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EXAMPLE QUESTIONS FOR PCN AEROSPACE SECTOR EXAMINATIONS

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The British Institute of Non-Destructive Testing is an accredited certification body offering personnel and quality management systems assessment and certification against criteria set out in international and European standards through the PCN Certification Scheme.



LEVEL 2 PRODUCT TECHNOLOGY THEORY

WROUGHT MATERIALS AND COMPONENTS

1. Poor forging temperature or too great a reduction in section can give rise to rupturing of the material, this is called a:
 - a) lap
 - b) seam
 - c) burst
 - d) inclusion

2. The failure of turbine blades at the junction of the blade and larger section where it will be attached to the rotor, can often be ascribed to cyclical stresses which are concentrated in this region. The failure mechanism is called:
 - a) stress rupture
 - b) intergranular fretting corrosion
 - c) fatigue
 - d) hot tearing

CAST COMPONENTS

3. Large smooth voids or porosity in a casting results from:
 - a) turbulent flow of metal during pouring
 - b) segregation of alloy constituents
 - c) gas evolved before and during solidification
 - d) hot tearing in the thick sections of the casting

4. Discontinuities which originate in the cast ingot can often be reduced by a process which closes and welds the voids, as well as breaking up inclusions, this process is:
 - a) machining
 - b) welding
 - c) forging
 - d) cold extrusion

AEROSPACE STRUCTURES

5. Fretting corrosion on a mainplane skin may be identified by:
 - a) black or greyish brown powder
 - b) a white deposit on the skin surface
 - c) severe pitting of the skin surface
 - d) splitting of the skin edge

6. A structural member described as a longeron is a:
 - a) chordwise member in a wing
 - b) horizontal member in a fuselage
 - c) spanwise member in a wing
 - d) circumferential member in a fuselage

WELDED AEROSPACE PRODUCTS

1. Slag inclusions are a common weld defect but such defects will not be found in:
 - a) MMA welds
 - b) TIG welds
 - c) submerged arc welds
 - d) cored wire MIG/MAG welds
2. A lack of fusion defect orientated perpendicular to the test surface is most likely not to occur in which of the following processes?
 - a) spot welding
 - b) TIG welding
 - c) MIG/MAG welding
 - d) oxy-acetylene welding
3. Which of the following is a weld defect?
 - a) porosity
 - b) hot tear
 - c) lamination
 - d) burst

SAFETY IN THE AEROSPACE ENVIRONMENT

1. Splashes of hydraulic fluid in the eyes must be treated by:
 - a) immediately going to the nearest hospital
 - b) immediately irrigating the eyes thoroughly with cold clean water
 - c) gently dabbing the eyes with a clean tissue
 - d) gently wiping the eyes with a clean damp tissue
2. When working in the vicinity of a moveable flight control surface, it is advisable to:
 - a) mechanically wedge the control surface to prevent movement
 - b) ensure that all external and internal power supplies are disconnected
 - c) only work near the control surface when no one else is on the aircraft
 - d) ensure that the aircraft controls are labelled "DO NOT OPERATE CONTROLS"

LEVEL 3 PRODUCT TECHNOLOGY THEORY

1. The heat treatment process which is employed to give a soft ductile product, by recrystallisation of the material, is termed:
 - a) tempering
 - b) hardening
 - c) stress relieving
 - d) annealing
2. A casting discontinuity which is caused by gas release or the evaporation of moisture during solidification is:
 - a) microshrinkage

- b) porosity
 - c) porous segregation
 - d) hydrogen induced porosity
3. The corrosion resistance of high strength aluminium alloys is generally excellent unless exposed to:
- a) radiation
 - b) alkaline environments
 - c) mineral oil
 - d) liquid oxygen
4. Small, isolated indications, of high density and irregular, angular form, on a radiograph of a sand cast aluminium component are most likely due to:
- a) porosity or gas pores
 - b) shrinkage sponge
 - c) hot tears
 - d) inclusion
5. Which of the following statements is true of plastics following initial polymerisation?
- a) thermoplastics soften when reheated
 - b) thermosetting plastics do soften when reheated but also char and deteriorate
 - c) all plastics are synthetic and contain no natural materials
 - d) all of the above are true
6. Design engineers are responsible for establishing the function, appearance, quality and cost of a product. Regarding the role of NDT in product design, which of the following is true?
- a) designers, by their training and education, are sufficiently well informed about NDT that they are able to formulate NDT procedures and acceptance criteria
 - b) when NDT appears necessary in a design, the designer should select the NDT method and technique to be used after reference to NDT handbooks
 - c) designers should depend solely on NDT personnel to establish defect acceptance criteria
 - d) none of the above is true

