

INI CET Radiology

Sample Paper – 5

Duration: 14 Minutes

Maximum Marks: 15

Instructions

- This paper contains **15** Multiple Choice Questions (Single Best Response), modelled on the Radiodiagnosis (Radiology) content of **INI CET** (Institutes of National Importance Combined Entrance Test) conducted by AIIMS New Delhi.
- The **15-question** length matches the number of Radiology items you actually meet in the real 200-question paper.
- Each correct answer carries **+1 mark**. There is **negative marking of one-third (0.33) mark** for every incorrect answer; unattempted questions carry no penalty.
- Every question has **exactly one best answer**. Choose the single most appropriate option.
- Attempt this practice paper in one timed sitting of about **14 minutes**, the pace the real computer-based test demands.

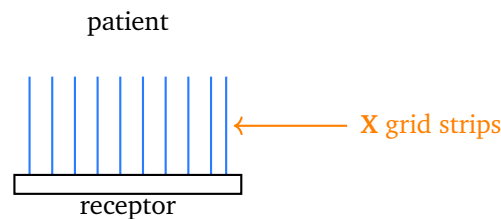
Physics and Radiation Safety

- Q1.** In a woman of reproductive age, the '10-day rule' recommends that a non-urgent radiographic examination of the abdomen or pelvis be performed:
- (A) Within the 10 days following the onset of menstruation, when an early pregnancy is least likely
 - (B) Only during the last 10 days of the menstrual cycle
 - (C) At any time, since the menstrual cycle is irrelevant to imaging
 - (D) Only after 28 completed weeks of a confirmed pregnancy
- Q2.** During fluoroscopy, the single most effective simple measure to reduce the dose to the operator and to shield the patient's gonads is to:



- (A) Increase the exposure time so fewer runs are needed
- (B) Wear a lead apron and use gonad shielding where appropriate
- (C) Remove the collimator to widen the field
- (D) Stand as close to the X-ray tube as possible

Q3. The device placed between the patient and the image receptor to absorb obliquely travelling scattered photons and improve image contrast, drawn in the schematic below (marked **X**), is the:



- (A) Collimator
- (B) Intensifying screen
- (C) Anti-scatter grid
- (D) Compensating filter

Imaging Modalities and Contrast Media

Q4. Which of the following is an *absolute* contraindication to magnetic resonance imaging (MRI)?

- (A) A modern titanium hip prosthesis
- (B) Dental amalgam fillings
- (C) An old (non-MRI-conditional) cardiac pacemaker
- (D) A peripheral intravenous cannula

Q5. A barium swallow showing smooth tapering of the distal oesophagus to a 'bird-beak' point with proximal dilatation and absent peristalsis is characteristic of:

- (A) Carcinoma of the oesophagus with an irregular shouldered stricture



- (B) A sliding hiatus hernia
- (C) A congenital oesophageal web
- (D) Achalasia cardia

Q6. To assess the lung parenchyma for early interstitial disease on a chest CT, the images should be reviewed on a:

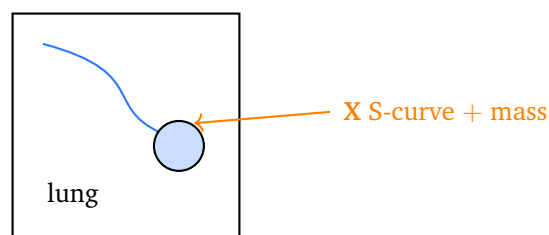
- (A) Bone window (wide width, high centre)
- (B) Soft-tissue (mediastinal) window
- (C) Lung window (wide width, low centre)
- (D) Brain window (narrow width)

Chest and Cardiovascular Radiology

Q7. Which set of chest-radiograph features best indicates lobar collapse (atelectasis) rather than a pleural effusion?

