

# United States Fencing Association

## Armors' Commission

### National Armors' Examination Study Guide

#### **INTRODUCTION**

It is recognized throughout the international fencing community that the armors in the United States are among the finest in the world. In order to maintain this level of expertise among our armors, and to ensure that the U.S.F.A. can count on the availability of armors of the highest quality, the Technical Committee of the U.S.F.A. has prepared a system of training, testing and certification of armors. As part of this ongoing activity, the following Study Guide is being made available to all candidates for training and certification. All questions in the written section of the tests will be drawn from the sample questions to be found in this study guide. The guide will be updated regularly by the Technical Committee of the U.S.F.A., and armors are asked to submit any suggestions for improvement of the guide, as well as any additional questions which they feel might be of value. The Technical Committee recognizes that new information, new rules and rule changes and improved techniques are constantly appearing, so the guide may well be considered a work in progress. Any such suggestions or questions should be directed to the chairman of the committee.

Both testing and training are designed in response to the premise that there are three basic areas of expertise necessary in order for a person to be a qualified armor: knowledge of the rules, skills learned through experience and an ability to work well with people while utilizing the first two. No single one of the three, taken by itself, is enough to qualify a person as a good armor; all three are necessary. It is hoped that the training, testing and certification processes will identify the candidates' abilities in all three of these important areas.

In order to receive a rating as described below, as an armor of the U.S.F.A., it is necessary for candidates to undergo three examinations: a written test, a verbal examination and an observation by a rated armor designated by the Technical Committee. The four ratings and the requirements for each rating are as follows:

- **Level-1 certification**

This certification is the highest rating available for an armor. The candidate must pass both a rigorous written and verbal examination and a practical observation, during which he or she must demonstrate:

- 1) A comprehensive knowledge of all technical and related rules of fencing;
- 2) The highest degree of technical skills in the maintenance and repair of equipment, demonstrating speed, accuracy and quality of workmanship;
- 3) A comprehensive knowledge and familiarity with all brands of equipment used throughout the world and an ability to maintain and repair them;
- 4) The ability to diagnose quickly and accurately, as well as to deal correctly with, any technical or equipment emergencies which might occur during a competition;
- 5) An ability to work well with other armors, fencers, referees, organizers and the public in a professional manner;
- 6) The ability to organize and supervise an efficient weapons control to the highest national and international standards.

A minimum passing score in the written examination is 95% overall (80% minimum in any section) as well as 95% for the verbal portion. Furthermore, the candidate must be rated as "outstanding" in the observation phase of the examination.

In addition, the candidate for a Level-1 certification must meet the following requirements:

- 1) He or she must possess all of the necessary test equipment, tools, supplies and spare parts which may be required to meet any reasonable technical or equipment contingency which might normally be encountered during fencing competitions at any level;
- 2) The candidate must have demonstrated over a period of not less than five years of continued activity as a competition armorer at national and international (NAC minimum) level, the ability to conform to the requirements outlined above, to standards equal to the highest to be found anywhere in the world;
- 3) The candidate must have held a Level-2 certification for at least two years.

It is expected that a person who has received a Level-1 certification is universally accepted by his peers, both in the United States and abroad, as a world-class armorer.

The person who possesses a Level-1 certification is qualified to be head armorer at any level of competition in the United States, either National or International.

Note: Normally, only those armorers who have received the Level-1 certification can be considered for recommendation by the Technical Committee for a position as head team armorer with any national team at any international competition.

- **Level-2 Certification**

This certification is a lower rating than the Level-1 certification, and will require a written examination, a verbal examination and a practical observation by a certified Level-1 armorer designated by the Technical Committee. During these examinations, the candidate must demonstrate:

- 1) An excellent knowledge of the rules;
- 2) A high degree of expertise in weapon control;
- 3) A high skill-level in maintenance and repair of fencers' personal equipment;
- 4) An ability to repair and maintain most of the central scoring equipment;
- 5) An ability to diagnose and deal with most equipment faults, both on the strip and in the armory;
- 6) The ability to work well with other armorers, fencers, organizers, officials and the public.

