

Post test

Now that you have completed the course your knowledge of the subjects should be much greater. You should now complete this post course test and compare the results with the results of the pre course test.

You will then have an idea of how much knowledge you have gained from the course.

Instructions

This is a multiple choice test. In each question you are given three possible answers.

Read each question carefully.

Indicate the answer that you feel is the most accurate by placing a "X" in front of the letter preceding it.

All questions must be answered

1. Intensifying screens must be cleaned by using:
 - a) Plenty of water.
 - b) Small circular motions followed by top to bottom sweeps.
 - c) Pouring screen cleaner onto the screen then wiping off.
2. Film/Screen contact test tool can be:
 - a) Plastic sheet.
 - b) Perforated aluminium sheet.
 - c) Fine metal mesh.
3. Blue light emitting intensifying screens should:
 - a) Be used with blue sensitive film.
 - b) Be used only for extremities.
 - c) Need an exposure reduction of 10kV.
4. Grid ratio is:
 - a) The ratio of the height of the lead strip to its thickness.
 - b) An indication of the focal range.
 - c) The height of the lead strips to the distance between them.
5. To test the alignment of the X-ray beam to a grid, the following test tool should be used:
 - a) A sheet of perforated zinc.
 - b) A lead strip with a series of 1 cm holes in it.
 - c) Eight coins.
6. To test a lead rubber apron for cracks:
 - a) Use fluoroscopy.
 - b) Feel it.
 - c) Hold it up to the light.
7. Lead rubber items should be tested every:
 - a) Month.
 - b) 6 months.
 - c) Once a year.
8. Setting up a reject film analysis you should:
 - a) Count all the unexposed films.
 - b) Count only the film boxes in the film store.
 - c) Carry out the analysis without the staff knowing.
9. A reject film analysis could indicate:
 - a) Which is the most common fault.
 - b) How much money has been wasted.
 - c) Both of the above.

10. The wattage of a safelight bulb should be, if facing down:
 - a) 100.
 - b) 60.
 - c) 15.

11. A Wisconsin cassette is used for testing:
 - a) mA.
 - b) Exposure time.
 - c) KVp.

12. A spinning top can be used to check the:
 - a) Timer of a capacitor discharge X-ray unit.
 - b) Timer of a single phase X-ray unit.
 - c) Timer of a three phase X-ray unit.

13. Developer temperature should be checked:
 - a) Weekly.
 - b) Twice a week.
 - c) Daily.

14. Sensitometry testing on automatic processors should be carried out:
 - a) At 5-0pm every day.
 - b) Every Monday.
 - c) Before the start of work every day.

15. A densitometer:
 - a) Measures the specific gravity of developer.
 - b) Is used to make a test film for monitoring film processor performance.
 - c) Measures the density of an X-ray image.

16. Empty developer and fixer bottles:
 - a) Should have holes put in them and disposed of.
 - b) Can be washed out thoroughly and used as water containers.
 - c) Can be sold after rinsing.

17. B + Fog stands for:
 - a) Film fog caused by scattered radiation.
 - b) Film fog caused by light leakage.
 - c) Fog present in all film, created in manufacture.

18. A step wedge is:
 - a) A foam positioning pad.
 - b) A tool for testing tomography cut levels.
 - c) A tool for producing a standard set of densities.

19. Consistency of output can be checked by:
 - a) Recording how many patients are X-rayed each day.
 - b) Making four exposures under identical conditions.
 - c) Running a Reject Film Analysis program.

20. A single pulse X-ray unit with a 50 cycles per second mains supply should produce how many dots on a spinning top image with a 0.1sec exposure time?
 - a) 5
 - b) 10
 - c) 15

21. To test film screen contact use:
 - a) Aluminium sheet.
 - b) Fast screens.
 - c) Fine wire mesh.

22. Specific Gravity level in developer is an indication of:
 - a) Its activity.
 - b) Its colour.
 - c) Its age.

23. Film is most sensitive when:
 - a) It is new.
 - b) Before it has been exposed to radiation.
 - c) After it has been exposed to radiation and before processing.

24. The Step System refers to:
 - a) A method of calculating exposures.
 - b) How to make a step wedge.
 - c) Sensitometry.

25. Clearing time refers to:
- a) The film processing time.
 - b) The time the film should be in the wash.
 - c) The time it takes for the film to get rid of the "cloudy look" in the fixer.
26. Latitude is defined as:
- a) The range of exposure factors which will produce an acceptable image.
 - b) The range of pH values of developer.
 - c) The amount of light produced by an intensifying screen.
27. Radiolucent means:
- a) X-rays will pass through.
 - b) X-rays will not pass through.
 - c) The colour of the light given off by intensifying screens.
28. Quality control refers to:
- a) The number of good films produced over a given period.
 - b) Making sure the processor is clean.
 - c) A system which assesses and evaluates a particular activity.
29. To make a noticeable change in film density the exposure must be changed by a minimum of how many steps?
- a) 1
 - b) 3
 - c) 5
30. mAs determines:
- a) Penetration.
 - b) Contrast.
 - c) Density.

