor cloud.
4. Protect the exposures.

9. When planning the fire defence of a specific area, what are the determining factors?

A. 1. Available fire apparatus.
2. Available manpower.
3. Structural features.
4. General occupancy.
5. Water supply.
6. Hazards involved.
7. Utility shut-offs.
8. Private fire protection.

10. What areas should be pre-planned by all Fire Departments?

A. 1. Residential.
2. Institutional.
3. Mercantile.
4. Educational.
5. Industrial.
6. Suburban; Shopping Centres and Malls.

QUESTION (continued)

11. When should a sprinkler system be shut off?
A. 1. When ordered by the Officer in Charge.
2. When the fire is out.
3. After 1½" lines are stretched for dealing with hidden fires.

12. Name two types of thermostatic devices?
A. 1. Spot device.
2. Continuous line device.

13. How can we control the occurance of a possible fire within a building?
A. We can control the possible occurance of a fire by:
1. Inspections and a good fire prevention program.
2. By influencing the design of the building.

14. Name three emergencies defined in the Emergency Measures Act?
A. 1. Normal, 2. Natural, 3. National.

15. What is the maximum coverage for sprinkler systems protecting ordinary hazards?
A. Maximum coverage for sprinkler protection is: 130 square feet.

16. Why does Sodium, Potassium, Calcium present a firefighting problem?
A. Each of these chemicals react violently if water is applied.

17. What takes place when a massive metal pile ignites?
A. Flaking and sporadic sparking.

18. What can spontaneous ignition of metal powders be compared to?
A. To the spontaneous ignition of oily rags.

19. Can large metal fires be extinguished?
A. Massive metal fires cannot be normally extinguished, only if they are attacked with a massive amount of water on the initial attack which is in most cases impossible.

20. What extinguishing agent can be used on small metal fires?
A. Graphite powder.

21. What are the names of the two main valves in a sprinkler system?
A. 1. The P.I.V. (post indicator valve).
2. The O.S. & Y. (outside screw and yoke).

22. What agency is responsible for setting fire insurance rates in Canada?
A. The Canadian Underwriter's Association.

23. What are three top management functions?
A. Planning, - Training, - Supervision.

24. What is the meaning of the word "Authority"?
A. Authority is the legal or rightful power to command or act.

25. What hazard is involved in a large Chlorine leak?

QUESTION (continued)

A. Chlorine constitutes a major respiratory problem, and evacuation of a large area is needed. It is heavier than air and an extremely hazardous irritant. Water is not to be used on a chlorine leak. Fire vehicles should be kept out of the area as they will not start without sufficient oxygen. Evacuate to high ground or to the upper floors of buildings. Send out radio and T.V. warnings. Approach with the wind and be careful of wind shifts. Call Police, Ambulance services. Wear self-contained breathing apparatus.

26. What three situations may require mechanical ventilation?

A. (a) When the type of construction is not suitable for natural methods.
(b) When the fire is below ground level in basements and sub-basements.
(c) When the fire has been extinguished and no air currents exist.

27. Name six special hazards that should be pre-planned?

A. 1. Lumber yards.
2. Schools.
3. Highrise buildings.
4. Bulk oil storage.
5. Churches.
6. Chemical plants.
7. Hospitals.
8. Theatres.
9. Shopping malls.

28. What is a "Conflagration"?

A. A conflagration is a sweeping fire, out of control, spreading in more than one direction, destroying large areas.

29. Name four types of sprinkler systems?

A. Wet pipe, Dry pipe, Deluge, Pre-action.

30. What are some of the causes of a conflagration?

A. Winds over thirty miles per hour, Lack of manpower and equipment, Inadequate water supply, Combustible construction, Wooden shingles, Dry forest areas, Lack of exposure protection, fire breaks, rivers, wide roads, etc.

31. What is a "Detection System"?

A. A detection system is an early warning device that operates when an abnormal heat condition exists, it activates an alarm that warns the occupants.

32. Name four detection systems?

A. (a) Fixed temperature.
(b) Rate of rise.
(c) Combination fixed temperature and Rate of rise.
(d) Smoke detectors.
(e) Rate compensated, thermostatic devices.
(f) Ionized particles of combustion.

33. What are Pyrophoric Metals?

A. Pyrophoric metals are those which are capable of taking fire spontaneously.

QUESTION (continued)

34. Name four pyrophoric metals?
A. Magnesium, Calcium, Sodium, Potassium, Uranium, Thorium.
35. Name three types of radiation hazards?
A. Alpha, Beta, Gamma.
36. What are the three fundamental rules for safety when fire-fighting involves radio active materials?
A. Time, time of exposure should be kept to a minimum.
Distance, keep as far away from the material as possible.
Shielding, keep as much dense materials between you and the source as possible such as buildings, etc.
37. Is Chlorine a fire hazard?
A. Chlorine cannot catch fire but, it will support combustion of certain other substances.
38. What is the thumb rule for determining a course of action against a fire?
A. Locate - Confine - Extinguish.
39. What factors have contributed to the downward trend in fire losses?
(a) Increased fire prevention activities.
(b) Improved building construction.
(c) Fire resistive materials.
(d) Better building codes.
(e) Improved firefighting and training methods.
(f) Better firefighting equipment.
(g) Better salvage and overhaul techniques.
40. What should be avoided when operating an Aerial Ladder?
A. Whipping the ladder, Improper angles and improper loading.
41. How would you address a Supreme Court Judge?
A. My Lord or Your lordship.
42. How would you address a County Court Judge?
A. Your honour.
43. How would you address a Magistrate's Court Judge?
A. Your Worship.
44. What is the ignition temperature of Carbon Particles?
A. 412 degrees Fh.
45. What is the radio frequency allocated to the London Fire Department?
A. 154.37 Mcs.
46. What radio frequency is allocated to the Ontario Fire Marshal's Office?
A. 154.07 Mcs.
47. What is the greatest danger when fighting tank fires?
A. A pressure failure of the tank or an internal vapor-air explosion.
48. How should Propane cylinders be stored?
A. Always store, transport and use propane cylinders in an upright position.
49. How many sprinkler heads can be handled effectively by siamesing two 2½" hose lines to the sprinkler connection?
A. Two 2½" hose lines siamesed into the sprinkler connection can effectively handle 20 to 25 sprinkler heads.

