DIGIWELD
DIGITAL EDUCATION AND TRAINING IN WELDING

Erasmus+

2021

Innovative digital tools for training in the field of welding

Elaboration of digital examination system

IO4 – ELABORATION OF DIGITAL EXAMINATION SYSTEM

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Introduction in Computer and Simulation

1. **The use of digital tools implies the use of a learning system:**
    a. Centered on teacher
    b. Centered on student
    c. Centered on teacher and student
    d. Centered on digital tools used in learning process

2. **Welding simulators can support:**
    a. Theoretical training and assessment
    b. Practical training and assessment
    c. Theoretical and practical training and assessment
    d. Online or offline theoretical and practical training and assessment

3. **Please select the advantages of simulated welding:**
    a. Economical, Ecological, Safety, Educational
    b. Economical, Safety, Educational
    c. Economical, Ecological, Safety, Educational, Social
    d. Economical, Social, Educational

4. **In terms of economical aspects please select the most appropriate benefits:**
    a. Reduced costs with: energy, human resource
    b. Reduced training time
    c. No waste materials which can affect the environment
    d. No risks regarding safety issues

5. **Please select the main disadvantages of simulated welding:**
    a. Cost of technology
    b. Lack of digital skills of trainers and technology limitations
    c. Cost of operation
    d. No disadvantages identified regarding the simulators or simulated welding

6. **The virtual learning environment (VLE) can be categorized as follow:**
    a. Open-source, Bespoke and Of-the-shelf
    b. The VLE can be only open-source taking into consideration that the software is free
    c. Open-source, Closed-source
    d. Free, Commercial

7. **What are the minimum functionalities for LMS?**
    a. Reporting, Analysis, Customization, Communication
    b. Reporting, Analysis, Customization, Registration
    c. Reporting, Analysis, Customization, Evaluation, Interactive
    d. Reporting, Analysis, Customization, Assessment, Communication

8. **What is the main difference between AR and VR?**
    a. AR blends real and virtual, VR only creates virtual world
    b. AR is cheaper technology than VR
    c. AR uses sensors, VR uses helmets
    d. No difference between these technologies

9. **In VR technology can a full 360 degree view be obtained?**
    a. Yes, but only with HMD
    b. Yes, but only with EyeGlass
    c. No
    d. Yes, using multiple monitors

10. **The remote server is required by AR technology for:**
    a. Storing virtual images
    b. Blending virtual with real images
    c. Internet access
    d. Only VR technology requires a remote server

11. **The definition of LMS is:**
    a. A software application for assesing specific learning process
    b. A software application or web-based technology for planning, implementing and assessing a specific learning process.
    c. A software application or web-based technology for planning, implementing and assessing a specific learning process using blended learning
    d. An AR technology used only in welding education

12. **The main differences between welding simulator and real welding system are:**
    a. Practice in different environment, level of pollution, safety issues, number of attempts, arc time, level of qualification
    b. Simulator is a computer, real system is a specific equipment
    c. There are no differences between simulator and real welding system
    d. First two options are good

Welding Processes – GMAW

1. **How can we designate the MAG welding process with solid wire according to EN ISO 4063?**
   a. 141
   b. 111
   c. 131
   d. 135

2. **What does MIG stand for?**
   a. Metal Ionized Gas
   b. Metal Tungsten Gas
   c. Metal Inert Gas
   d. Metal Active Gas

3. **In MIG/MAG welding:**
   a. only inert gases are used
   b. the wire feed speed varies during welding
   c. the wire electrode is non-consumable and protection is achieved with gases
   d. the wire electrode is consumable and protection is achieved with gases

4. **MIG/MAG welding equipment consists of:**
   a. welding jig, welding fixtures and manipulator
   b. power source, wire feed equipment and welding gun
   c. welding accessories and, welding consumables
   d. All the above answers are correct

5. **Ampere is the unit for:**
   a. arc voltage
   b. travel speed
   c. wire feed speed
   d. welding current

