

UNIVERSIDADE DA BEIRA INTERIOR

COURSE: MESTRADO INTEGRADO EM ENGENHARIA AERONÁUTICA – 4º ANO
SUBJECT: FABRICAÇÃO E MANUTENÇÃO DE AERONAVES – 10384
EXAM: 1
ACADEMIC YEAR: 2013/2014
DATE: 30-01-2014

The test contains 60 multiple choice questions, each one counting 3 marks. The total number of marks is 180. The test should be completed in 2 hours. You should answer in the test sheets by selecting the correct option.

Good Work

Name: _____

Student's number: _____

Answer each of the following questions, indicating the correct option of those provided.

1. **JAA organization changed its name to EASA.**
 - a. Correct!
 - b. Incorrect! ✓
 - c. Correct, but JAA organization still work as a training organization and as a technical advisor to EASA.
2. **The EASA acronym means:**
 - a. European Agency for Safety Aviation.
 - b. European Aviation Safety Agency. ✓
 - c. European Aviation Safety Aircraft.
3. **EASA was created by the Commission of the European Communities with the goal and scope to:**
 - a. establish administrative procedures and common technical requirements to ensure the maintenance of aircraft. ✓
 - b. legislate the business of aircraft among Member States.
 - c. replace ECAC in Europe and ICAO in the rest of the world.
4. **The document issued by the Aeronautical Authority of the State which registers the airplane before it can fly is the:**
 - a. Supplemental Type Certificate.
 - b. Type Certificate.
 - c. Airworthiness Certificate. ✓
5. **The meaning of ICAO is:**
 - a. International Civil Airport Organisation.
 - b. International Civil Aviation Organisation. ✓
 - c. International Civil Aerospace Organisation.

6. In Portugal, according to the Part M document, all aircraft must be subjected to a Maintenance Program approved by:
- EASA
 - JAA
 - INAC. ✓
7. *“Commission Regulation (EU) No 748/2012 of 03/08/2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organizations.”*
These organizations are certificated according the annex I, named:
- Part-M
 - Part-21 ✓
 - Part-147
8. For the certification of technical personnel, the regulation must be accomplished according to:
- Part-145
 - Part-147
 - Part-66 ✓
9. Part-CAT, Part-ORO and Part-SPA are regulations applicable to:
- State owned aircraft
 - Commercial Operations ✓
 - Non-Commercial Operations
10. Issue a CAME, review the ARC, establish the maintenance plan, planning the maintenance, update the records: these are responsibilities of an organization approved according to EASA:
- Part-M ✓
 - Part-21
 - Part-145
11. Where can one obtain training for the license of maintenance technician Part 66?
- In an approved Part 145 organization.
 - In an approved Part 147 organization. ✓
 - In a technician training organization.
12. In order to maintain its airworthiness condition, an airplane must have its certificate regularly renewed. This renewal is done:
- every 3 years.
 - every 4 years.
 - following a time interval defined by INAC. ✓
13. Part M code is applied to:
- the certification of all aircraft categories.
 - all military and commercial air transport aircraft.
 - the continued airworthiness of aircraft and components. ✓
14. A maintenance action due to a FOD is considered,
- Preventive and unscheduled maintenance
 - Corrective and expected maintenance
 - Corrective and unexpected maintenance ✓