- (A) Increased hemithorax volume with the mediastinum pushed away
- (B) Volume loss with the trachea and mediastinum pulled towards the opacity
- (C) A peripheral lucent zone with no lung markings beyond a pleural line
- (D) A dependent meniscus with no change in lung volume

Q8. The reverse-S (golden-S) sign on a chest radiograph, sketched below (marked X), indicates a right-upper-lobe collapse caused by:



- (A) A simple free-flowing pleural effusion
- (B) A spontaneous pneumothorax



- (C) Acute cardiogenic pulmonary oedema
- (D) A central obstructing hilar mass

Gastrointestinal and Genitourinary Radiology

- Q9.** On a small-bowel study, closely and regularly spaced complete mucosal folds crossing the full width of dilated bowel, producing a 'stack-of-coins' (string-of-beads) appearance, are the:
- (A) Valvulae conniventes (plicae circulares) of the small bowel
 - (B) Haustra of the colon
 - (C) Rugae of the stomach
 - (D) Taeniae coli of the large bowel
- Q10.** On abdominal ultrasound, a diffusely bright (hyperechoic) liver with poor sound penetration of the deep parenchyma and blurred vessel walls is typical of:
- (A) Fatty liver (hepatic steatosis)
 - (B) A single simple hepatic cyst
 - (C) A completely normal liver
 - (D) Gallstones within the gallbladder
- Q11.** The investigation of choice to demonstrate and grade vesicoureteric reflux in a child with recurrent urinary tract infection is:
- (A) A plain abdominal radiograph
 - (B) A non-contrast CT of the abdomen
 - (C) Renal ultrasound on its own
 - (D) A micturating cystourethrogram (MCUG)

Musculoskeletal and Neuroradiology

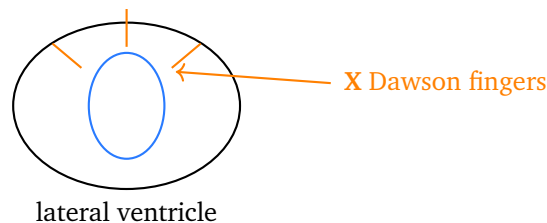
- Q12.** On a plain radiograph of the hands, symmetrical marginal erosions, peri-articular osteopenia and joint-space narrowing with soft-tissue swelling



centred on the metacarpophalangeal and proximal interphalangeal joints are typical of:

- (A) Rheumatoid arthritis
- (B) Osteoarthritis
- (C) Chronic tophaceous gout
- (D) Entirely normal hands

Q13. The MRI schematic below shows ovoid periventricular white-matter lesions orientated perpendicular to the lateral ventricle (marked X, the 'Dawson fingers'). These are characteristic of:



- (A) An acute middle-cerebral-artery infarct
- (B) A glioblastoma multiforme
- (C) Multiple sclerosis
- (D) A completely normal brain

Interventional, Nuclear and Emergency Radiology

Q14. Transarterial chemoembolisation (TACE), in which chemotherapy and embolic material are delivered selectively through the hepatic artery, is used mainly to treat:

- (A) Staghorn renal calculi
- (B) Unresectable hepatocellular carcinoma
- (C) Acute appendicitis
- (D) An uncomplicated pancreatic pseudocyst

Q15. A hepatobiliary (HIDA) scan showing tracer in the liver, common bile duct and bowel but persistent *non-visualisation* of the gallbladder indicates:



- (A) A normally functioning gallbladder
- (B) Acute cholecystitis from cystic-duct obstruction
- (C) Hepatocellular carcinoma
- (D) Portal hypertension



Detailed Solutions**Q1.****Solution**

Concept – the 10-day rule: The rule limits irradiation of an unrecognised early pregnancy.

Step 1 – state the timing: Non-urgent abdominal or pelvic radiography is best performed **within the 10 days following the onset of menstruation**, when conception is least likely to have occurred.

Step 2 – the wider principle: The related 28-day rule allows imaging at any time up to a missed period provided pregnancy is reasonably excluded; a clearly justified urgent study is never withheld.

Why the other options are wrong:

- B, last 10 days of the cycle: this is when a fertilised implanted embryo is most at risk, the opposite of the safe window.
- C, any time regardless: ignores the small risk to a possible early pregnancy.
- D, after 28 weeks: confuses the rule with late-pregnancy timing and has no basis here.