A minimum passing score in the written examination is 90% overall (a minimum of 70% in any section) as well as 90% in the verbal portion. Furthermore, the candidate must be rated as "excellent" in the observation phase of the examination.

In addition, the candidate for a Level-2 certification must meet the following requirements:

- 1) The candidate must possess enough of the test equipment, tools, supplies and spare parts (as may be necessary) to deal with most situations which might normally occur at any level of competition;
- 2) Must have served actively as a fencing armorer (at national-level competitions) over a continuous period of not less than four years;
- 3) Must have demonstrated during this time a degree of skill which has earned the candidate the respect of both fencers and other armorers;
- 4) Must have demonstrated a high degree of dedication and commitment to the art of armoring during this time;
- 5) Must have held the Level-3 certification for at least one year.

A Level-2 armorer shall be qualified to be head armorer at any national level of competition in the United States and is also qualified to serve as head armorer at any North-American Circuit (NAC) event. This person will also be considered as sufficiently

qualified to be recommended by the Technical Committee for the position of assistant team armorer for any of the United States fencing teams at any international fencing competitions. In compelling circumstances, and with the recommendation of the Technical Committee, a person with a level-2 certification can be considered for a position as Head Armorer for a United States team.

- **Level-3 certification**

This level of certification is lower than a Level-2 certification and entitles the holder to work as a certified armorer at all levels of U.S.F.A. competition. This certification will be granted upon the successful completion of both a written and a verbal examination on the equipment and technical rules of fencing, as well as a practical observation by a certified armorer designated by the Technical Committee. The minimum scores in both the written and verbal tests are 75% overall (a minimum of 50% in any section), and the rating in the practical observation must be "good". The candidate for Level-3 certification must demonstrate:

- 1) A good knowledge and understanding of the technical and related rules of fencing;
- 2) An ability to do accurate diagnoses of problems related to the fencer's personal equipment;
- 3) An ability to perform routine maintenance on fencers' personal equipment ;
- 4) An ability to perform diagnosis and normal maintenance on reels;
- 5) An ability to perform normal equipment control tasks;
- 6) An ability to work well with fencers, referees, organizers and the public in a professional manner;
- 7) A visible dedication to the art of armoring.

In addition, the candidate for certification as a Level-3 armorer must meet the following requirements:

- 1) Must possess (or have consistent access to) sufficient test equipment to perform basic equipment control tasks;
- 2) Must have worked as an armorer and/or apprentice armorer at local, divisional, sectional and national-level competitions for at least two years;
- 3) Must possess the basic tools required for basic maintenance and repair of fencers' personal equipment;
- 4) Must have gained the respect of his/her peers as an armorer.

A Level-3 armorer is qualified to serve as head armorer at all levels of competition up to (and including) sectional and regional championships.

- **Apprentice Armorer**

A candidate for the certification as an apprentice armorer will not be required to take either the written or verbal examinations, but must have been observed by a certified armorer who will recommend his certification as an apprentice armorer, based on the following:

- 1) The candidate will have demonstrated a dedication to quality armoring;
- 2) The candidate will have demonstrated a desire to learn and improve his/her skills as an armorer;
- 3) The candidate will have demonstrated an acceptable knowledge and understanding of the basic technical rules of fencing;
- 4) The candidate will have demonstrated an ability to diagnose basic faults in fencers' personal equipment and to make basic repairs;
- 5) The candidate will have a knowledge of the tools and test equipment required and will have demonstrated an understanding of how to use them properly;

- 6) The candidate will demonstrate an ability to work well with other armorer, fencers, officials and the public.

A person certified as an apprentice armorer is authorized to assist certified armorers at any level of national competition, under the supervision of an armorer certified at level 1, level 2 or level 3.