Glossary

Acid A solution with a pH less than 7. It reacts with blue litmus paper and turns it red.

Alkali A solution with a pH greater than 7. It reacts with red litmus paper and turns it blue.

Artefact Marks on a radiograph that are foreign to the image, such as scratches, finger prints or static.

Base + fog The density normally found in unexposed film, caused by manufacture and storage.

Bench top processor A small, automatic film processor, best sited on a bench top. Suited to low throughput.

Beam The beam of radiation produced by the X-ray tube.

Bucky A commonly used abbreviation of the Potter-Bucky moving grid system.

Callipers A device used to measure the thickness of body parts.

Central ray The centre of the X-ray beam. Often used to define the direction of the beam, or, its position, related to a body part.

Cassette A light tight holder that contains a pair of intensifying screens, between which, is placed the film.

Characteristic curve Also known as H & D Curve or sensitometric curve. It is a plotted graph of the various densities of a step wedge image. Any variation in type of film/screen, exposure or processing will vary the shape, or Position, of the curve.

Clearing time The time it takes for a film to lose the cloudy appearance when placed in the fixer during film processing. In other words the time it takes for the unwanted film emulsion to be dissolved off by the fixer.

Collimator A device used to control the coverage of the X-ray beam. Also known as a Light Beam Diaphragm (LBD).

Contrast The difference between the light and dark areas of a radiograph. High contrast is when there

are few shades of grey between the lightest and darkest areas of the image. Low contrast is when there are many more shades of grey in the image.

Compression band A strip of material, usually linen or plastic, approximately 20cm wide, attached at one end to a ratchet device, and at the other to a hook. It is used for compressing or immobilising patients.

Densitometer A device for measuring the density of any specific spot on a radiograph, by measuring the light that is allowed to pass through it.

Density: radiographic Radiographic density is the degree of blackening of a radiograph caused by the deposit of metallic silver.

Density: tissue Tissue density is the mass of body tissue in a given volume, or the concentration of atoms. The greater the tissue density the more X-ray absorption takes place and the lighter the image on the radiograph. (Do not confuse radiographic density with tissue density.)

Detail: radiographic image The amount and quality of information contained in a radiographic image. The amount of detail seen in a radiograph. Is determined by image sharpness, contrast and density.

Detail: intensifying screens The name applied to a type of intensifying screen that gives better image detail, but is less responsive to radiation and therefore requires a higher exposure. Commonly used for extremities.

Development The chemical process of converting the latent film image into a visible one.

Distortion Misrepresentation of a body part outline, in the image, due to changes in X-ray beam/body part alignment or unacceptable object film distance.

Emulsion The active layer of chemical crystals suspended in a gelatine layer, of film, which is sensitive to light and radiation. The word emulsion can also be used to describe the radiation sensitive layer of intensifying screens.

Exposure The amount of radiation produced from the X-ray tube, by a pre determined set of exposure factors, kV, mA, seconds. In practice the term tends to be used loosely. The term “exposure” being used to mean exposure factors”.

FFD Focus/film distance. More accurately, SID (source image distance).

Focal range The range of focal film distances at which, a grid is designed to be used.

Focal spot The area on the X-ray tube anode where the X-rays are produced.

Focussed grid Grid lines are inclined toward the centre of the grid, to better accommodate the spreading X-ray beam.

Fog Radiation fogging of a film is commonly caused by scattered radiation reaching the unprocessed film. Light fog is caused by unwanted white light reaching the unprocessed film. Base fog is inherent fog, caused in film manufacture.

Filter: safelight A specialised, coloured glass, window, fitted to a safelight, that enables the safe handling of X-ray film.

Filter: X-ray A sheet of metal (usually aluminium) fitted to the port of an X-ray tube to filter out the low wavelength X-ray photons.

Grid A device consisting of alternate radiopaque and radiolucent strips. Designed to allow the primary X-rays to pass through, but absorb scattered radiation.

Grid ratio The ratio of the height of the radiopaque (lead) strips to the distance between them (radiolucent strips).

Grid line The number of lead strips to the cm/inch.

Grid cut off A reduction in grid efficiency due to misalignment of the X-ray beam to the grid.

Hanger Film hanger is a stainless steel frame with clips at each corner, for holding the film when manual processing takes place.

Hazardous chemicals Any chemical which may have an injurious affect. Developer and fixer both fall into this category.

Hydrometer A sealed, weighted glass tube, with a visible scale marked on it, which will float in a liquid. Used for assessing the specific gravity (S.G.) of developer and fixer, the level of which is an indication of the concentration.

Intensifying screens Radiation sensitive screens, placed inside a cassette, on either side of the film. When struck by radiation the screens give off a blue or green light that has a blackening effect on the radiographic image produced. The colour of light emitted depends on the type of fluorescent materials used. Remember that the film colour sensitivity must match the colour of light given off by the screens.

kV Kilovoltage (1000 volts). Controls the quality (penetrating power) of the X-ray beam. Affects contrast of resultant image (high kV—low contrast, low kV—high contrast). Affects intensity of radiation and therefore patient dose, to a lesser extent (mAs has a greater effect on intensity and patient dose).

