Exam Questions   DIA 2023/24

Exam questions of Diagnostic imaging consist of radiology and nuclear medicine parts and of the clinical problems.

A single question from each question group will be randomly assigned to the student.

When answering questions from a section of radiolohy and nuclear medicine, it is important to list the examination modalities, the diagnostic procedure and the basic pathology.

In the part of clinical problems examiners will assess the correct indication of investigative methods for solving the clinical problem, the accuracy of the methods and contraindications.

1. **Special section- the position of imaging techniques in the diagnostic algorithm**

1. Headache
2. Stroke
3. Head and neck trauma
4. Hypogastrium pain
5. Epigastrium pain
6. Pancreatitis
7. Expansion in the abdominal cavity
8. Peritoneal irritation
9. Renal colic
10. Hematuria
11. Polytrauma
12. Shortness of breath
13. Chest pain
14. Lower limb pain
15. Lymphadenopathy
16. Injury of the esophagus
17. Enteritis and colitis
18. Elevation of obstructive enzymes
19. Acute back pain
20. Scrotal pain
21. Liver lesion - diagnostic methods, basic pathology (focal and diffuse lesions)

1. **Radiology section**
2. Radiography and X-rays - principle, radiation load, indications, contraindications, DICOM, PACS
3. Fluoroscopy - principles, radiation exposure, indication, contraindication
4. Ultrasound imaging principles - principle, basic indications
5. CT imaging principles - principle, basic indications, contraindications, 3D reconstruction (various types)
6. MR imaging principle - principle, basic indications, contraindications
7. Angiography and DSA principles- principle, basic indications
8. Interventional Radiology - division, meaning the method, spectrum of procedures
9. Contrast Agents for X-ray Examination - principle, examples of use, side effects
10. Contrast agents in Ultrasound and MR imaging - principles, examples of use, side effects
11. Adverse reactions following administration of contrast agents, their prevention and treatment
12. Traumatology - axial skeleton - diagnostic methods, types of fractures
13. Traumatology - long bones - diagnostic methods, types of fractures
14. Traumatology - Specifics of childhood (types of fractures, abused child)
15. Imaging of the esophagus - diagnostic methods, basic pathology
16. Heart imaging- diagnostic methods, basic pathology
17. Chest - possibilities of different diagnostic methods
18. Imaging possibilities of non-traumatic diseases of the skeleton - degenerative changes and inflammations of the spine - basic pathology
19. Imaging possibilities of soft tissue diseases (trauma, inflammation, tumors) - diagnostic methods
20. Tumors of the lung, pleura and mediastinum expansion - diagnostic methods
21. Chest imaging - specifics of childhood
22. Imaging of the arterial system - diagnostic methods, basic pathology
23. Imaging of the venous system - diagnostic methods, basic pathology
24. Imaging of digestive tract - diagnostic methods, basic pathology
25. Gall bladder and biliary tract imaging - diagnostic methods, basic pathology
26. Pancreas imaging - diagnostic methods, basic pathology
27. Gastrointestinal tract imaging - childhood specifics
28. Uroradiology - diagnostic methods, basic pathology
29. Head and neck imaging incl. imaging methods in dentistry - diagnostic methods, basic pathology
30. Neuroradiology - specifics of childhood
31. Imaging of brain and spinal cord - diagnostic methods, basic pathology (especially tumours, inflammation)
32. Breast imaging
33. Interventional diapeutic (diagnostic-therapeutic) procedures of the vascular system
34. Interventional diapeutic (diagnostic-therapeutic KE) procedures of the urinary system
35. Interventional diapeutic (diagnostic-therapeutic) procedures of the gastrointestinal system
36. Intervention diapeutic (diagnostic and therapeutic) procedures of the central nervous system
37. Interventional Oncology – spectrum of methods and their practical use
38. Percutaneous drainage of collection and abscesses - principles, examples of pathological conditions suitable for drainage
39. Imaging of sex organs in men and women - diagnostic algorithm, basic pathology
40. Gynecology and obstetrics imaging - diagnostic algorithm, basic pathology
41. **Nuclear medicine section**

1. Detection of ionizing radiation - interaction with matter - ionizing radiation detectors - shielding, electronic evaluation apparatus

2. Radioactive transformation - alpha-, beta-, beta+, gamma - importance for diagnosis and therapy

3. Measuring instruments in nuclear medicine - scintillation probe, scintillation camera

4. Imaging methods in nuclear medicine - static and dynamic scintigraphy, planar and tomography - principles, differences, practical applications

5. Emission tomography - SPECT, PET (principles and differences of methods and practical use), PET - patient preparation, radiopharmaceuticals

6. Radiopharmaceuticals - definition, dosage forms, requirements for radiopharmaceuticals, their control

7. Radionuclide sources - principles of nuclear reactors, accelerators and generators (practical examples of radionuclides)

8. Hybrid imaging systems (SPECT/CT, PET/CT, PET/MR) - principles, practical applications

9. Radiation load, dosimetry, protective equipment in radiology and nuclear medicine, special features in the examination of children

10. Palliative treatment of bone metastases with radionuclides, clinical significance. Radiation synovectomy, principles of the method, clinical use

11. Bone scintigraphy, importance of hybrid methods in bone lesions - principle, radiopharmaceuticals, methods, clinical significance

12. Diagnosis and therapy with MIBG, radiopharmaceuticals, clinical use

13. Perfusion and ventilation scintigraphy of the lungs - principle of the method, radiopharmaceuticals, indications and evaluation, phlebography

14. Myocardial perfusion - principle, radiopharmaceuticals, stress tests

15. Detection of GIT bleeding and ectopic gastric mucosa

16. Dynamic cholescintigraphy, dynamic scintigraphy of the oesophagus, radionuclide diagnosis of functional GIT disorders - principles, radiopharmaceuticals, indications

17. Radionuclide diagnostics and therapy of gastro-entero-pancreatic neuroendocrine tumours

18. Renal scintigraphy - principles, radiopharmaceuticals, indications

19. Possibilities of radionuclide diagnosis and therapy in prostate cancer and its metastases

20. Radionuclide diagnosis of hyperthyroidism and its therapy with radioiodine. Detection of parathyroid adenoma or hyperplasia.

21. Diagnosis and therapy of thyroid cancer - differences in diagnostic and therapeutic procedures, use of radioiodine for diagnostic and therapeutic purposes

22. Possibilities of nuclear medicine in the diagnosis of neurodegenerative diseases - neuroreceptor diagnostics using SPECT (DATscan), PET (FDG, imaging of amyloid plaques)

23. Examination of brain perfusion by SPECT - conditions for application and importance of the method for practice, use of SPECT and PET in epileptology.

24. Sentinel lymph node diagnosis using radionuclides

25. Lymphoscintigraphy

26. PET/CT in oncology - indications, contraindications, oncological diagnostics by nuclear medicine methods and comparison with other imaging methods

27. Determination of brain death by radionuclides and comparison with other imaging methods

28. Diagnosis of inflammation by nuclear medicine methods, and comparison with other imaging methods