Any person desiring to become an armorer, or wishing to obtain a certification as an armorer or apprentice, is entitled to the best training and preparation available. All such persons are encouraged to request the right to work alongside other armorers, from the club level up to the highest level of national competitions. All qualified/certified armorers are likewise encouraged to offer all assistance to these persons in the form of exchange of information, discussions of the rules, demonstration of techniques and work methods, and "hands-on" demonstrations of both the skills and requirements for armoring. To meet this goal, scheduled armoring workshops and clinics will be given under the auspices of the Technical Committee. There should be no secrets regarding armoring techniques or skills between armorers, nor between armorers and those desiring to become armorers. A refusal of an armorer to help another armorer or a person desiring in all good will to become an armorer will be viewed as grounds for re-examination of that armorer's certification.

**The following questions are designed to prepare armorers for the written and verbal examinations which are required in order to obtain a rating as an armorer of the U.S.F.A. The written portion of the test is to be taken without any references (e.g. rules, study guide, notes, consultation with others),**

### **SECTION 1 – RULES**

- **GENERAL**

- 1) The minimum blade length is? (Epee, Foil, Sabre)
  - a. 50 cm
  - b. 70 cm
  - c. 75 cm
  - d. 80 cm
  - e. None of the above
- 2) A tip is required to have how many screws? (Epee and Foil)
  - a. 1
  - b. 2
  - c. Either
  - d. All of the above
  - e. None of the above
- 3) Which of these are compatible? (Epee and Foil)
  - a. *Uhlmann* tip and barrel with Russian blade
  - b. *Prieur* tip and barrel and *France Lames* blade
  - c. *Leon Paul* tip and barrel and *Scaroni* blade
  - d. Russian tip and barrel and a *Lammet* blade
  - e. All of the above
- 4) Masks are tested with what punch?
  - a. 5 kg
  - b. 7 kg
  - c. 10 kg
  - d. 12 kg
  - e. None of the above

- 5) Which of the following statements is true?
- The strengthener on the front of the guard is to be considered as part of the blade
  - A blade may not be made of electrically conductive composite material
  - The blade may be curved in only one direction
  - All of the above
  - None of the above
- 6) Part of a cross-bar or body-cord socket may project beyond the edge of the guard:
- A maximum of 0.5 cm
  - A maximum of 1.0 cm
  - A maximum of 1.5 cm
  - Not at all
  - It doesn't matter

• **RULES SPECIFIC TO FOIL**

- 1) What is the minimum length of tape on the blade?
- 10 cm
  - 12 cm
  - 15 cm
  - 20 cm
  - None of the above
- 2) The maximum tip travel length is?
- 0.5 mm
  - 1.0 mm
  - 1.5 mm
  - 2.0 mm
  - None of the above
- 3) What is the maximum length of tape on the blade?
- 10 cm
  - 12 cm
  - 15 cm
  - 20 cm
  - None of the Above
- 4) The maximum allowable diameter of a foil guard is?
- 95 mm
  - 100 mm
  - 110 mm
  - 120 mm
  - None of the above
- 5) Which of these statements is true?
- The blade can be as short as the fencer wishes
  - If the weapon is placed on the floor with the tip down and it breaks the circuit, the weapon will fail a weight test
  - The blade must be completely rectangular in cross section
  - All of the above
  - None of the above
- 6) The maximum allowable curvature of the blade is
- 1 cm
  - 2 cm
  - 3 cm
  - 4 cm
  - There is no maximum