QUESTION (continued)

50. In a highrise building fire, what is one of the most important things that should be established by the Officer in charge as soon as possible?
A. Communication system between the crews on the fire floor and the vehicles on the ground at street level.

51. What is the term used to identify liquid propane gas?
A. LPG.

52. At what temperature is LPG normally a vapor gas?
A. 44 degrees Fh. below zero which is its boiling point.

53. How is LPG stored?
A. LPG is compressed into a liquid state for storage, in cylinders, in an upright position.

54. When does LPG lose its liquid state?
A. When it is not under pressure.

55. When fighting a tank fire involving flammable liquids, how should you make your attack?
A. Slowly and deliberately and from the sides of the tank or tanks.

56. How should an Officer position himself, regarding the hose lines, to make an attack on a tank fire?
A. The Officer should position himself between the nozzlemen placing one hand on their shoulders to direct them as the attack is carried out.

57. If a tank fire is considered too dangerous or useless to fight, what procedure should be followed?
A. Portable monitors or householders should be set up to protect the exposures and withdraw the men to a safe distance.

58. What is the definition of a British Thermal Unit?
A. A British Thermal Unit is the amount of heat required to raise the temperature of one pound of water one degree Fh. One BTU = 252 calories.

59. What is the meaning of the term "Flash Point" of a liquid?
A. The "Flash Point" of a liquid is the temperature at which a flammable liquid will give off vapors that will flash and burn upon the approach of an open flame.

60. What is the meaning of the term, "Ignition temperature"?
A. The "Ignition temperature" is the degree of heat at which a combustible material will ignite and burn without an outside source of ignition such as an open flame or match.

61. What is fire?
A. Fire is the rapid oxidization of a combustible material at or above its ignition point usually accompanied by evolutions of heat and light. It is the union of oxygen with a combustible material at or above its ignition temperature.

QUESTION (continued)

62. What is the definition of water?

A. Water is a colorless, odorless, tasteless liquid that has volume but no definite shape taking the shape of the container into which it is poured. Water is the only element known that can be found in all three states of matter namely: liquid, gas or solid. Water is a combination of two parts Hydrogen to one part Oxygen and the chemical formula is H_2O. Water is practically incompressible, it requires a pressure of 33,000 psi to reduce it in volume by 1%.

63. What three facts must be legally proven to convict a person of the crime of Arson?

A. (a) That there was a fire.
(b) That the fire was of incendiary origin, and,
(c) The accused either set or procured the setting of the fire.

64. What three important questions should be asked about each fire?

A. (a) Where did the fire start?
(b) Was there evidence of an explosion?
(c) Was there more than one fire?

65. What are the four main responsibilities of a Fire Department?

A. (a) To prevent fires from starting.
(b) To prevent the loss of life and property if a fire should start.
(c) To confine the fire to its point or points or origin.
(d) To extinguish the fire.

66. What are three general types of building construction?

A. (a) Fire resistive, (b) Brick, (c) Frame.

67. Name six types of building occupancies?

A. (a) Public buildings.
(b) Mercantile buildings.
(c) Institutional buildings.
(d) Industrial buildings.
(e) Storage buildings.
(f) Multiple occupancy.

68. What three considerations should be given when making an attack on a fire?

A. (a) Cover the exposures.
(b) Cover the avenues of escape.
(c) Stop the spread of the fire.

69. What four point rule can be use in making an attack on a fire?

A. (a) Over, (b) Under, (c) Front, (d) Rear.

70. Name four methods of fire spread from point to point?

A. (a) Convection,
(b) Conduction,
(c) Radiation,
(d) Direct flame contact.

71. What should you consider when deciding on the size of your attack lines?

A. (a) The size of the fire.
(b) Size of the area involved.
(c) Building construction.
(d) Material involved.
(e) Exposures.
(f) Water supply.

72. What does the amount of heat generated at a fire depend upon?

A. (a) The amount of oxygen.
(b) The amount of combustible material.

73. What two methods of applying water fog streams are used to extinguish a fire?

A. (a) The direct method and (b) The indirect method.

74. What other City Departments aid in some measure towards fire protection?

A. (a) Waterworks.
(b) Police.
(c) Planning.
(d) Building inspection.
(e) Health.
(f) Engineering.

75. What four agencies assist in some measure toward fire protection?

A. (a) Canadian Underwriter's Association.
(b) Canadian Standards Association.
(c) National Research Council.
(d) Underwriter's Laboratories of Canada.