15. A maintenance action due to tires' wear is considered
- Preventive and schedule maintenance
 - Corrective and expected maintenance ✓
 - Corrective and unexpected maintenance
16. In case an accident occurs, the Entity Part 145 must inform:
- only the Quality Department.
 - the National Aviation Authority. ✓
 - the JAA Safety Department.
17. By the MSG-2 logic, if we have a component where preventive maintenance does not increase reliability and the equipment malfunction cannot affect safety, that component shall be controlled by the process:
- On-Condition.
 - Condition Monitoring. ✓
 - Hard Time.
18. The MSG-3 group issues the MRB report with the inspection tasks and limitations applicable to the aircraft model. Choose the false sentence:
- This MRB report is a closed list of inspection and airworthiness limitations to help the operator to schedule the maintenance.
 - This MRB report is an open list of inspections that the operator can adapt to suit better its operation. ✓
 - This MRB report should be supported by an operator reliability program.
19. A manufacturer's recommended program that allows the operator to distribute scheduled maintenance tasks in smaller allocations thereby improving aircraft availability is called:
- Equalized Maintenance Program ✓
 - Flexible Maintenance Program
 - Customized Maintenance Program
20. The Fuel Tank Safety training requirements are applicable to:
- Airworthiness staff
 - Maintenance staff
 - Airworthiness and Maintenance staff ✓
21. Who can issue an AD?
- The Type Certificate holder organization.
 - The Civil Aviation Authority of the country of the Type Certificate holder organization.
 - Any Civil Aviation Authority. ✓
22. The Quality Manual of an Entity Part 145 is known as the Maintenance Organization Manual (MOM). This should always be accessible to:
- managers and administrators.
 - managers and engineers.
 - all staff of the company. ✓
23. A Maintenance Technician can lose his/her aircraft maintenance license if he/she:
- performs unsafe maintenance actions in a negligent fashion. ✓
 - moves from a Part 145 approved entity to a FAR-145 entity.
 - fails two times in a row a given exam module.

24. The minor, unscheduled or scheduled, maintenance carried out on aircraft between flights is called:
- Shop Maintenance
 - Base Maintenance
 - Line Maintenance ✓
25. What is an SB?
- A mandatory airworthiness limitation.
 - An advisory to the Operator.
 - A recommended modification. ✓
26. *“An intensive visual examination of a specific structural area, system, installation or assembly to detect damage, failure, or irregularity. Available lighting is normally supplemented with a direct source of good lighting at an intensity deemed appropriate by the inspector. Inspection aids such as mirrors, magnifying lenses, etc. may be used.”*
- This is a:
- General visual inspection
 - Detailed visual inspection ✓
 - Special detailed visual inspection
27. Termination of the ability of an item to perform a required function is called:
- Failure ✓
 - Fault
 - Both, are the same
28. When in a material corrosion tends to manifest itself into distinct layers, like the sheets of a book, we are facing:
- Exfoliation corrosion. ✓
 - Galvanic corrosion.
 - Inter-granular corrosion.
29. Non-destructive tests are used to determine:
- the number of life cycles left of materials or components.
 - the presence of discontinuities, damage or other properties without jeopardizing the future use of materials or components. ✓
 - the limit strength of materials or components.
30. From the treatment types below, indicate the one that is not used to increase aluminium corrosion protection.
- Cadmium ✓
 - Alodining
 - Anodizing
31. What is aeronautical manufacturing?
- Production includes all activities of analysis, selection and implementation of most efficient technologies and production processes in combining and transforming the production factors (inputs) for maximizing the goods and services related with the aeronautical product.
 - A set of articulated and organized activities of engineering, logistics, quality and production which, based on design specifications, include the manufacturing of aeronautical components. ✓
 - A set of activities related to production which implies any type of aeronautical application.

- 32. Identify the types of activities related to the Aeronautical Production Life-Cycle and are non-recurring activities**
- a. Conceptual studies, preliminary studies, development, prototyping, production, process definition, industrialization optimization. ✓
 - b. Conceptual studies, preliminary studies, development, prototyping, process definition, industrialization optimization, series production.
 - c. Process definition, industrialization optimization, series production.
- 33. Identify the main tasks of the Project Management.**
- a. To ensure the project completes according to the contract and within the time and budget. ✓
 - b. To define, transmit and manage the project tasks.
 - c. To manage the industrialization process.
- 34. The industrialization typically has three main lines of action which are**
- a. pre-industrialization; industrialization; post-industrialization.
 - b. pre-industrialization; industrialization; series production.
 - c. production and assembly; jigs; tooling. ✓
- 35. Which activity occurs in the pre-industrialization process?**
- a. Economic Assessment. ✓
 - b. Logistics.
 - c. Production.
- 36. Identify from the following the list that best defines the overall manufacturing process:**
- a. Budgeting, Production Planning and Contract Negotiation.
 - b. Engineering, Special Process Definition, Manufacturing and Quality.
 - c. Pre-industrialization, Industrialization and Series Production. ✓
- 37. Which of the following steps is not considered a Logistics activity?**
- a. Materials management.
 - b. Suppliers analysis.
 - c. Conceptual design. ✓
- 38. What is the aim of quality in the production process?**
- a. To support production activities in the mass production phase (modifications and improvements in the process).
 - b. To assure that the manufacturing of aeronautical components and systems follows the previously defined plan.
 - c. To assure that the manufacturing follows quality requirements defined in relevant regulations (EASA PART 21, FAR 21) and in specific contract documents. ✓
- 39. What is an ERP system?**
- a. It is a modular system aimed at managing, planning and executing in an integrated manner the activities of a production unit. ✓
 - b. It is a management system to verify production times and optimize the industrialization.
 - c. It is an integrated and optimized manufacturing system for aeronautics.
- 40. Consider the differences between the aeronautical manufacturing in the beginning of aviation and today's. What change do you consider is the most important?**
- a. Mass production.
 - b. Automation.
 - c. Implementation of traceability techniques. ✓