- 7) Which of these statements is true?
- 9-mm "children's" guards are legal for adult competition (in the U.S.)
  - A 40-year-old tip, if it still functions properly, is legal for competition (in the U.S.)
  - The groove for the wire can be on either the top or the bottom of the blade
  - All of the above
  - None of the above
- 8) The threading of the blade for the tip must be
- S.I. 3.0 x 0.6
  - S.I. 3.5 x 0.6
  - S.I. 3.5 x 0.7
  - S.I. 4.0 x 0.7
  - None of the above
- 9) Which of the following is true?
- Completely covering the screw on the jacket-clip with solder is required
  - A jacket clip can only be soldered; it cannot have a screw
  - The free length of the wire of the jacket clip must be between 30 cm and 40 cm
  - The wire for the jacket clip must be connected to the outside pin ("C" line)
  - None of the above
- 10) What is the maximum allowable length of the blade?
- 70 cm
  - 80 cm
  - 88 cm
  - 90 cm
  - There is no maximum
- 11) What is the maximum combined length of the guard, handle and pommel?
- 15 cm
  - 17 cm
  - 18 cm
  - 20 cm
  - There is no combined maximum
- 12) The specified tolerance for a foil test weight is
- +/- 1.0 g
  - +/- 1.5 g
  - +/- 2.0 g
  - +/- 2.5 g
  - None of the above

• **RULES SPECIFIC TO EPEE**

- 1) What is the minimum total tip-gap distance?
- 0.5 mm
  - 1.0 mm
  - 1.5 mm
  - 2.0 mm
  - None of the above
- 2) What is the minimum that the tip has to travel before it registers a touch? (Epee)
- 0.49 mm
  - 0.5 mm
  - 1.0 mm
  - 1.5 mm
  - None of the above

- 3) The minimum blade length is
  - a. 50cm
  - b. 70 cm
  - c. 80 cm
  - d. 88cm
  - e. There is no minimum
  
- 4) The threading of the blade for the tip must be
  - a. S.I. 3.0 x 0.6
  - b. S.I. 3.5 x 0.6
  - c. S.I. 3.5 x 0.7
  - d. S.I. 4.0 x 0.6
  - e. S.I 4.0 x 0.7
  
- 5) The maximum length of the guard, handle (including pommel) is
  - a. 15 cm
  - b. 17 cm
  - c. 18 cm
  - d. 20 cm
  - e. None of the above
  
- 6) The specified tolerance for an epee weight is
  - a. +/1.0 g
  - b. +/- 1.5 g
  - c. +/- 2.0 g
  - d. +/- 3.0 g
  - e. None of the above
  
- 7) Which of the following statements is true?
  - a. The tip must have a diameter of between 5.5 and 7.0 mm
  - b. The tip must have two screws
  - c. The flange must be recessed less than 0.3mm
  - d. All of the above
  - e. None of the above
  
- 8) Which of these statements is true?
  - a. The maximum combined length of the guard, handle and pommel is 20cm
  - b. The maximum blade length is 90cm
  - c. The eccentricity of the guard must be less than 3.5cm
  - d. All of the above
  - e. None of the above
  
- 9) The maximum width of the blade is
  - a. 2cm
  - b. 2.2cm
  - c. 2.4cm
  - d. 1 inch
  - e. There is now no maximum width
  
- 10) Touches begin registering on fencer B's guard. Your first move should be:
  - a. Disconnect B from the reel and check the C-line at the reel end
  - b. Examine A's tip for rust or dirt, then press it down on the C-pin of B's body cord
  - c. Change the reels
  - d. Change the floor cords
  - e. Change the machine

- **RULES SPECIFIC TO SABER**

- 1) Which of these statements is/are true?
  - a. The tip of the blade must be folded over
  - b. There is no maximum size for the tip
  - c. The blade must be less than 90 cm in length
  - d. All of the above
  - e. None of the above
- 2) The minimum blade length is
  - a. 65 cm
  - b. 70 cm
  - c. 78 cm
  - d. 88 cm
  - e. There is no minimum
- 3) Which of these statements is/are true?
  - a. A coiled mask cable, when stretched to full length, cannot be more than 40 cm long
  - b. When testing a coiled mask cable, it must be stretched to maximum length
  - c. A coiled mask cable must be tested for length "at rest" only
  - d. The length of the two clips of a mask cable count as part of the length of the cable
  - e. None of the above
- 4) What is the maximum blade length?
  - a. 77 cm
  - b. 80 cm
  - c. 88 cm
  - d. 90 cm
  - e. 92 cm
- 5) What is the maximum allowable combined length of the guard, grip and pommel?
  - a. 15 cm
  - b. 17 cm
  - c. 18 cm
  - d. 19 cm
  - e. None of the above