76. How do we determine the point of origin of a fire?

A. We determine the point of origin of a fire by looking for the greatest amount of charing at the lowest point or level.

77. What is the meaning of Public Relations?

A. Public Relations is considered to be the total effect of:
(a) What we say. (b) What we do. (c) What we are.

78. What are eight points for a general size-up at a fire?

A. (a) Call for help.
(b) Rescue.
(c) Laddering.
(d) Ventilation.
(e) Forcible entry.
(f) Salvage.
(g) Overhaul.
(h) Stretching hose lines.

79. Who are designated as Statutory Assistants to the Fire Marshal?

A. (a) Fire Chiefs of established Fire Departments.
(b) Municipal Clerks.
All persons assigned exclusively to Fire Prevention activities.

80. What do we mean when we talk about pre-planning, or, we pre-plan an area or a building?

A. Planning the process of taking time to analyze the problem of;

A. (a) Where are you going?
(b) How you intend to get there?
(c) What you intend to accomplish?

81. How can we extinguish tank fires involving flammable liquids?
A. Tank fires involving flammable liquids can be extinguished by:
(a) Stopping the flow of fuel by closing the proper valve.
(b) Stop the flow of fuel by replacing the fuel with water.

82. Name four concealed places that should be checked at all fires?
A. (a) Cock lofts. (b) Ducts. (c) Attics (d) Crawl spaces.

83. What is the formula for determining the gallons per minute discharge from a nozzle?
A. $24.7 \times D^2 \sqrt{N.P.} = G.P.M.$ discharge.

84. What is the formula for determining friction loss in 2½" hose?
A. $3Q^2 + Q =$ F.L. per 100' of 2½" hose.

85. What is the formula for determining the reach of a fire stream?
A. Reach = N.P./2 + 26 (add 5 more for every ⅛" over ¾").

86. What warning signs would indicate the possibility of a back-draft occuring?
A. (a) Unusually thick black smoke.
(b) Outside walls extremely hot.
(c) Windows hot and discolored.
(d) Windows rattling, can be heard from 3 to 5 ft.
(e) Roof shingles lifting or flapping.
(f) Flames lose their liveliness.
(g) Sounds become distant and muffled.
(h) Space breathing.
(i) No visible flame but intense heat.
(j) Sudden clearing and rushing of smoke.

87. How can we lessen the danger of a backdraft?
A. We can help to prevent a backdraft by:
(a) Prompt and controlled ventilation.
(b) Cooling the atmosphere quickly.

88. What is the current Class "A" rating for a pumper?
A. Class "A" Underwriter's rating of a pumper is;
One that will produce 100% of its rated capacity at 150 psi.
One that will produce 75% of its rated capacity at 200 psi.
One that will produce 50% of its rated capacity at 250 psi.

89. What three important things must be done before raising an Aerial Ladder?
A. (a) Set the brakes.
(b) Place the wheel chocks.
(c) Position the stabilizing jacks or outriggers.

90. When is the least strain encountered when operating an Aerial Ladder?
A. The least strain is placed on an Aerial Ladder when it is at an angle of seventy to eighty degrees from the horizontal with the top end supported. The truck should be at a slight angle to the building.

91. What is the meaning of Cantilever position of an Aerial Ladder?

A. An Aerial Ladder is said to be in the Cantilever position when the top end of the ladder is unsupported.

92. Name three control levers on the operator's pedestal of an Aerial?

A. (a) Raise and Lower — for lowering and raising the bed ladder.
(b) Extend or Retract — for extending or retracting the fly ladder.
(c) Rotation Left or Right — for turning the turntable left or right.

93. What is the maximum height to which the Aerial Ladder can be extended when it is being operated as a water tower?

A. Maximum height for a 100 foot Aerial Ladder used as a water tower is 80 feet. Minimum angle for a water tower fully extended to safe limits is 70 degrees. The angle depends on the length the ladders are extended.

94. How should the controls of an Aerial Ladder be used?

A. The controls of an Aerial Ladder should be used one at a time, trying to use two operations slows down the mechanical operation.

95. What precautions should be taken in severe icing or high wind condition?

A. The order "Rig for safety" should be given when operating in conditions of high winds or severe icing.

96. Name two types of sprinkler systems used in high hazard areas?

A. The Deluge system and the Pre-action system.

97. How is the water pressure, in the London water system maintained?

A. It is maintained by a combination of:
Direct pressure from pumps, and,
Gravity from elevated reservoir supply.

98. How can the desired ratio of air to water pressure be determined in a Dry Pipe sprinkler system.

A. By dividing the water pressure, as shown on the gauge, by six and add ten pounds.

99. What three means are available to an Officer in assisting him to locate a fire in a highrise building?

A. The enunciator panel, The superintendant or Custodian, and tenant in the building at the time of the fire.

100. What are two principal causes of unsatisfactory sprinkler system performance?

A. An inoperative valve in the system, or an inadequate water supply.

101. Regarding the crime of Arson, what is the difference between Motive and Intent?

A. Motive is the reason for committing the crime.
Intent is the malicious nature of the burning.

QUESTION:

1. How many gallons of water per minute discharge would there be from a nozzle with a 1½" tip and 50 p.s.i. nozzle pressure?