LEVEL 3 KNOWLEDGE OF THE REQUIREMENTS FOR PCN AEROSPACE CERTIFICATION

1. Level 3 personnel shall:
 - a) conduct NDT for the acceptance of parts only when a demonstration of proficiency in this capability was included in the practical examination
 - b) always be capable of conducting NDT for the acceptance of parts
 - c) never be capable of conducting NDT for the acceptance of parts
 - d) conduct NDT for the acceptance of parts only when in possession of the relevant acceptance standards

2. An employer may utilize external organisations, otherwise known as “Outside Agencies”, to develop a qualification programme, train and examine NDT personnel and perform any other Level 3 function. The employer shall:
 - a) notify the European Aviation Safety Agency (EASA) of the use of an Outside Agency
 - b) document the suitability of any external organization(s) selected to perform any function to meet the requirements of the applicable regulation
 - c) notify the relevant national regulatory body of the appointment of an Outside Agency
 - d) not be responsible for the approval of NDT personnel trained and examined by an Outside Agency

3. Level 2 personnel shall, when specified in the written practice, be capable of developing written instructions from approved general procedures. Such instructions:
 - a) shall be authorized by the employer before use
 - b) shall be approved by the relevant national authority
 - c) shall require final approval by the Responsible Level 3
 - d) may be authorized by the Level 2 originator

EDDY CURRENT TESTING OF AEROSPACE MATERIALS COMPONENTS & STRUCTURE

LEVEL 2

GENERAL THEORY OF THE EDDY CURRENT METHOD

1. When the applied voltage and current through a circuit are in phase the:
 - a) current leads voltage by 90 degrees
 - b) current and voltage have the same value
 - c) voltage leads current by 90 degrees
 - d) none of the above

2. In eddy current test systems where encircling coils are used, coupling efficiency is referred to as:
 - a) lift off
 - b) edge factor
 - c) fill factor
 - d) phase differentiation

3. The term used to define the value of H field required to decrease the residual magnetism in a material to zero is:
 - a) coercive force
 - b) magnetizing force
 - c) back emf
 - d) the overlap value

4. When the voltage applied to a circuit and the current through the circuit both reach their maximums at the same time the voltage and current are:
 - a) additive
 - b) in phase
 - c) regenerate
 - d) out of phase

SECTOR SPECIFIC THEORY OF THE EDDY CURRENT METHOD

1. Which of the following conditions are not important when selecting specimens to be used as a reference standard?
 - a) the specimen should be the same size and shape as the piece to be tested
 - b) the specimen should have the same heat treatment as the piece to be inspected
 - c) the surface finish of the specimen should be the same as the piece to be tested
 - d) if the material is aluminium the surface should be anodised

2. One main advantage of a CRT display instrument over meter reading equipment is that:
 - a) it can be pocket size
 - b) it allows separation of many test variables
 - c) it is simple to use

- d) test variables cannot be separated
3. The impedance of an AC system used for eddy current testing is a combination of:
- a) inductive reactance, resistance and capacitive reactance
 - b) inductive reactance and capacitive reactance only
 - c) resistance and capacitive reactance only
 - d) none of the above

LEVEL 3

GENERAL THEORY OF THE EDDY CURRENT METHOD

The questions will be similar to those for level 2, but generally more complex.

1. When a non-ferrous bar is passed through two comparative encircling coils a false defect free indication can arise when the defect is:
- a) filled with water
 - b) deep but very narrow
 - c) long and uniform
 - d) short and wide
2. Impedance of an AC system used for eddy current testing is a combination of:
- a) inductive reactance, resistance and capacitive reactance
 - b) inductive reactance and capacitive reactance only
 - c) resistance and capacitive reactance only
 - d) frequency and phase
3. The effect of lift-off on the impedance of a test coil is used principally when designing:
- a) crack detectors
 - b) coating thickness meters
 - c) conductivity meters
 - d) AC crack depth instruments

GENERAL THEORY OF OTHER NDT METHODS AT LEVEL 2

Refer to the examples provided for Level 2 under the respective NDT method section. The examination will test the candidate's understanding of the general theory at level 2 of four out of the radiographic, ultrasonic, eddy current, magnetic particle and liquid penetrant NDT methods to enable him/her to recognise correct application but not necessarily to specify techniques.