6. **Which polarity do you choose for MAG welding (135)?**
   a. alternating current
   b. positive polarity connected to the torch and the negative connected to the piece
   c. positive polarity connected to the piece and the negative connected to the torch
   d. free choice

7. **A tubular cored electrode consists of:**
    a. a steel tube which contains flux or powder
    b. a steel tube which contains inert gas
    c. a hollow rod in order to save weight
    d. a steel tube which contains flux and inert gas

8. **The most used metal transfer modes in MAG-welding (135) are:**
    a. short arc and pulse arc
    b. short arc, spray arc and pulse arc
    c. pulse arc and globular arc
    d. spray arc and globular arc

9. **What is one of the advantages of the GMAW process**
    a. The deposition rate is high
    b. Not economical for welding thicknesses greater than 8 mm
    c. It produces more welding fumes than other processes
    d. All the above answers are correct

10. **With which shielding gas will we achieve greater penetration when welding with MAG?**
    a. Argon
    b. Hydrogen
    c. Nitrogen
    d. CO2

11. **Lack of fusion in MIG/MAG welding can be caused by:**
    a. excessive welding speed
    b. low thermal inputs
    c. Transfer by short arc
    d. All the above answers are correct

12. **The best solution to reduce gas and smoke hazards in GMAW welding is:**
    a. general ventilation and localized extraction
    b. stay away from the torch with your face
    c. to use gas masks
    d. No answer is correct

Welding Processes – MMA

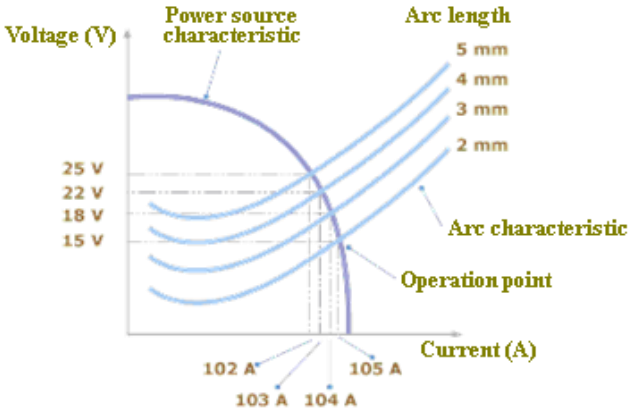
1. **How can we designate the MMA welding process according to EN ISO 4063?**
   a. 141
   b. 111
   c. 131
   d. 135

2. **When we weld with MMA process, what provides the protection against environmental agents?**
   a. The slag that generates the electrode coating.
   b. The slag that generates the electrode core.
   c. The protective gas used in the process.
   d. With this welding process, no protection of the molten pool is necessary.

3. **What kind of materials can we weld with MMA process?**
   a. Carbon steels.
   b. Stainless steels.
   c. Bronze alloys.
   d. All the above answers are correct.

4. **The characteristics of a power supply required for MMA welding are:**
   a. Provides low voltage and high current.
   b. It provides low voltage, high intensity and can work in AC or DC.
   c. Provides high voltage and low current.
   d. Provides high voltage, low current and can work in AC or DC.

5. **Indicate the type of power supply characteristic curve shown in the figure below, corresponding to MMA process.**



a. Downslope characteristic (constant voltage).
b. Downslope characteristic (constant current).
c. Plain characteristic (constant voltage).
d. Plain characteristic (constant current).

6. What does the value of "short-circuit current" mean?

a. The short-circuit current (Isc) is the maximum current supplied by the power supply, where the electrode heats up and can establish the arc.
b. The short-circuit current (Isc) is the maximum current supplied by the power supply, where the arc extinction occurs.
c. Value where the arc is unstable.
d. None of the answers is correct.

7. The electric arc that occurs in MMA welding is formed by:

a. Protective inert gas.
b. Flame (area outside the arc).
c. Plasma (it is an ionized gas).
d. Answers b and c are correct.