A. Gallons per minute discharge from a nozzle = $24.7\ D^2\sqrt{N.P.}$
$24.7 \times 3/2 \times 3/2 \times 7 = 389.025$ gallons per minute.

2. What is the friction loss in a 2½" hose line discharging 400 GPM?

A. Friction loss = $3Q^2 + Q$.
$3 \times 4 \times 4 + 4 = 52$ pounds friction loss per 100 feet.

3. What is the reach of a fire stream from a 1" tip having a nozzle pressure of 50 psi?

A. Reach = ½ N.P. + 26 (+ 5 for every ⅛" over ¾")
$50/2 + 26 + 10 = 61$ feet of reach.

4. What is the discharge in gallons per minute from a hydrant orifice having 35 psi flow pressure?

A. GPM from a hydrant = $140 \times \sqrt{F.P.}$
$140 \times 6 = 840$ gallons per minute.

5. What engine pressure is required to supply two 1½" hose lines each equipped with fog nozzles at 100 psi nozzle pressure and discharging 100 gpm from each line. These two lines are fed from one line of 2½" hose 200 feet long. The 1½" lines are 100 feet long.

A. Friction loss in the two 1½" lines is approximately 30 psi.
Friction loss in the 2½" line will be approximately 28 psi.
Nozzle pressure is 100 psi.
Required pump pressure will be:
1½" friction loss = 30 psi.
2½" friction loss = 28 psi.
Nozzle pressure = 100 psi.
Pump pressure = 158 psi.

6. What engine pressure will be required to supply 500 feet of 2½" hose equipped with a 1-⅛" nozzle tip having a nozzle pressure of 45 psi?

A. The tip factor for a 1-⅛" tip is 3.
Divide the tip factor into the nozzle pressure 45 divided by 3 = 15
Multiply that by the number of 100' lengths of hose = 15 x 5 = 75
Add this to the nozzle pressure 75 + 45 = 120 psi.
The required pump pressure for this lay out would be 120 psi.

7. A pumper is feeding a water tower hook-up with three 2½" lines into the Triplex, these lines are 300 feet each in length. The triplex is feeding the 3" hose up the Aerial Ladder which is raised to a height of 80'. The nozzle aloft on the water tower is discharging 500 gpm at 100 psi nozzle pressure. What will be the required pump pressure?

A. Friction loss in the triplexed lines will be 30 psi.
Friction loss in the 3" hose line will be 30 psi.
Back pressure due to height will be 40 psi.
Nozzle pressure at the water tower is 100 psi.
Required pump pressure for this lay-out is 200 psi.

8. A pumper is feeding two 2½" lines, each 300 feet long into a Monitor. The monitor is equipped with a 1½" nozzle tip at 80 psi nozzle pressure. What is the required engine pressure?

A. Divide the tip factor of 1 into the nozzle pressure of 80 = 80
Multiply this by the length of the lines 80 x 3 = 240
This 240 must be divided by 8 for triplexed lines = 30
This 30 equals the total amount of friction loss in this lay-out add this 30 to the nozzle pressure of 80 and the required pump pressure will be 80 + 30 = 110 psi.

9. Explain how you would hook up the Foam Generator, what would you use, what would be your pump pressure?

A. Position the Hopper so that no more than 150 feet of hose is required from there to the fire area. Place the tins of foam powder in close proximity to the hopper already to be dumped into it, the nozzle on the 150 feet of line is supplied with the generator. Lay the necessary amount of hose from the pump to the hopper. The length of this supply line from the pump to the hopper will determine the pump pressure because you must maintain a pressure on the hopper gauge of 75 to 80 pounds.

QUESTION:

10. Explain how you would hook a pump up to a line of 1½" hose, 100 feet long, having a fog nozzle, with an in-line eductor using a foaming agent?

A. First of all make sure that the nozzle used and the eductor are matched, if the eductor is 95 gpm then the nozzle must be 95 gpm also. For a setting of 60 gpm the hose layout recommended is not more than 350 feet of hose beyond the eductor and for 95 gpm it is not more than 150 feet of hose. After setting the eductor at the percentage required 1%, 2%, 3% or 6% for the type of foam being used, making sure the nozzle and eductor are matched, lay out the recommended feet of hose and maintain 200 psi on the inlet side of the eductor.

11. What kind of gauges do we have on the pump operator's panel?

A. Compound gauges and pressure gauges.

12. What is a Transfer Valve or a Change-over Valve?

A. It is the Valve that changes the operating position of the pump. It can change the operation from Series Position or Pressure position to the Volumn Position or Parallel Position. When pumping in the Series or Pressure Position the water is directed through the intake to the eye of the first impeller from there to the eye of the second impeller and out to discharge producing greater pressure but less volume. In the Volume or Parallel Position the water is directed through the intake to the eyes of both impellers and then out to discharge producing maximum volume.