Latitude: exposure Exposure latitude is the range of exposure factors that will produce an acceptable image.

Latitude: film Is a film emulsion characteristic that increases or reduces exposure latitude.

mA (milliamperere, 1/1000th of an ampere) A radiographic exposure factor that controls the intensity of radiation, influences image density and patient dose.

mAs (milliamperere-seconds) A radiographic exposure factor. mA x seconds.

Non-focused A grid that does not have focused grid lines.

Oxidation A weakening of developer strength caused by prolonged exposure to air.

Penetration The ability of the X-ray beam to penetrate structures. Determined by the energy of the beam (controlled by kV).

pH Indicates the degree of acidity/alkalinity of a solution. Water is neutral and has a pH of 7. Solutions with pH of less than 7 are acid. Solutions with pH more than 7 are alkaline. Developer is strongly alkaline with a pH of about 14. Fixer is strongly acidic with a pH of about 3.

Phantom An object that substitutes as a patient, when performing X-ray tests. The material used can be anything that is similar in density and thickness to the appropriate body part.

Potter-bucky A moving grid system designed to reduce the amount of scattered radiation reaching the film. Often abbreviated to “bucky”.

- Primary radiation** Radiation emitted from the X-ray tube that has not reached the patient, or object, being X-rayed.
- Processing** The chemical treatment of an exposed X-ray film that results in the production of an X-ray image. It involves the processes of developing, rinsing, fixing, washing and drying.
- Polyethylene foam** An artificial substitute for foam rubber. Is ideal for use as patient positioning pads. Can be easily cut to required shapes.
- Puffer** A rubber bulb with a nozzle for blowing dirt particles from cassettes. Often has a soft bristle brush on the end of the nozzle for the same purpose.
- Quality assurance (QA)** An overall management program to monitor the various quality control measures being used.
- Quality control (QC)** The quality control measures used to evaluate performance and outcome.
- Quality: radiograph** A radiograph is said to have good quality, when the contrast and definition are sufficient to demonstrate all required body parts well.
- Quality: X-ray beam** X-ray beam quality is determined by its ability to penetrate objects (the higher the penetrating power, the higher the quality).
- Radiolucent (radiotransparent)** The property of a structure to wholly or partially allow the passage of X-rays.
- Radiopaque** The property of a structure to wholly or partially stop the passage of X-rays.
- Replenisher** The chemical solutions that are added to developer or fixer to maintain their volume and working strength.
- Replenishment** Adding replenishment solutions to developer or fixer to maintain their volume and working strength.
- Rinsing** In *manual processing* it is necessary to wash off as much of the alkaline developer as possible, before placing the film in the acid fixer. Transfer of excessive amounts of developer into the fixer will result in the fixer becoming prematurely exhausted, lessening its hardening properties and artefacts may appear on the films. In *automatic processing* a rinse bath is not used as the rollers effectively remove the developer from the film and the processing time is shortened.
- Scattered radiation** Secondary radiation which has been changed in direction from that of the primary beam.
- Sensitometry** The study of the response of film to exposure and processing conditions.
- Sensitometer** A standard light source that is used to produce consistent step wedge images for sensitometric monitoring of processors.
- SID** Source/image distance. Refers to the distance between the source of the X-ray beam (focal spot) and the image receptor (in conventional radiography, the film). Is a more accurate form of, focus/film distance (FFD).
- Specific gravity** The weight of a substance compared to an equal volume of water. Specific gravity measurement, using a hydrometer, can be used to measure the concentration of developer and fixer.
- Stand pipe** A pipe which fits into the inside of a manual processing units wash and rinse tanks drain holes. Its height is just below the top edge of the tank, allowing the tank to fill up and drain through the top of the pipe. They are also found in the developer and fixer tanks of most automatic processing units.
- Step chart** A system of exposure calculation using a series of exposure factor steps. Step charts are available for kV, mA, mAs, time and FFD (SID).
- Step wedge** Usually made of aluminium, is a block cut to form a standard number and sized steps. Used as a test tool for various quality control tests.
- Test tool** Specialised items of equipment that can be used to evaluate X-ray or accessory equipment.
- Thermostat** A device for controlling heat output from a heating unit. Used in X-ray film processing to control the temperature of developer.
- Thiosulphate** Usually sodium thiosulphate. Is the fixing agent in X-ray fixing solutions.
- Timer: darkroom** An accurate time clock for timing X-ray film development during manual processing.
- Timer: X-ray** A device for determining the length of radiographic exposure in an X-ray unit.
- Washing** All film must be adequately washed to remove the acid fixer and avoid future film deterioration.
- Wisconsin cassette** A specialised X-ray cassette, used to determine X-ray kVp. Used to check the accuracy of kVp in an X-ray unit.

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