SECTOR SPECIFIC THEORY OF THE EDDY CURRENT METHOD

Multiple choice answer questions will be similar to those for level 2, but generally more complex.

1. During testing the secondary magnetic field developed by the eddy currents:
- a) totally cancels the coils magnetic field
 - b) totally reinforces the coils magnetic field
 - c) partially reinforces the coils magnetic field
 - d) partially cancels the coils magnetic field
2. The impedance of a test coil can usually be represented by the vector sum of:
- a) inductive reactance and resistance

- b) capacitive reactance and resistance
 - c) inductive reactance, capacitive reactance and resistance
 - d) inductance and capacitance
3. The inductive reactance of a test coil depends upon which of the following?
- a) frequency, coil inductance, coil resistance
 - b) coil inductance
 - c) coil resistance and inductance
 - d) frequency and coil inductance

LEVEL 2

GENERAL THEORY OF THE ULTRASONIC METHOD

1. The angle at which the shear component of an incident beam is refracted at 90 degrees to the normal is called:
 - a) the normal angle of incidence
 - b) the first critical angle
 - c) the angle of maximum reflection
 - d) the second critical angle

2. As frequency increases in ultrasonic testing the angle of beam divergence of a given diameter crystal:
 - a) decreases
 - b) remains constant
 - c) increases
 - d) varies uniformly through each wavelength

3. The fundamental frequency of a piezo-electric crystal used in ultrasonic probes is a function of:
 - a) its thickness
 - b) the velocity of sound in the crystal material
 - c) both A and B above
 - d) its diameter

4. Shear waves are generally more sensitive to fine discontinuities for a given frequency than longitudinal waves because:
 - a) the wavelength is shorter
 - b) shear waves are not as easily dispersed in the material
 - c) the direction of particle vibration of shear is more sensitive
 - d) the wavelength of shear waves is longer

5. A linear time base is achieved when the electron beam in the CRT:
 - a) is deflected with constant velocity
 - b) is deflected with constant acceleration
 - c) is deflected with the same velocity as the probe movement
 - d) produces four echoes on the screen

SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE ULTRASONIC METHOD IN THE TESTING OF AEROSPACE PRODUCTS

1. DGS diagrams compare flaw signal amplitudes to:
 - a) reference blocks
 - b) flat bottomed holes
 - c) a theoretical maximum
 - d) DAC

2. Given that the velocity of a compression wave in steel is 6000 m/s, how long does it take a wave to travel from one end to the other of a 30mm steel bolt?
 - a) 5 microseconds
 - b) 5 milliseconds
 - c) 2 microseconds
 - d) 2 milliseconds
3. The most appropriate method for sizing lamination in rolled plate would be:
 - a) DGS
 - b) DAC
 - c) 20 dB
 - d) 6 dB
4. The vertical axis of the DGS diagram represents:
 - a) probe diameter
 - b) flat-bottomed hole size
 - c) gain
 - d) reflector depth

LEVEL 3

GENERAL THEORY OF THE ULTRASONIC METHOD

The questions will be similar to those for level 2, but generally more complex.

GENERAL THEORY OF OTHER NDT METHODS AT LEVEL 2

Refer to the examples provided for Level 2 under the respective NDT method section. The examination will test the candidate's understanding of the general theory at level 2 of four out of the radiographic, ultrasonic, eddy current, magnetic particle and liquid penetrant NDT methods to enable him/her to recognise correct application but not necessarily to specify techniques.

SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE ULTRASONIC METHOD IN THE TESTING OF AEROSPACE PRODUCTS

Multiple choice answer questions will be similar to those for level 2, but generally more complex.

1. A through-wall welded repair in a 30 mm thick casting is tested using a 60 degree shear wave probe and is found to contain a flaw. If the sound path to the flaw is 85 mm, the flaw is approximately:
 - a) 17.5 mm from the test surface
 - b) 12.5 mm from the test surface
 - c) 1.5 mm from the opposite surface
 - d) 26 mm from the opposite surface
2. A plot of the variation of beam intensity along the beam axis for a given target size is:
 - a) a distance amplitude curve
 - b) used for determining the vertical extent of the beam
 - c) used for determining the horizontal extent of the beam
 - d) not useful