**SECTION 2 – EQUIPMENT: BRANDS/IDENTIFICATION/INTERCHANGEABILITY OF PARTS**

- 1) Which of these statements is/are true?
  - a. A 6-mm pommel can be modified to 12-24
  - b. A 6-mm tan g can be modified to 12-24
  - c. Six millimeter and 12-24 are the only current legal sizes for pommel threading
  - d. All of the above
  - e. None of the above
- 2) Which of these statements is/are true?
  - a. Parts from the same manufacturer will always match
  - b. Parts from different manufacturers cannot be interchanged
  - c. Parts from the same country will be interchangeable
  - d. All of the above
  - e. None of the above
- 3) Which of the following statements is/are true?
  - a. German and French epee screws are not interchangeable
  - b. German and French foil screws are not interchangeable
  - c. English epee screws match with German tips but not with French tips
  - d. All of the above
  - e. None of the above

### **SECTION 3 – EQUIPMENT CONTROL: METHODS AND REQUIREMENTS**

- 1) The allowable deflection for testing the flexibility of a foil blade is
  - a. 5.0 – 8.0 cm
  - b. 4.5 – 9.0 cm
  - c. 5.5 – 9.5 cm
  - d. 5.0 – 9.0 cm
  - e. None of the above
  
- 2) The allowable deflection for testing flexibility of an epee blade is
  - a. 4.0 – 7.0 cm
  - b. 4.5 – 7.0 cm
  - c. 4.0 – 7.5 cm
  - d. 4.5 – 8.0 cm
  - e. None of the above
  
- 3) The allowed deflection for testing flexibility of a saber blade is
  - a. 4.0 – 7.0 cm
  - b. 4.5 – 6.5 cm
  - c. 3.5 – 6.0 cm
  - d. 4.0 – 6.5 cm
  - e. None of the above
  
- 4) The required weight for testing blade flexibility is
  - a. 100 g
  - b. 150 g
  - c. 200 g
  - d. 250 g
  - e. None of the above
  
- 5) The maximum resistance for a foil or epee (out-and-return circuit resistance) is
  - a. 1 ohm
  - b. 1.5 ohms
  - c. 2.0 ohms
  - d. 2.5 ohms
  - e. None of the above
  
- 6) What point to what point is measured when testing the electrical resistance of a saber?
  - a. Guard to “C”-line connector of the socket
  - b. “B” to “C” line in the socket
  - c. Blade to “C” connector of the socket
  - d. Any of the above
  - e. None of the above
  
- 7) What is the maximum resistance of any line in a body cord?
  - a. 0.5 Ohms
  - b. 0.75 Ohms
  - c. 1.0 Ohms
  - d. 1.2 Ohms
  - e. None of the above
  
- 8) What tests are required for an FIE mask?
  - a. Visual inspection for safety of mesh and bib
  - b. Verification that it meets current specifications for bib size and puncture resistance (Newtons)
  - c. Verification that the trim is firmly affixed
  - d. All of the above
  - e. None of the above