Final Answer: Within 10 days of the onset of menstruation $\Rightarrow$ **A**

Answer: (A) [Go Back to Q1](#)

Q2.**Solution**

Concept – personal protective shielding: Barrier shielding is a core pillar of radiation protection.

Step 1 – name the measure: Wearing a **lead apron** (with a thyroid collar and gonad shielding where appropriate) attenuates scattered radiation and is the simplest, most effective personal safeguard.

Step 2 – the supporting rules: It works alongside minimising time, maximising distance and tight collimation, all guided by the ALARA principle.

Why the other options are wrong:

- A, increasing exposure time: raises dose rather than lowering it.
- C, removing the collimator: widens the beam and increases scatter and dose.
- D, standing close to the tube: dose falls with the square of distance, so



proximity increases it.

Final Answer: Wear a lead apron and gonad shielding ⇒ B

Answer: (B) [Go Back to Q2](#)

Q3.

Solution

Concept – controlling scattered radiation: Scatter degrades contrast and adds noise to the image.

Step 1 – identify the device: The **anti-scatter grid (X)** is a series of thin lead strips placed between the patient and the receptor; it absorbs obliquely travelling scattered photons while letting the primary beam pass.

Step 2 – the trade-off: The grid improves contrast but absorbs some primary beam, so a higher exposure (and dose) is needed; it is used for thicker body parts.

Why the other options are wrong:

- A, collimator: limits the field size at the tube, it does not sit at the receptor to remove scatter.
- B, intensifying screen: converts X-rays to light to boost efficiency, not a scatter remover.
- D, compensating filter: evens out exposure across uneven anatomy, unrelated to scatter rejection.

Final Answer: Anti-scatter grid ⇒ C

Answer: (C) [Go Back to Q3](#)

Q4.

Solution

Concept – MRI safety: The strong static field can move or malfunction ferromagnetic and electronic devices.

Step 1 – pick the absolute contraindication: An **old, non-MRI-conditional cardiac pacemaker** is an absolute contraindication, as the field can disrupt pacing and heat the leads.

Step 2 – the general rule: Other classic absolute contraindications include ferromagnetic intracranial aneurysm clips, cochlear implants and intraocular metallic foreign bodies; every implant should be checked for MRI conditionality.



Why the other options are wrong:

- A, titanium hip prosthesis: titanium is non-ferromagnetic and MRI-safe.
- B, dental amalgam: is inert in the field and only causes minor local artefact.
- D, intravenous cannula: a plastic cannula is not a contraindication.

Final Answer: Old non-conditional cardiac pacemaker ⇒ C

Answer: (C) [Go Back to Q4](#)

Q5.

Solution

Concept – the bird-beak sign: The distal oesophageal appearance reflects a failure of relaxation.

Step 1 – read the study: Smooth, symmetrical tapering to a ‘bird-beak’ point with a dilated proximal oesophagus and absent peristalsis is classic for **achalasia cardia**, where the lower oesophageal sphincter fails to relax.

Step 2 – the contrast with cancer: An oesophageal carcinoma instead gives an irregular, shouldered or ‘apple-core’ stricture with mucosal destruction.

Why the other options are wrong:

- A, carcinoma: produces an irregular, asymmetrical stricture, not a smooth beak.
- B, hiatus hernia: shows stomach above the diaphragm, not a tapering distal oesophagus.
- C, oesophageal web: is a thin shelf, usually in the upper oesophagus.

Final Answer: Achalasia cardia ⇒ D

Answer: (D) [Go Back to Q5](#)

Q6.

Solution

Concept – CT window settings: The window width and centre are chosen to match the tissue of interest.

Step 1 – choose the window: The **lung window** (wide width, low centre) spreads the greyscale across the very low densities of aerated lung, revealing fine interstitial and parenchymal detail.



Step 2 – the alternatives: A soft-tissue (mediastinal) window shows nodes and vessels, and a bone window shows cortical detail; each optimises a different density range.

Why the other options are wrong:

- A, bone window: saturates the low lung densities and hides parenchymal detail.
- B, soft-tissue window: is for the mediastinum, not fine lung markings.
- D, brain window: is a narrow window for cerebral tissue and is inappropriate for the chest.