13. Name three different types of pumpers used by Fire Departments?

A. Rotary Pumps, Centrifugal Pumps, Pis'on Pumps.

14. What type of pumpers do we use on the London Fire Department?

A. Centrifugal Pumps.

15. What is the total pumping capacity of the motorized pumpers on the London Fire Department?

A. Engine # 1 = 1050 GPM
Engine # 2 = 840 GPM
Engine # 3 = 840 GPM
Engine # 4 = 840 GPM
Engine # 5 = 840 GPM
Engine # 6 = 1050 GPM
Engine # 7 = 840 GPM
Engine # 8 = 840 GPM
Engine # 9 = 1050 GPM
Engine #10 = 840 GPM
Truck # 1 = 1050 GPM
Engine #11 = 500 GPM
Tanker # 1 = 200 GPM
Truck # 3 = 1050 GPM
Total pumping capacity = 11,830 GPM

16. What is the difference between a Rotary Pump and a Centrifugal Pump?

A. A Rotary Pump is a Positive Displacement pump and is capable of pumping air as well as water therefore it does not require a priming device.
A Centrifugal Pump is a non-positive displacement pump and is not capable of pumping air therefore it requires a priming device.

17. Explain fully how you draft water from a source below the intake of your pumper?

A. The pumper is set up with the hard suction hose in the water, the operator is ready to draft water. The priming device is engaged, this extracts the air from within the pump body and the hard suction hose decreasing the pressure to less than atmospheric (14.7 psi). The pressure on the outside being now greater than that inside the pump will force the water up the hard suction hose and into the pump body. Drafting is nothing more than creating pressure differentials.

QUESTION:

18. Name three kinds of pressures that a Firefighter must be concerned with and explain what is implied by the name given them?

A. Static pressure, Residual pressure and Flow pressure.
Static pressure is the pressure exerted by a body of water at rest and is likened to hydrant pressure. Static pressure is the total pressure that you have to work with, stored potential energy. Residual pressure is what pressure you have left after water is set in motion and likened to reserve pressure. Flow pressure is the pressure the water leaves the opening at and is likened to the nozzle pressure or the working pressure.

19. What are the two conditions under which water enters the intake side of the pumper?

A. Under pressure or vacuum.

20. Why do Centrifugal pumps require a priming device?
A. Because they are non-positive displacement and are not self-priming at draft.
21. Name three types of priming pumps?
A. Rotary Gear, Rotary Vane, Exhaust Primer, Rotary Gear Electric.
22. What do we mean by a Vacuum?
A. A negative pressure condition.
23. Explain the meaning of the term Friction Loss?
A. It is the resistance to the flow of motion, or the total loss of pressure between the pumper and the nozzle.
24. What are the units in which we read vacuum?
A. Vacuum is read in inches of mercury.
25. What are the pumping capacities of: Engine #1, Engine #2, Engine #8?
A. Engine #1 = 1050 gpm, Engine #2 = 840 gpm, Engine #8 = 840 gpm.
26. What is meant by the term, a Triple Combination pumper?
A. It is a pumper that carries its own, Water, Pump and Hose.
27. What is the weight of a column of water 2.309 feet high having a cross-sectional area of one square inch?
A. One pound.
28. How much Back Pressure will there be from a column of water 100 feet high?
A. 100 divided by .433 = 43.3 psi.
29. What will be the weight of one cubic foot of water?
A. 62.5 pounds.
30. Is Carbon Dioxide heavier than air?
A. Carbon Dioxide is slightly heavier than air.
31. Is Carbon Monoxide lighter or heavier than air?
A. Carbon Monoxide has approximately the same gravity as air.
32. What occurs when gases are heated?
A. They become buoyant and rise.
33. What gas is produced by a smouldering fire?
A. Carbon Monoxide.
34. What is the ignition temperature of Carbon Monoxide?
A. 1204 degrees Fh.
35. What is the ignition temperature of Carbon Particles?
A. 412 degrees Fh.
36. What is a Back-draft?
A. A Back-draft is a smoke explosion, the rapid almost instantaneous combustion of flammable gases, carbon particles and tar balloons.

QUESTION:

37. When should you begin Ventilation?
A. When ordered to do so by the Officer in Charge of the fire.
38. What is the meaning of Ventilation in the fire service?
A. Ventilation is the controlled removal of heat, gases and smoke and the controlled replacement with fresh air.
39. Name two natural methods of ventilation?
A. Vertical and Horizontal.

40. How much air will a smoke ejector move?
A. 5000 to 12,000 cubic feet per minute.
41. What very important precaution should be taken when ventilating?
A. Have charged lines ready to move in, wear self-contained breathing apparatus.
42. What types of Breathing Apparatus are used on the London Fire Department?
A. Self-contained and Oxygen rebreathing types.
43. What are the different types of Breathing Apparatus used in the Fire Service in general?
A. Filter type, Demand type, Oxygen Generating type and the Oxygen rebreathing type.
44. What important chemical is used in the canister of the Filter type breathing apparatus?
A. Hopcalite.
45. What is Hopcalite known as and what does it do?
A. Hopcalite is known as a Catalyst and it changes Carbon Monoxide to breathable Carbon Dioxide.
46. What important chemical is used in the Oxygen Generating type and what is its function?
A. Potassium Superoxide is the chemical and it converts Carbon Dioxide to oxygen.
47. What is the rated time limit for the Filter type, Demand type, Oxygen Generating type and the Oxygen Rebreathing type apparatus?
A. Filter type approximately 2 hours.
Demand type approximately 30 minutes.
Oxygen Generating approximately 45 minutes.
Oxygen Rebreathing approximately 2 hours.
48. What are the three valves on the Demand type apparatus?
A. Tank valve, Demand valve, and the Emergency By-pass valve.
49. What is the atmospheric pressure at sea level?
A. Approximately 14.7 psi.
50. If you had to wear a Filter type breathing apparatus under what conditions would you wear it?
A. Only if there were 16% oxygen or more, and never in a basement or below ground level or on the floor immediately above the fire.
51. Which of the different types of breathing apparatus' are known as having a Closed System?
A. The Oxygen Generating type and the Oxygen Rebreathing type.
52. Why are these apparatus' known as having a Closed System?
A. Because the air that you exhale is not vented to the outside but is always contained within the unit.
53. How much psi pressure is there in the Demand type cylinders?
A. 1800 psi + 10% = 1,980 psi.