- 9) When testing body cords, which of the following statement(s) are true?
- It is mandatory to pull each connector sharply prior to testing
  - When testing for continuity or resistance, the connectors should be moved or jiggled
  - When testing for continuity or resistance, the connector should not be moved or jiggled
  - When testing for resistance, it is necessary to test two wires at once
  - None of the above
- 10) Which of the following statements is true?
- The length of the jacket-clip wire is measured from the end of the clip
  - Epee body cords are not tested for length
  - Leon Paul* and European two-prong connectors are the only ones legal for use in the U.S.
  - All of the above
  - None of the above
- 11) Which of these statements is true?
- All weapons must contain a security device
  - The maximum allowable depth of dents on the guard is 1.5mm
  - Thumb pads can be taped down
  - All of the above
  - None of the above
- 12) Which of the following statements is true?
- The weight used for testing flexibility is placed 3cm from the end of the blade in all weapons
  - The blade is always tested for curvature by attempting to pass the block under the center of the blade
  - The blade needs to be straight in order to test for blade length
  - All of the above
  - None of the above
- 13) In testing conductive-cloth items (electric jackets, gauntlets, etc):
- The weight must be pressed down firmly on the cloth
  - The weight must be moved very rapidly over the surface of the cloth
  - The weight must be repeatedly lifted and lowered onto the surface of the cloth
  - The conductive cloth must be laid over a backing of foam or a similar spongy surface
  - All of the above
  - None of the above
- 14) In using a mask punch:
- An enclosed-head model must be "bottomed against the surface of the mask
  - An open-head model must be depressed sufficiently to bring the plunger flush to the thumb
  - The punch must be applied in one firm, continuous straight motion, i.e. without wobbling
  - All of the above
  - None of the above
- 15) Which statements are true about electrical jackets?
- All must show less than 5 ohms from any one point to any other on the jacket
  - Foil jackets (laid out flat) must be cut on a straight line from the hip to the cuissard strap
  - Saber jackets must include a lamé tab at the rear of the collar for attachment of the mask cord
  - All of the above
  - None of the above
- 16) In checking cords, cables, reels, weapons, etc., a quality ohmmeter is preferable to a simple Simple lamp/LED tester because:
- It is more professional
  - It gives better – more accurate – value readings on the equipment being tested
  - It can accurately read very low resistances
  - It can read single lines rather than loops
  - All of the above

#### **SECTION 4 – DIAGNOSIS, MAINTENANCE AND REPAIR OF PERSONAL EQUIPMENT**

- 1) According to the current rule in saber, if a white light appears on the scoring box during the bout and stays lit, it means:
  - a. The fencer on the same side as the light on the box has a break somewhere in his circuit
  - b. The fencer on the side opposite that shown on the box has a break somewhere in his circuit
  - c. The fencer on the side with the white light is given a warning
  - d. The box must be considered as faulty and should be replaced
  - e. None of the above
  
- 2) In the start of the third bout of a preliminary foil pool of five fencers, when there has been no control or testing of body cords or weapons, only a white light can be registered on one side of the scoring box. After checking that all parts of the system are connected, the first test that you should perform is:
  - a. Check the equipment of the fencer who is fencing for the first time in the pool
  - b. Check the equipment of the other person, if he/she has already fenced in this pool
  - c. Check the equipment of the person who is being touched
  - d. Check the equipment of the fencer who is doing the touching
  - e. Change the scoring box
  
- 3) It is the second bout of a preliminary foil pool, and there has been no preliminary control of body Cords or weapons. When the fencers test their weapons at the start of the bout, only a white light can be achieved on one side of the scoring box. After you check the equipment of the person who is being touched (with only a white light showing), the next test you should make is:
  - a. Check the reel behind the fencer who is being touched
  - b. Check the reel behind the fencer who is doing the touching
  - c. Check the equipment of the fencer who is doing the touching
  - d. Have both fencers change their body cords
  - e. Change both reels

#### **SECTION 5 – KNOWLEDGE/MAINTENANCE/REPAIR OF SCORING AND RELATED APPARATUS**

- 1) What is the main mechanical difference between a Russian and *Uhlmann* “turtle” reel?
  - a. All-metal versus all-plastic cases
  - b. The wire goes through a pulley system versus directly out through a grommet
  - c. rubber “feet” versus no “feet”
  - d. All of the above
  - e. None of the above
  