Final Answer: Lung window $\Rightarrow$ C

Answer: (C) [Go Back to Q6](#)

Q7.

Solution

Concept – signs of lobar collapse: Collapse causes loss of lung volume, which pulls nearby structures towards it.

Step 1 – identify the pattern: Lobar collapse shows **volume loss** with the **trachea and mediastinum pulled towards** the opaque lobe, often with crowded ribs and a raised hemidiaphragm.

Step 2 – the contrast with effusion: A large pleural effusion adds volume and pushes the mediastinum *away*, the opposite direction of shift.

Why the other options are wrong:

- A, increased volume with shift away: describes a large effusion or tension pneumothorax, not collapse.
- C, peripheral lucency with no markings: describes a pneumothorax.
- D, dependent meniscus with no volume change: describes a pleural effusion.

Final Answer: Volume loss with shift towards the opacity $\Rightarrow$ B

Answer: (B) [Go Back to Q7](#)



Q8.

Solution

Concept – the golden-S sign: A collapsing lobe combined with a central mass makes a reverse-S contour.

Step 1 – interpret the sign: In a right-upper-lobe collapse, the concave upward displaced fissure plus the convex bulge of a **central obstructing hilar mass** form the reverse-S (golden-S) shape (X).

Step 2 – the clinical importance: The sign warns that the collapse is caused by an obstructing central tumour rather than simple loss of air, and prompts CT and bronchoscopy.

Why the other options are wrong:

- A, pleural effusion: gives a dependent meniscus, not an S-shaped fissure with a hilar bulge.
- B, pneumothorax: gives a peripheral lucency, not a central mass.
- C, pulmonary oedema: gives bilateral perihilar shadowing, not a focal S-curve.

Final Answer: Central obstructing hilar mass ⇒ D

Answer: (D) [Go Back to Q8](#)

Q9.

Solution

Concept – small-bowel mucosal folds: The jejunum has closely packed circular folds that cross the full lumen.

Step 1 – name the folds: The regularly spaced complete folds giving the ‘**stack-of-coins**’ (string-of-beads) appearance are the **valvulae conniventes (plicae circulares)** of the small bowel.

Step 2 – the diagnostic value: Because they cross the full width, they help identify a dilated loop as small bowel rather than colon, and they stand out in obstruction.

Why the other options are wrong:

- B, haustra: are incomplete sacculations of the colon, not full-width folds.
- C, gastric rugae: are the coarse folds of the stomach, not small bowel.
- D, taeniae coli: are longitudinal muscle bands of the colon, not mucosal folds.



Final Answer: Valvulae conniventes of the small bowel $\Rightarrow$ A

Answer: (A) [Go Back to Q9](#)

Q10.

Solution

Concept – ultrasound of fatty liver: Fat within hepatocytes increases the echogenicity of the liver.

Step 1 – read the scan: A diffusely **bright (hyperechoic)** liver with poor deep-beam penetration and loss of clarity of the vessel walls is typical of **fatty liver (hepatic steatosis)**.

Step 2 – the comparison: The liver normally appears slightly brighter than the renal cortex; in steatosis this hepatorenal contrast is exaggerated, and long-standing disease may progress to portal hypertension with a nodular liver and splenomegaly.

Why the other options are wrong:

- B, simple hepatic cyst: is a focal anechoic lesion with posterior enhancement, not diffuse brightness.
- C, normal liver: does not show exaggerated brightness or deep attenuation.
- D, gallstones: are echogenic foci with shadowing inside the gallbladder, not diffuse liver change.

Final Answer: Fatty liver (hepatic steatosis) $\Rightarrow$ A

Answer: (A) [Go Back to Q10](#)

Q11.

Solution

Concept – imaging vesicoureteric reflux: Reflux is best shown while the bladder is filled and emptied under contrast.

Step 1 – name the test: The **micturating cystourethrogram (MCUG)** fills the bladder with contrast through a catheter and images during voiding, directly demonstrating and grading reflux up the ureters.

Step 2 – the practical use: It is the reference standard in a child with recurrent urinary infection; ultrasound and DMSA scanning complement it by assessing the kidneys and scarring.