RADIOGRAPHIC TESTING OF AEROSPACE MATERIALS COMPONENTS & STRUCTURE

LEVEL 2

GENERAL THEORY OF THE RADIOGRAPHIC METHOD

1. Thin sheets of lead foil in intimate contact with radiographic film increase film density because they:
 - a) fluoresce and emit visible light which helps expose the film
 - b) absorb the scattered radiation
 - c) prevent back-scattered radiation from fogging the film
 - d) emit electrons which helps darken the film

2. The fact that gases, when bombarded with radiation, ionise and become electrically conducting make them useful in:
 - a) X-ray transformers
 - b) X-ray tubes
 - c) masks
 - d) monitoring equipment

3. Developer preferentially reduces:
 - a) bromide ions over silver ions
 - b) silver ions over bromide ions
 - c) exposed silver ions over unexposed silver ions
 - d) unexposed silver ions over exposed silver ions

4. Many modern X-ray units utilise _____ circuits to provide smooth high voltage supplies to the X-ray tube.
 - a) diode
 - b) triode
 - c) Villard
 - d) thyristor based

5. A beam of radiation consisting of a single wavelength is known as:
 - a) microscopic radiation
 - b) monochromatic radiation
 - c) heterogeneous radiation
 - d) fluoroscopic radiation

BASIC RADIATION SAFETY

See PCN General Requirements Appendix E3.

SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE RADIOGRAPHIC METHOD IN THE TESTING OF AEROSPACE MATERIALS, COMPONENTS AND STRUCTURES

1. The end result of filtering an X-ray beam is to:
 - a) increase net contrast

- b) decrease net contrast
 - c) increase or decrease contrast depending on the nature of the part radiographed
 - d) have no effect on radiographic contrast
2. Which has a higher radiographic equivalence factor than steel?
- a) magnesium
 - b) aluminium
 - c) titanium
 - d) brass
3. A film being manually processed was tapped gently to remove bubbles but clear streaks still occurred. This is because:
- a) developer was spilled on the film prior to development
 - b) developer contaminated the fixer
 - c) the film was not agitated sufficiently during development
 - d) water splashed on the film prior to development
4. The focal spot should be small (as conditions will allow) in order to obtain the:
- a) density required
 - b) sharpest image
 - c) sharpest contrast
 - d) required kilovoltage

LEVEL 3

GENERAL THEORY OF THE RADIOGRAPHIC METHOD

1. Radiographic film is most sensitive to light in the _____ part of the spectrum.
- a) UV
 - b) blue
 - c) yellow/green
 - d) red
2. Pair production occurs when electromagnetic radiation consists of photons in the energy range:
- a) 0.025 to 0.1 MeV
 - b) 30 to 50 eV
 - c) 1.02 or greater MeV
 - d) 0.1 to 1.0 MeV
3. In a Betatron, electrons are accelerated by:
- a) field emission
 - b) changing magnetic field
 - c) high frequency electrical wave
 - d) accelerating magnets

4. X-ray photons differ from gamma photons of the same energy only in their:
 - a) biological effect
 - b) origin
 - c) interaction
 - d) wavelength

5. Focusing of the electron beam on to the target is controlled by:
 - a) shape and size of filament
 - b) shape and size of focusing cup
 - c) position of filament within the focusing cup
 - d) all of the above

BASIC RADIATION SAFETY

See PCN General Requirements Appendix E3.

GENERAL THEORY OF OTHER NDT METHODS AT LEVEL 2

Refer to the examples provided for Level 2 under the respective NDT method section. The examination will test the candidate's understanding of the general theory at level 2 of four out of the radiographic, ultrasonic, eddy current, magnetic particle and liquid penetrant NDT methods to enable him/her to recognise correct application but not necessarily to specify techniques.

SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE RADIOGRAPHIC METHOD IN THE AEROSPACE SECTOR

1. In the tube shift method of defect location, the most accurate method of determining the depth of the defect is:
 - a) calculation from measurement of ffd, ofd etc
 - b) a scale drawing of the set up used in tube shift
 - c) graphical presentation of tube shift vs. image shift
 - d) by using markers and taking data from the radiograph only

2. A radiographic image of a casting which appears as small areas of differing density could be due to grain structure effects or segregation. To determine which, a second shot would be taken:
 - a) at lower kilovoltage
 - b) at higher kilovoltage
 - c) with thicker back screens
 - d) after the casting has been annealed

3. Dark crescent shaped marks on a radiograph could be caused by:
 - a) pressure after processing or an unfused chaplet
 - b) pressure before processing or shrinkage sponge
 - c) developer splashes before developments or static
 - d) fixer splashes before development or mottling