QUESTION:

54. When should the cylinders of the Demand type apparatus be given a Hydrostatic test?
A. They should be hydrostatically tested every five years.

55. What most important thing should be done after every time Breathing Apparatus has been used?
A. It should be properly cleaned and inspected and put back in service in good condition.
56. How should the canisters of the Filter and the Oxygen Generating type apparatus' be stored?
A. In a horizontal position.
57. Name three different fibres from which rope is made of?
A. Hemp, Manila and Sisal.
58. What kind of rope is used on the London Fire Department?
A. Manila rope.
59. What is the Safe Working Load for a ½" Manila rope?
A. 530 pounds.
60. Name five Fire Service Knots used in this Department?
A. Reef knot, Bowline, Becket Bend, Rescue Hitch, Sheep Shank, Timber Hitch, Running Bowline, Rolling Hitch, Snap Bowline, Chimney Hitch, Chair Knot, Clove Hitch, Half Sheep Shank.
61. Name four sizes of hose used on the London Fire Department?
A. 1½", 2½", 3", 3½", 4".
62. Explain the meaning of a Female and a Male Coupling?
A. A Female Coupling is a cylindrical brass coupling having inside threads and is swivelled on one or both ends.
A Male Coupling is a solid brass coupling having outside threads.
63. What are four ways by which hose may be damaged?
A. Running over it with vehicles.
Hauling aloft without using a hose roller.
Improper drying.
Dragging through chemicals.
Too much pressure.
Dragging through broken glass.
64. Name four different adaptors used in various hose lays?
A. Double Male Adaptor.
Reducing Adaptor 2½" to 1½".
Double Female Adaptor.
Multiple Reducing Adaptor 2½" to two or three 1½"
Siamese Adaptor.
Triplex Adaptor.
Wye Adaptor.
Hydrant Gate.
65. What is the color code used to identify four different sized nozzle tips?
A. Orange = ⅞", Yellow = 1", Blue = 1⅛", and Red = 1¼".
66. Name three types of nozzles that will produce fog streams?
A. Impinging, Periphery and Swirling.
67. Name two kinds of lugs that are found on hose couplings?
A. Pin lugs and Rocker lugs.
68. Explain a Siamese adaptor?
A. A Siamese Adaptor is known as a 2 into 1. It has two female couplings and one Male coupling.

69. Explain a Wye Adaptor?

A. A Wye Adaptor is known as a 1 into 2. It has one Female Coupling and two Male Couplings.

QUESTION:

70. Name the different types of ladders carried on our Aerial Service Trucks?

A. (a) Attic ladder
(b) Wall ladder
(c) Extension ladder
(d) Extension Bangor
(e) Roof ladder

71. What is the standard size ladder carried on our pumpers?

A. A 35 foot Extension ladder.

72. Name two different types of beam construction of ladders?

A. Solid beam and Trussed beam.

73. Name three kinds of materials from which ladders are made?

A. Wood, Aluminum Alloy and Steel Alloy.

74. Name seven parts of a Bangor Extension ladder?

A. Main or Bed, Fly or Extension, Butt or Heel, Top or Tip, Dogs or Pawls, Halyard, Spurs or Spikes, Rungs, Spacer Blocks, Toggles.

75. What is the safe ladder load on a 45 or 55 foot Bangor Extension ladder?

A. The safe loading of men on ladders is one man every ten feet, on a 45 to 55 foot ladder the safe loading would be four men.

76. Name five advantages that ladders provide a firefighter with?

A. (a) To gain access to upper floors.
(b) Perform rescue.
(c) Advancing hose lines aloft.
(d) Bridging gaps.
(e) A vantage point from which to direct hose streams.
(f) To improvise a cellar nozzle.
(g) To improvise a stretcher.

77. Name five Forcible Entry tools?

A. Fireman's Axe.
Battering Ram.
Detroit Door Opener.
Wire Cutters.
Tin Roof Cutter.
Hydrant Wrench.
Crow Bar.
Wrecking Bar.
Chain Saw.
Cutting Torch.
Wolf Cutting Tool.
Skill Saw.
Porto-power Hydraulic.
Bar Cutters.

78. What is the meaning of Forcible Entry?
A. Gaining entry into a locked building without use of a key, or by normal entry through a locked door. Forcible entry involves entry in an unusual way using forcible entry tools, with the least possible damage.

79. What should you do before making a Forcible Entry into a building?
A. (a) Check to make sure that the normal means are locked.
(b) Lay a charged line to the point of entry.
(c) Open up only when ordered to do so by the Officer in Charge.

80. Name three reasons for entry into a building?
A. (a) to perform a rescue.
(b) to perform ventilation.
(c) to perform salvage.
(d) to perform a search.
(e) to extinguish a fire.

