**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_Instructor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**1) OSHA is the \_\_\_\_\_\_\_\_\_\_\_\_\_. NFPA 70E is the \_\_\_\_\_\_\_\_\_\_\_\_\_.**

**2) What does the 70E cover?**

**\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ to perform installation and maintenance work safely.**

**\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ for employees and employers on equipment maintenance.**

**3) What is the purpose of the NFPA 70E?**

**4) OSHA Section: \_\_\_\_\_\_\_\_\_\_\_\_\_ states that every employer shall furnish a place of employment free of any \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ that might cause death or serious physical harm to the employees.**

**5) Section \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the California Labor Code requires any \_\_\_\_\_\_\_\_\_\_\_\_\_ and any \_\_\_\_\_\_\_\_\_ to be to be OSHA and 70E compliant. [see handout page 1]**

**6) There are three basic causes of electrical incidents**

**1)**

**2)**

**3)**

**7) Electrical hazard 70E Article 100 defines a dangerous condition such that contact or equipment failure can result in**

**1)**

**2)**

**3)**

**4)**

**8) What are the four protective strategies of the 70E?**

**1) 4)**

**2)**

**3)**

**9) NFPA 70E Article 100 definition of a Qualified Person is one who has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ related to the construction and operation of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equipment and installations and has received safety training to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and avoid the hazards \_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**10) OSHA 1910.399-Qualified person one who has received \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in and has \_\_\_\_\_\_\_\_\_\_\_\_ skills and knowledge in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and operation of electric equipment and installations and the \_\_\_\_\_\_\_\_\_\_\_\_\_ involved.[OSHA is the enforcer]**

**11) What are the six steps to establishing an electrically safe work condition?**

**1)**

**2)**

**3)**

**4)**

**5)**

**6)**

**12) Appropriate devices must be applied to \_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_ equipment to properly isolate all energy sources.**

**13) What category tester would you use for feeders and branch circuits?**

**14) There are two techniques for controlling hazardous energy are: Section: 120.2(D)**

**1) 2)**

**15) Section 120.2(B)(3)(4) states the employee is required to have documented training in LOTO every \_\_\_\_\_ years.**

**16) When it is Infeasible to De-energize? (there are only three)**

**1) If deenergizing is infeasible due to \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**2) If deenergizing is infeasible due to \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ work that can be done only while the circuits are energized.**

**3) If deenergizing introduces \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_.**

**17)** **Section:** **130.2(B)(1) The Energized Electrical Work Permit [EEWP] is required under the following conditions:**

**a) When work is performed within the \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_**

**Or**

**b) When the employee interacts with the equipment when conductors or circuit parts are not exposed but an increased \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ from an exposure to an arc flash exists.**

**18) Section: 130.2(B)(3) There are four Exemptions to when an EEWP is not required.**

**a) Testing, toubleshooting and \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_**

**b)Thermography and \_\_\_\_\_\_\_\_\_\_ inspection if the restricted approach boundary (RAB) is not crossed**

**c) \_\_\_\_\_\_\_\_\_\_\\_\_\_\_\_\_\_\_\_\_ from an area with energized electrical equipment with no electrical work and the RAB is not crossed**

**d) General \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and miscellaneous nonelectrical task if the RAB is not crossed**

**19) Section: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the 70E details the minimum information that must be documented in the energized electrical work permit.**

**20) What are the two Shock Approach boundaries and what is the distance limitation of each for equipment rated at 50 volts to 750 volts? Understand that you will see on older electrical warning labels with a “prohibited approach boundary”.[ Section 130.4 and Table 130.4(D)(a)]**

**1)**

**2)**

**21) Which Shock Approach boundary requires insulating gloves and at what A/C voltage?**

**22) Electrical injuries can be caused by what three things?**

**1) 3)**

**2)**

**23) [2015 NFPA 70E Article 100 Definitions] Incident Energy is the amount of thermal energy impressed on a \_\_\_\_\_\_\_\_\_\_, a certain \_\_\_\_\_\_\_\_\_\_\_\_\_ from the \_\_\_\_\_\_\_\_\_\_\_\_\_, generated during an electrical \_\_\_\_\_\_\_\_ event. Incident energy is typically expressed in calories per square centimeter. Cal/cm2**

**24) 2015 NFPA 70E Section 130.5 (B) Arc Flash Boundary[AFB] shall be the distance at which the incident energy equals \_\_\_\_\_\_\_\_\_\_\_\_. What degree burn is that? \_\_\_\_\_\_\_\_\_\_**

**25) [2015 NFPA 70E Section 130.5]**

**An Arc Flash Risk Assessment shall determine three things:**

**1)**

**2)**

**3)**

**26) Arc Flash Label are required to display five things list them: The new 2015 70E has two more requirements [labels older than 2012 may have only 5]**

**1) 6)**

**2) 7)**

**3)**

**4)**

**5)**

**27) 2015 NFPA 70E Article 130.5(2) states that arc flash risk assessment be updated when a major modification or renovation takes place. It shall be reviewed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, at intervals not to exceed \_\_\_\_\_\_\_\_\_years to account for changes in the electrical distribution system that could affect the results of the arc flash risk assessment.**

**28) Label placement should be \_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_ to the appropriate system or equipment. Label placement should be \_\_\_\_\_\_\_\_\_\_\_\_\_ from the point of normal approach.**

**29) Electrical Equipment that are in other than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that are likely to require adjustment, servicing or maintenance while energized, \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ field marked to warn qualified person of potential electrical arc flash hazard**

**30) List the five specific types of electrical equipment requiring arc flash labeling [NFPA 70E 2015]**

**1)**

**2)**

**3)**

**4)**

**5)**

**31) In Section 130.5 Informational Note No. 5 it states to see \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ for more information regarding arc flash hazards for three-phase systems rated less than \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ .**

**32) For energized circuit over \_\_\_\_\_\_\_ volts or more \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ must be used.**

**33) Table \_\_\_\_\_\_\_\_\_\_\_\_\_ has \_\_\_\_\_\_\_ categories for Arc Flash Clothing.**

**34) What is the calorie rating for Category 2 clothing?**

**35) Using Table 130.7(C)(16) what PPE would you be required to wear for Category 2?**

**Note: Rubber Gloves are for shock protection only and are rated by the voltage of the equipment**

**1)**

**2) 6)**

**3) 7)**

**4) 8)**

**5)**

**36) Section 130.7(C)(7)(a) Rubber Insulating Equipment**

**\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ shall be rated for the voltage for which the gloves will be exposed.**

**37) NFPA 70E \_\_\_\_\_\_\_\_\_\_\_\_\_\_ employees to have \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ but does not provide the details.**

**38) OSHA regulations require that at least \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ on each job site be trained in \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_.**

**39) What is the leading cause of deaths due to electricity?**

**What are the other two causes?**

**1)**

**2)**

**40) Under Section:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ requires employees to be retrained at intervals not to exceed \_\_\_\_\_\_ years. Under Section \_\_\_\_\_\_\_\_\_\_\_\_\_\_training must be documented.**