- 2) What is the main electrical difference between a *Prieur* reel and an *Uhlmann* “turtle” reel?
  - a. The ground in one is isolated from the case; in the other the case is the ground
  - b. One uses a commutator, the other used directly soldered wires
  - c. One has no insulating sleeve over the three wires, the other has an insulating sleeve
  - d. All of the above
  - e. None of the above
  
- 3) When replacing a reel cable, the minimum cable length should be
  - a. 20 feet
  - b. 20 meters
  - c. 10 meters
  - d. 14 meters
  - e. It doesn't matter

- 4) When replacing a floor cable, the minimum cable length should be
  - a. 20 feet
  - b. 32 feet
  - c. 7 meters
  - d. 14 meters
  - e. It doesn't matter
  
- 5) Which of the following is the main mechanical difference between a *Leon Paul* and an *Uhlmann* Upright reel?
  - a. The springs in one are in separate spring cases versus springs that are attached via screws
  - b. Plastic case versus metal case
  - c. The wire exits the reel at the top versus exiting the reel at the bottom
  - d. The *Uhlmann* connector is better made
  - e. There is no difference
  
- 6) What is the main electrical difference between an *Uhlmann* upright reel and a *Paul* reel?
  - a. The *Leon Paul* connector has more tendency to short circuit
  - b. On the *Paul* reel, the electricity goes through a commutator
  - c. The case in one is used as the ground
  - d. All of the above
  - e. None of the above
  
- 7) Which of the following statements is true?
  - a. A *Soudet* cable connector cannot be used on an *Uhlmann* reel
  - b. A spring from an *Uhlmann* upright reel can be used in a *Leon Paul* reel
  - c. An *Uhlmann* wire can be used in a *Prieur* "turtle" reel
  - d. All of the above
  - e. None of the above
  
- 8) An *Uhlmann* reel wired at the factory uses the following respective color coding for the "A", "B" and "C" lines
  - a. Brown, White, Green
  - b. White, Green, Brown
  - c. Green, Brown, White
  - d. Brown, Green, White
  - e. None of the above
  
- 9) A *Prieur* "turtle" reel, wired at the factory, has the following color coding respectively for the "A", "B" and "C" lines
  - a. Red, White, Yellow
  - b. Red, Yellow, White
  - c. Yellow, White, Red
  - d. White, Yellow, Red
  - e. None of the above
  
- 10) What is the main mechanical difference between upright and "turtle" reels
  - a. Multiple springs versus a single-spring system
  - b. Upright reels frequently fall over
  - c. Turtle reels slide more easily on the floor
  - d. A "drum" versus a rotating "bail"
  - e. None of the above
  
- 11) To make repairs on a *Paul* reel spring, you first remove the cover on
  - a. The connector side
  - b. The side opposite the connector
  - c. The bottom of the reel
  - d. The back side
  - e. It doesn't matter on this reel

- 12) To make repairs on a spring on an *Uhlmann* "turtle" reel, you remove the cover on
- The floor-cable connector
  - The top of the reel
  - The bottom plate of the reel
  - Any of the above – on this reel it doesn't matter
  - None of the above
- 13) When adjusting a Russian screwless epee tip (when the wire is known to be good) the best method is to
- File down the contact post
  - Add a drop of solder to the contact post
  - Add or remove a washer from the tip
  - Loosen or tighten the screw at the end of the tip
  - None of the above
- 14) What is the main difference encountered between *Uhlmann* and *Prieur* "turtle" springs?
- The outside end of one spring is welded, the other is not
  - The inside end of the spring is connected via a screw versus a slot
  - The spring is reached by opening the top of the reel versus opening the bottom
  - All of the above
  - None of the above
- 15) What is the most efficient and effective way – the best first step -- to shorten an epee contact spring (such as in French or German tips)
- Replace the spring
  - Cut the spring
  - Turn the spring clockwise on the mounting shaft
  - Slightly stretch and then cut the spring
  - Replace the tip