4. A trial shot on a structure of varying thickness shows that the range of densities produced are too great for satisfactory interpretation. In selecting the films for a 'two film' technique, the single exposure is best determined from:
 - a) an exposure chart for each film

- b) characteristic curves for the films
 - c) a 'two film' trial shot
 - d) two films of the same grain size
5. Real-time radiographic systems using an image intensifier and a vidicon camera or a fluorescent screen and isocon camera combination can perform at _____ sensitivity.
- a) less than 1%
 - b) between 1.5% and 2%
 - c) not better than 5%
 - d) not better than 10%

RADIOGRAPHIC TESTING OF AEROSPACE WELDS

LEVEL 2

BASIC RADIATION SAFETY

See PCN General Requirements Appendix E3.

SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE RADIOGRAPHIC METHOD IN THE TESTING OF AEROSPACE WELDS

1. The end result of filtering an X-ray beam is to:
 - a) increase net contrast
 - b) decrease net contrast
 - c) increase or decrease contrast depending on the nature of the part radiographed
 - d) have no effect on radiographic contrast

2. Which has a higher radiographic equivalence factor than steel?
 - a) magnesium
 - b) aluminium
 - c) titanium
 - d) brass

3. A film being manually processed was tapped gently to remove bubbles but clear streaks still occurred. This is because:
 - a) developer was spilled on the film prior to development
 - b) developer contaminated the fixer
 - c) the film was not agitated sufficiently during development
 - d) water splashed on the film prior to development

4. The focal spot should be small (as conditions will allow) in order to obtain the:
 - a) density required
 - b) sharpest image
 - c) sharpest contrast
 - d) required kilovoltage

LEVEL 3

For general theory of radiography, see example questions provided for radiography of materials, components and structures.

GENERAL THEORY OF OTHER NDT METHODS AT LEVEL 2

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SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE RADIOGRAPHIC METHOD IN THE TESTING OF AEROSPACE WELDS

1. X-radiography and neutron radiography can be considered:
 - a) equivalent NDT techniques
 - b) competitive NDT techniques
 - c) complementary NDT techniques
 - d) unsuitable for testing welds

2. Which of the following could cause non-repeatability of film contrast when producing a radiograph of the same weld?
 - a) supply voltage
 - b) supply current
 - c) screen thickness
 - d) all of the above variables

3. Real-time radiographic systems using an image intensifier and a vidicon camera or a fluorescent screen and isocon camera combination can perform at _____ sensitivity.
 - a) less than 1%
 - b) between 1.5% and 2%
 - c) not better than 5%
 - d) not better than 10%

MAGNETIC PARTICLE TESTING OF AEROSPACE PRODUCTS

LEVEL 2

GENERAL THEORY OF THE MAGNETIC PARTICLE METHOD

1. The technique which involves the application of the detecting medium after magnetisation has ceased is the:
 - a) re-applying technique
 - b) residual technique
 - c) continuous technique
 - d) collective technique

2. When applying a magnetic field to an item, the term flux density refers to the:
- a) concentration of lines of flux generated in the sample
 - b) magnitude of flux leakage detected
 - c) observable magnetic furring that occurs
 - d) concentration of flux adjacent to the defect
3. When testing a component using a coil, the magnetic field is:
- a) transverse
 - b) circular
 - c) diametrical
 - d) longitudinal
4. Which of the following current waveforms is suitable for current flow prod testing?
- a) AC
 - b) DC
 - c) half-wave rectified AC
 - d) all of these
5. For a given current using a coil the magnetic field strength is dependent upon:
- a) coil diameter
 - b) number of turns
 - c) length/diameter ratio
 - d) all of these

SPECIFIC THEORY OF THE APPLICATION OF THE MAGNETIC PARTICLE METHOD

1. Indications caused by magnetic leakage fields which result from the geometry of the component, ie. keyways, splines etc., are referred to as:
- a) magnetic writing
 - b) non-relevant indications
 - c) boundary zones
 - d) relevant indications

2. Which of the following methods of measuring current form the basis for calculating magnetic field intensity?
 - a) average
 - b) mean
 - c) median
 - d) peak

3. What is the maximum specified solid content of a fluorescent ink to comply with BS 4069?
 - a) 0.80%
 - b) 1.50%
 - c) 0.30%
 - d) 0.03%