81. What two principle factors determine where entry will be made?
A. (a) Location of the fire.
(b) Purpose of the entry.

82. What is a three strand rope called?
A. A Hawser laid rope.

83. What is a four strand rope called?
A. A Shroud laid rope.

84. What type of rope do we have on the London Fire Department?
A. Three strand, Hawser laid rope.

QUESTION:

85. Name three common sizes of rope that we have on this Department?
A. ½", ¾", ⅝", and ¼" for life lines.

86. How should you check a rope after it has been used?
A. It should be checked along its entire length by separating the strands every three feet checking for sharp objects such as glass, stones, stone chips, etc. Check the crowns of the rope for broken fibres.

87. When or how often should ropes be replaced?
A. If a rope has been damaged, or every five years.

88. How should a new rope be treated before being put into service?
A. One end should be back spliced or have an eye splice put in it and the other end should be whipped using a Sailmaker's Whipping. The rope should then be soaked in water and stretched, this is done by hanging it with weights attached to straighten and stretch it.

89. What is the Breaking Strength of a ½" Manila rope?
A. The Tensile or Breaking strength of a ½" Manila rope is 2,650 pounds. This can be calculated by multiplying the Safe Working Load by five, 530 x 5 = 2,650.

90. Name five different kinds of fire streams?
A. (a) Straight Stream.
(b) Broken Stream.
(c) Fog Stream.
(d) Master Stream.
(e) Water Curtains.

91. How many men are required to raise a 55 foot Bangor Extension ladder?
A. A 55 foot Bangor Extension ladder requires six men to raise it properly.

92. What is the longest manually handled ladder carried on the Aerial Service truck?
A. A 55 foot Bangor Extension ladder is the longest.

93. How many feet of hand ladders are carried on Truck #2?
A. 277 feet.

94. How many feet of hand ladders are carried on Truck #8?
A. 215 feet.

95. How long is the Aerial ladder on Truck #2 & Truck #8?
A. They are both 100 foot Aerial ladders.

96. How many feet of hand ladders are carried on Truck #1?
A. 151 feet.

97. What is considered to be the best angle for climbing a ladder?
A. 70 degrees.

98. What is the thumb rule for determining the distance that the Butt of a hand ladder should be placed out from a building?
A. There are three methods to do this, namely;
(a) Divide the working length of the ladder by two and add two for any cornice or overhang.
(b) Divide the working length of the ladder by five and add two, plus two more for cornice or overhang.
(c) Stand with your feet between the beams of the raised ladder at the butt, extend your arms straight out from your shoulders if you can grasp a rung the ladder is at a good angle for climbing.

99. Name four kinds of portable fire extinguishers?
A. Water pump tank, Dry powder, Soda-acid, Carbon Dioxide.

100. What kind of extinguisher would you use to put out a small fire in an oven?
A. Carbon Dioxide extinguisher.

101. Why would you use a Carbon Dioxide extinguisher to put out a small fire in an oven?
A. Less mess, Doesn't spoil food, It is good for electrical or grease fires.

QUESTION:

102. What classification of fire is an electrical fire?
A. An electrical fire is a Class "C" fire.

103. What classification of fire is a grease or flammable liquid fire?
A. They are Class "B" fires.

104. What procedure would you follow if the regulator on your Demand type Breathing apparatus failed to function properly?

A. Notify the man I was with that I am leaving the area, leave the area immediately, use my Emergency By-pass valve by opening it carefully as I needed air then shut it off again to conserve the air supply allowing me to get out.

105. What type of knot would you use to lower an unconscious person from the upper floors of a building?

A. A rescue sling.

106. If you were ordered to cut a hole in a roof for ventilation purposes where would you cut the hole, how would you cut it and how would you position yourself?

A. The hole should be cut as close to being directly over the fire as possible.
The hole should be cut large enough to do the job instead of having to cut many small holes.
You should position yourself with your back to the wind, and know an escape route if it should be needed.

107. Approximately how many turns is required to fully open a fire hydrant?

A. From 18 to 20 turns.

108. How far apart are the rungs of a Fire Service ladder spaced?

A. From 12 to 14 inches.

109. What are three advantages of Aluminum alloy ladders over wooden ladders?

A. (a) They are stronger.
(b) They are lighter.
(c) They require less maintenance.

110. If it is required that you work off the side of a hand or wall ladder what should you do?

A. You should apply a Leg Lock and lock the opposite leg to the side of the ladder that you are working off.

111. On what type of ladder would you never apply a Leg Lock, what should be used instead of a Leg Lock?

A. A Leg Lock should never be applied when working on an Aerial Ladder. If working on an Aerial Ladder you should wear a Safety Belt.

112. If the order was given by an Officer to "Rig for safety", what would have to be done and on what piece of equipment?

A. You would have to get two separate ropes and apply them to the top of the Aerial Ladder using a Half Sheep Shank.

113. How often should the hose load on a pumper be changed?

A. Hose loads on pumpers should be changed every month.

114. What should be done with the Halyard of an Extension ladder once it is raised and in position for using?

A. It should be tied off on the beam of the ladder using the approved hitch.

115. What does the 40% - 20% - 10% and 7% rule mean when operating a pump at a hydrant?

A. When you are hooked up the Static pressure should be noted. If, when you start water flowing from the pump you notice that there is a 40% drop in the Static pressure, no more lines of that size and calibre can be taken off the pump.
A 20% drop in the Static pressure, one more line can be taken off.
A 10% drop in the Static pressure, two more lines can be taken off.
A 7% drop in the Static pressure, three more lines can be taken off.

