

SAMPLE QUESTIONS 2A2 (MULTIPLE CHOICE)

(NOTE: These questions are intended as representations of the style of questions that may appear on examinations, they are not intended as study material and, as such, may not be in line with any current examination syllabus)

Currently all the 2A2 SOPEEC examinations are delivered in a multiple-choice format. Examination candidates have 3.0 hours to answer 100 multiple choice questions. This works out to be 1.8 minutes per question.

To use your time wisely it is recommended that you read through the questions and answer only the questions for which the answer comes to you quickly. Leave other questions and calculation questions for later.

A piece of silver has a 25 mm diameter hole in it. If the silver is heated from 15°C to 60°C what would be the diameter of the hole after heating?

- A. 24.978 mm
- B. 25.0003 mm
- C. 25.022 mm**
- D. 24.9997 mm

The specific heat of a gas at constant volume is 0.7285, and the value of C_p/C_v for this gas is 1.35. If 1.7 kg of this gas is heated from 15°C to 155°C, find the heat absorbed if the heating takes place at a constant pressure.

- A. 171.69 kJ
- B. 191.89 kJ
- C. 234.06 kJ**
- D. 261.60 kJ

A cylinder in a reciprocating engine has a volume of 1.0 litres and is initially at atmospheric pressure. The air is compressed under a constant temperature process to 0.125 L. What is the final pressure?

- A. 43 kPa
- B. 125 kPa
- C. 405 kPa
- D. 810 kPa**

A boiler feed water at 80°C enters a boiler at a rate of 75 tonnes per hour and steam leaves at 7,000 kPa and 400°C. If fuel is burnt at a rate of 6,300 kg/h and has a heating value of 39,000 kJ/kg what is the boiler thermal efficiency?

- A. 77%
- B. 82%
- C. 86%**
- D. 89%

The Otto cycle is the air standard cycle for the

- A. gas engine**
- B. gas turbine
- C. rotax engine
- D. diesel engine

A throttling calorimeter operates on the principle that throttling takes place at a constant

- A. entropy
- B. enthalpy**
- C. pressure
- D. temperature

A face-centered cubic structure has _____ atoms which gives the metals the properties of high ductility, low shear and low tensile strength

- A. 9
- B. 14**
- C. 17
- D. 21

The purpose of heat treating is to force a physical and/or chemical transformation in the alloy, and then

- A. reheat it to avoid cracking of the alloy.
- B. cool the alloy for further welding processes.
- C. cool it at a rate so it retains the desired properties.**
- D. cool it for testing in different environment conditions.

What is used on the other side of a groove weld to prevent melt through?

- A. Spacer
- B. Backing**
- C. Reinforcement
- D. Consumable insert

Which destructive testing method applies a load to the material in order to determine the elongation and stress of the material?

- A. Proof
- B. Impact
- C. Tensile**
- D. Hardness

What type of mechanically-assisted corrosion occurs when a material is subjected to repeat loading and unloading stresses while in a corrosive environment?

- A. Corrosion fatigue**
- B. Erosion-corrosion
- C. Flow accelerated corrosion
- D. Microbiologically influenced corrosion

The particles used when the magnetic particle examination is performed using an ultraviolet light (black light) in a darkened area are

- A. dry
- B. wet
- C. fluorescent**
- D. multispectral