8. Indicate the welding that has been used for optimum voltage, current and welding speed.

a. A
b. B
c. C
d. D

9. What does the term of "alternating current" mean?

a. When the arc is established in alternating current, the electrode is always acting as an anode.
b. When the arc is established in alternating current, the electrode is always acting as a cathode.
c. When the arc is established in alternating current, the electrode acts as an anode for half a cycle and as a cathode for the other half of the cycle.
d. When the arc is established in alternating current, the electrode undergoes current variations in the coating.

10. What is the electrode coating made of?

a. Of the same composition as the base material.
b. It is made up of a mixture of components that have various functions, such as stabilizing the arc and forming slag to protect the molten pool.
c. Formed by a polymeric material that disappears when the arc is established.
d. None of the answers are correct.

11. What problems can occur with overhead welding (PE) in the MMA process?

a. The molten pool drains, generating a non-uniform cord.
b. Risk of slag inclusions in the weld, due to the difference in density between the molten pool and the slag.
c. The only problem that can arise is the presence of undercuts.
d. Answers a and b are correct.

12. What type of cloth is suitable for welding with MMA process?

a. Cotton.
b. Leather.
c. Any material that protects from flames.
d. All answers are correct.

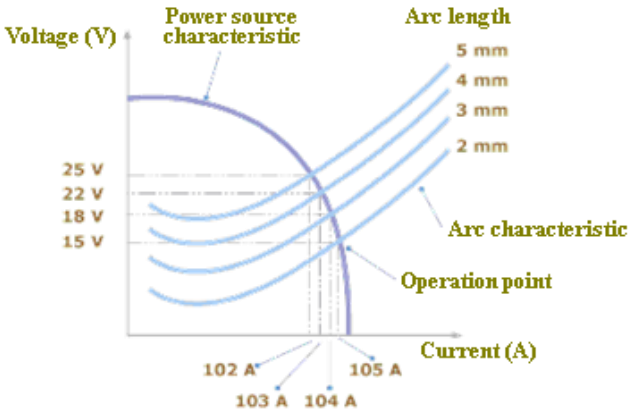
Welding Processes – TIG

1. **How can we designate the TIG welding process according to EN ISO 4063?**
   a. 111
   b. 141
   c. 131
   d. 135

2. **When we weld with TIG process, what provides the protection against environmental agents?**
   a. The slag that generates the electrode coating.
   b. The slag that generates the electrode core.
   c. The protective gas used in the process.
   d. With this welding process no protection of the molten pool is necessary, as the filler material protects the molten pool.

3. **What limitations can occur when welding with TIG process?**
   a. The deposition rate is low.
   b. Not economical for welding thicknesses greater than 10 mm.
   c. It produces more ultraviolet radiation than other processes.
   d. All the above answers are correct.

4. **Indicate the type of characteristic curve of the power supply shown in the following figure, corresponding to the TIG process.**



   a. Downslope characteristic (constant voltage).
   b. Downslope characteristic (constant current).
   c. Flat feature (constant voltage).
   d. Flat characteristic (constant current).

5. **What does the value "open-circuit voltage" mean?**
    a. Open circuit voltage (Vo) is the maximum voltage that the power source can supply and is the voltage at the terminals of the source when not welding.
    b. Open circuit voltage (Vo) is the minimum voltage that the power source can supply and is the voltage at the terminals of the source when not welding.
    c. Value where the arc is unstable.
    d. No answer is correct.

6. **What is the "Lift-Arc"™ technique for priming the arc with the TIG process?**
    a. In a capacitive discharge.
    b. Application of a high voltage pulse between the non-consumable electrode and the workpiece.
    c. This method involves gently tapping (without scratching) the workpiece with the electrode, keeping the torch perpendicular to the workpiece.
    d. To touch (by scraping) with the electrode, very carefully, against the base metal.