Why the other options are wrong:

- A, plain radiograph: shows no reflux and gives no functional information.
- B, non-contrast CT: is not the reflux study and adds radiation.
- C, ultrasound alone: detects hydronephrosis but cannot reliably show or grade reflux.

Final Answer: Micturating cystourethrogram (MCUG) ⇒ D

Answer: (D) [Go Back to Q11](#)

Q12.

Solution

Concept – rheumatoid arthritis on plain film: The disease is an inflammatory, symmetrical, erosive arthropathy.

Step 1 – read the radiograph: Symmetrical marginal erosions, periarticular osteopenia and uniform joint-space narrowing with soft-tissue swelling at the **MCP and PIP** joints are classic for **rheumatoid arthritis**.

Step 2 – the contrast with osteoarthritis: Osteoarthritis instead shows osteophytes, subchondral sclerosis and cysts with asymmetrical narrowing, typically at the DIP joints, and no periarticular osteopenia.

Why the other options are wrong:

- B, osteoarthritis: gives osteophytes and sclerosis, not marginal erosions with osteopenia.
- C, gout: shows well-corticated ‘punched-out’ erosions with overhanging edges, often asymmetrical.
- D, normal hands: would show no erosions, osteopenia or narrowing.

Final Answer: Rheumatoid arthritis ⇒ A

Answer: (A) [Go Back to Q12](#)

Q13.

Solution

Concept – MRI of multiple sclerosis: Demyelinating plaques cluster around the ventricles along the deep veins.

Step 1 – read the MRI: Ovoid periventricular white-matter lesions orientated



perpendicular to the lateral ventricles (X, the '**Dawson fingers**') are characteristic of **multiple sclerosis**.

Step 2 – the supporting features: Lesions are disseminated in space and time and also involve the juxtacortical, infratentorial and spinal-cord white matter; active plaques may enhance with gadolinium.

Why the other options are wrong:

- A, acute infarct: follows a vascular territory and restricts diffusion, not a perpendicular periventricular pattern.
- B, glioblastoma: is a solitary infiltrating mass with necrosis and rim enhancement.
- D, normal brain: shows no periventricular ovoid lesions.

Final Answer: Multiple sclerosis ⇒

Answer: (C) [Go Back to Q13](#)

Q14.

Solution

Concept – transarterial chemoembolisation (TACE): TACE exploits the arterial blood supply of liver tumours.

Step 1 – state the use: TACE delivers chemotherapy and embolic particles selectively through the hepatic artery and is used mainly for **unresectable hepatocellular carcinoma**.

Step 2 – the rationale: Hepatocellular carcinoma draws its blood chiefly from the hepatic artery while normal liver is mostly portal-fed, so arterial embolisation concentrates the effect on tumour and spares the parenchyma.

Why the other options are wrong:

- A, renal calculi: are treated by lithotripsy or ureteroscopy, not TACE.
- C, appendicitis: is a surgical condition, not an embolisation target.
- D, pancreatic pseudocyst: is managed by drainage, not arterial chemoembolisation.

Final Answer: Unresectable hepatocellular carcinoma ⇒

Answer: (B) [Go Back to Q14](#)



Q15.

Solution

Concept – the HIDA scan: The hepatobiliary tracer follows the path of bile.

Step 1 – interpret the scan: Tracer reaching the liver, common bile duct and bowel but with persistent **non-visualisation of the gallbladder** indicates **acute cholecystitis** from cystic-duct obstruction.

Step 2 – the added value: A HIDA scan can also localise a bile leak by showing tracer accumulating outside the biliary tree, which is useful after cholecystectomy or trauma.

Why the other options are wrong:

- A, normal gallbladder: would fill with tracer within about an hour.
- C, hepatocellular carcinoma: is not diagnosed by gallbladder non-filling on HIDA.
- D, portal hypertension: is a vascular problem unrelated to cystic-duct patency.

Final Answer: Acute cholecystitis from cystic-duct obstruction ⇒ **B**

Answer: (B) [Go Back to Q15](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	B	3	C	4	C	5	D
6	C	7	B	8	D	9	A	10	A
11	D	12	A	13	C	14	B	15	B