QUESTION:

116. What is the explosive range of Natural Gas?
A. 4.5% to 14.5%.

117. In the National Fire Protection Handbook the flammability of Anhydous Ammonia is stated, what is it?
A. In the National Fire Protection Handbook it is stated that; Ammonia is non-flammable except in high concentrations not normally encountered.

118. What is the explosive limit of Anhydrous Ammonia?
A. Its explosive range is from 16% to 25%.

119. Is Anhydrous Ammonia heavier or lighter than air?
A. It is appreciably lighter than air.

120. In the event of an incident with Anhydrous Ammonia what three steps should be taken?
A. (a) Keep all sources of ignition from the affected area.
(b) Keep people well away from the area, upwind is the safest.
(c) Avoid entering the contaminated area unless equipped with self-contained breathing apparatus and full protective clothing.

NOTE:
The following are Completion Statement type questions with the answers listed separately following the series of questions.

1. The temperature at which a flammable liquid will give off vapours in sufficient quantity to flash or burn on the approach of a flame is called the .
2. If the temperature of a liquid is below 100 degrees Fh when it flashes or burns, it is called a flammable liquid.
3. Horizontal tanks containing flammable liquids, should not be set on unprotected supports.
4. The four key features that an Officer leading an attack on a tank fire should follow are:
(a) .
(b) .
(c) .
(d) .
5. When moving in on a tank fire using two fog patterns the Officer should have the fog patterns .
6. Before moving in on a tank fire, the tanks should be cooled down with long reach streams to reduce the in the tank.

7. The attack lines should always be ..... with another line.
8. In the attack on a tank fire the Officer should place himself ..... the two attacking lines, with his hands on the ..... shoulders to direct their approach.
9. If the Officer watches the ..... at the tank vent, he can usually tell if the internal ..... has been reduced.
10. All attacks on tank fire installations should be made from the ..... of the tank.
11. All attacks on a tank fire is made from the sides as the ..... are the weakest and may blow.
12. The vapor pressure in the tank will be determined by how long the ..... has been in progress and the ..... of the tank vent.

QUESTION:

13. Hose crews approaching the tank fire should remain on their ..... prepared for a hasty retreat.
14. All attacks on tank fires should be made ..... and deliberately.
15. If a tank fire is considered to be too dangerous to handle ..... should be set up.
16. If the tank fire is too dangerous to handle, protect the ..... .
17. Always contact the ..... and ask for his advice.
18. Vertical tanks should be constructed with a ..... roof to shell joint.
19. If a fire at the tank vent is extinguished too quickly the flammable vapors may still be flowing and ..... .
20. Fires involving flammable liquids in tank installations can be extinguished by ..... the flow of the ....., or by ..... the fuel with ..... .
21. The nozzle pressure for fog streams should be ..... psi.
22. Each tank installation should be ....., by the Companies responding in that area.
23. Four special target hazards that should be pre-planned are;
    (a) ..... .
    (b) ..... .
    (c) ..... .
    (d) ..... .
24. When fighting fires involving radio active materials, radio active elements may be ingested, therefore no ....., ..., or ..... should be allowed.
25. All fires involving radio active materials should be ..... by a trained ..... Official.
26. Firefighters should be scrubbed and ..... after fighting fires involving radio active materials.
27. When fighting fires involving radio active materials, the approach should be made ..... the wind.

28. The number of men allowed to fight the fire should be .....

29. All ..... & ..... should be checked and scrubbed if necessary after the fire and before the trucks return to the station.

30. For personnel protection, three safety rules should be followed when fighting fires involving radio active materials, they are ....., ..., distance and ..... .

31. Two places that radio active materials may be found are in ..... and Universities.

32. Three radio active elements are ..... , ... , and Uranium.

33. The Officer in charge should set a ..... on the crews working in a contaminated area.

34. When dealing with radio active material a ..... breathing apparatus should be used.

35. When involved with fires in radio active materials do not ..... a ..... area.

NOTE: The following are the answers to the Completion Statement questions.

ANSWER:

1. Flash point.
2. Volatile.
3. Steel.
4. (a) Command (b) Fog patterns (c) Hose line operations (d) Protective clothing.
5. Overlapping.
6. Vapor pressure.
7. Backed up.
8. Between, Nozzlemen's.
9. Flame, Vapour pressure.
10. Side.
11. Ends.
12. Fire. Size.
13. Feet.
14. Slowly.
15. Portable monitors.
16. Exposures.
17. Plant manager.
18. Weak.
19. Reignite.
20. Stopping, Fuel, Replacing, Water
21. 100 psi.
22. Pre-planned.

23. (a) Bulk oil storage plants.
    (b) Lumber yards.
    (c) Hospitals.
    (d) Churches.
    (e) Schools.
    (f) High Rise Buildings.
    (g) Chemical Industries.
24. Eating, Smoking, Drinking.
25. Monitored Monitoring.
26. Monitored.
27. With.
28. Limited.
29. Firefighters & Equipment.
30. Time, Shielding.
31. Hospitals.
32. Strontium, Cobalt.
33. Time limit.
34. Self-contained.
35. Enter a Placarded.