7. **What will happen if, when performing TIG welding, the electrode tip is too sharp?**
    a. It will generate an erratic arc, generating a large molten pool and little penetration.
    b. Risk of tungsten inclusions.
    c. No undesirable factors will occur, as it is always in the interest of the tungsten electrode to be as sharp as possible.
    d. No answer is correct.

8. **Indicate which alloys are added to the tungsten electrode to improve its properties in TIG welding.**
    a. Thorium.
    b. Thorium and Zirconium.
    c. Cerium.
    d. Thorium or zirconium, cerium and lanthanum.

9. **With which shielding gas will we achieve greater penetration when welding with TIG?**
    a. Argon.
    b. Helium.
    c. Nitrogen.
    d. CO_2.

10. **If when welding a piece with TIG process we obtain a lack of fusion, how could it be solved?**
    a. Increase the bevel angle at the joint.

b. Decrease the welding current.
c. Increasing the arc length.
d. Answers a and c are correct.

11. Why can tungsten inclusions appear in TIG welding?

a. Contact between workpiece and tungsten electrode.
b. Contact between filler rod and tungsten electrode.
c. Excessive welding current.
d. All answers are correct.

12. What risks should be taken into consideration when working with protective gases with TIG welding?

a. Asphyxiation by air displacement with inert gases.
b. Gas Poisoning.
c. Generation of gamma radiation.
d. No answer is correct.

Quality Assurance in Welding

1. **In the fabricating industry, quality assurance is applied to:**
   a. Ensure that the customer gets what was ordered
   b. Check for porosity
   c. Control the welding personnel
   d. None of the above

2. **What are degrees of quality? (ISO 5817)**
   a. B, C, D
   b. A, B, C
   c. A, B, C, D
   d. C, D, E

3. **When does the activity of quality assurance occur?**
   a. During the process as a corrective action
   b. After the fact as aresult of a error
   c. Before the event or activity to prevent errors
   d. As the result of a history of poor quality

4. **The ISO 3834 standard is structured in several parts. Which of the following options is correct?**
   a. Part 1 of ISO 3834 describes the comprehensive quality requirements of the management system
   b. Parts 2 to 4 of ISO 3834 describe the comprehensive quality requirements of the management system.
   c. Part 2 of ISO 3834 describes the comprehensive quality requirements of the management system.
   d. All answers are correct

5. **What is a pWPS?**
   a. A tested welding procedure specification
   b. A welding procedure specification especially for pressure welding
   c. A untested welding procedure specification
   d. An approved work instruction

6. **Which of the following option is correct regarding welding procedure documents?**
   a. WPS → WPQR → pWPS
   b. pWPS → WPQR → WPS
   c. WPQR → pWPS → WPS
   d. pWPS → WPS → WPQR

7. **What of the following parameters must be recorded on a WPS of GMAW welded joint?**
    a. Current value
    b. travel speed
    c. wire diameter
    d. all the previous are correct

8. **What kind of imperfection cannot be found with the visual test?**
    a. Undercut.
    b. Excess weld metal.
    c. End crater pipe.
    d. Lack of inter-run fusion.

9. **A imperfection becomes a defect when...**
    a. Hydrogen is present in the weld bead
    b. It exceeds the acceptance criteria of the manufacturing codes
    c. It is visible on the surface
    d. It reaches 1 mm in length

10. **Ultrasonic testing is a good NDT method for the detection of:**
    a. changes in hardness of a item
    b. fine porosity in thin wall TIG welded items
    c. surface cracks in the rough surface of a casting
    d. lack of sidewall fusion in thick wall carbon steel weldments

11. **A welder qualification test is intended to check:**
    a. the mechanical properties of the joint
    b. the manufacturing methods
    c. welding feasibility
    d. the skill of the welder

12. **According to ISO 9606-1 a new qualification test is required when a welder:**
    a. Is welding in two different factories
    b. Welds indoor and outdoor
    c. welds outside the approved qualification range
    d. Nove of the above is correct.