41. From the following, which is the performance indicator that differentiates the aeronautical market after the year 2000?
- Client satisfaction. ✓
 - Productivity.
 - Profit.
42. Which of the following metal processing operations are *Shaping Processes*?
- Heat treatment.
 - Material removal. ✓
 - Inorganic treatment.
43. Shot peening is a technology for
- surface protection.
 - improving the properties. ✓
 - permanent joints.
44. The wire electro-erosion cutting technique is used to
- obtain holes in metal components. ✓
 - rectify surfaces of metal components.
 - obtain holes in metal and non-metal parts.
45. Anode oxidation of aluminium is used to
- improve its mechanical strength.
 - increase its welding capability.
 - promote good resistance to corrosion. ✓
46. Which of the following coating application methods is the most efficient?
- Conventional spray.
 - Brushing and rolling. ✓
 - Electrostatic spray.
47. One should not put carbon components in contact with aluminium components because
- aluminium suffers from galvanic corrosion. ✓
 - the bonding of the two components with epoxy is inappropriate.
 - their thermal expansion coefficient is different.
48. Order the following materials with increasing density.
- Carbon, aramid, glass.
 - Aramid, glass, carbon.
 - Aramid, carbon, glass. ✓
49. Adding colloidal silica (silicell® or aerosil®) to a resin
- lowers its density.
 - rapidly makes it thixotropic. ✓
 - rapidly increases its density and lowers its viscosity.
50. Operating a PMC above its glass transition temperature may result in
- plastic deformation and then loss of mechanical strength. ✓
 - an increase in the intra-laminar adherence of the various layers.
 - an increase of the dimensional stability of the epoxy system.
51. The dosage and mixture of the two parts of an epoxy resin are done
- with some margin since it is a catalytic reaction.
 - in 100 grams intervals.
 - very tightly. ✓

- 52. What is the parameter that influences the most the speed at which an epoxy resin cures?**
- Humidity.
 - Pressure.
 - Temperature. ✓
- 53. The volume fibre ratio is highest with**
- contact impregnation.
 - vacuum bag with hand lay-up. ✓
 - RTM.
- 54. The processing method of a CFRP component that produces the best mechanical properties for the aerospace industry is**
- pre-preg cured in autoclave. ✓
 - infusion and curing at ambient temperature with vacuum bag.
 - hand lay-up end cure in an oven.
- 55. Producing a part with the infusion technique implies**
- having a stiff counter-mould.
 - injecting resin into the mould with some pressure.
 - spreading the resin over the mould using vacuum alone. ✓
- 56. The assembly of composite or wooden parts must be performed mainly with**
- rivets and staples.
 - glue that works in shear. ✓
 - glue that works in tension.
- 57. The rapid growth of a tree**
- implies better mechanical properties of wood.
 - implies worse mechanical properties of wood. ✓
 - has no influence because the type of wood is the only thing that matters.
- 58. The concentric growth circles of a tree trunk is an indication of the**
- mechanical quality of the wood. ✓
 - amount of moisture in the wood.
 - density of the wood.
- 59. In aeronautical construction the main plywood utilized is made of**
- Pine and Beech.
 - Okume and Oak.
 - Birch and Okume. ✓
- 60. A plywood panel can be added to another plywood panel by bonding the two together with**
- chamfers of 5% inclination.
 - chamfers of 10% inclination. ✓
 - an overlap of 15% of the surface.

THE END