LEVEL 3

GENERAL THEORY OF THE MAGNETIC PARTICLE METHOD

1. The BS 4069 test piece used for magnetic flow resembles:
 - a) a square bar with a transverse hole
 - b) a test sample with a visible surface hole
 - c) a cylindrical disc with many drilled holes
 - d) an insulated rod, supporting a ring with three sub-surface holes

2. Detecting media particles must possess:
 - a) high residual magnetism
 - b) high permeability
 - c) high retentivity
 - d) high coercivity

3. A five turn rigid coil is used to test a 180 mm long by 30 mm diameter bar. If the 'K' value is 22000, the minimum current is:
 - a) 73.3 amps rms
 - b) 51.8 amps rms
 - c) 733 amps rms
 - d) 518 amps rms

SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE MAGNETIC PARTICLE NDT METHOD TO AEROSPACE PRODUCTS.

1. When calibrating a fixed bench unit ammeter in accordance with BS 6072, which of the following standards apply?
 - a) calibration ammeter scale 60 mm. Accuracy + or - 5%
 - b) calibration ammeter scale 80 mm. Accuracy + or - 15%
 - c) calibration ammeter scale 80 mm. Accuracy + or - 5%
 - d) calibration ammeter scale 60 mm. Accuracy + or - 10%

GENERAL THEORY OF OTHER NDT METHODS AT LEVEL 2

Refer to the examples provided for Level 2 under the respective NDT method section. The examination will test the candidate's understanding of the general theory at level 2 of four out of the radiographic, ultrasonic, eddy current, magnetic particle and liquid penetrant NDT methods to enable him/her to recognise correct application but not necessarily to specify techniques.

LIQUID PENETRANT TESTING OF AEROSPACE PRODUCTS

LEVEL 2

GENERAL THEORY OF THE LIQUID PENETRANT METHOD

1. The property of a liquid which affects the speed of flow is:
 - a) surface tension
 - b) viscosity
 - c) contact angle
 - d) a combination of all the above

2. If fluorescent penetrant is applied after an acid pre-cleaning treatment:
 - a) the penetrant should dwell for twice the time specified
 - b) marking of the test piece may be evident
 - c) a decrease in brilliance of the penetrant may occur
 - d) an increase in brilliance of the penetrant may occur

SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE LIQUID PENETRANT METHOD TO GENERAL ENGINEERING PRODUCTS

1. The British Standard to be referred to for penetrant flaw detection is:
 - a) BS 6072
 - b) BS 4069
 - c) BS 4489
 - d) BS EN 571-1

2. To avoid the risk of fire, penetrants in cans should:
 - a) be stored away from direct sunlight
 - b) not be sprayed near or onto hot components
 - c) kept away from incandescent surfaces
 - d) be handled so as to avoid all of the above situations

LEVEL 3

GENERAL THEORY OF THE LIQUID PENETRANT METHOD

1. Colour contrast penetrants are best viewed in:
 - a) a minimum of 500 lux white light
 - b) a minimum of 800 lux white light
 - c) a minimum of 10 lux white light
 - d) a minimum 800 microwatts per square centimetre white light

2. If fluorescent penetrant is applied after an acid pre-cleaning treatment:
 - a) the penetrant should dwell for twice the time specified
 - b) marking of the test piece may be evident
 - c) a decrease in brilliance of the penetrant may occur
 - d) an increase in brilliance of the penetrant may occur
3. When using a post emulsifier penetrant, the emulsifier time should be:
 - a) as long as the penetrant dwell time
 - b) one half of the penetrant dwell time
 - c) the same as the developer time
 - d) minimised whilst ensuring all excess penetrant has been removed

GENERAL THEORY OF OTHER NDT METHODS AT LEVEL 2

Refer to the examples provided for Level 2 under the respective NDT method section. The examination will test the candidate's understanding of the general theory at level 2 of four out of the radiographic, ultrasonic, eddy current, magnetic particle and liquid penetrant NDT methods to enable him/her to recognise correct application but not necessarily to specify techniques.

SECTOR SPECIFIC THEORY OF THE APPLICATION OF THE LIQUID PENETRANT NDT METHOD TO AEROSPACE PRODUCTS

1. To reduce the corrosive effect of a penetrant, which chemical group should be maintained at a low level?
 - a) aqueous
 - b) halogens
 - c) thixotropics
 - d) volatiles
2. Which of the following flaws is most likely to be missed due to improper rinse techniques?
 - a) forging lap
 - b) deep pitting
 - c) shallow and broad flaws
 - d) the rinse techniques will not affect the detection of flaws