Carpe Diem Imaging Informatics I — Question Bank

ANSWERS AFTER EACH SECTION · PHAR 1XX · BASIC IMAGING INFORMATICS — UNIT 1A

80 questions · Unit 1a · KNUST Pharmacy Practice · Devil 20 · Easy 20 · Hard 20 · Medium 20

Contents

Module	Title	Questions
1	Unit 1a — Introduction to Imaging Informatics	80

Totals: 80 questions — Devil 20 · Easy 20 · Hard 20 · Medium 20.

Module 1: Unit 1a — Introduction to Imaging Informatics — 80 questions

1. Set 1 · Q1–10

Informatics · Easy

1. Informatics is described as the science of processing data for what purpose?

A Printing and publishing
B Storage and retrieval
C Encryption and deletion
D Sales and advertising

Informatics · Medium

2. Which fields does informatics integrate to solve complex problems?

A Chemistry, physics and mathematics alone, without computing
B Law, economics and history alone, without computing
C Computer science, information technology and domain knowledge
D Mechanical, civil and electrical engineering only

Informatics · Hard

3. Why is it prudent to qualify the term informatics with a knowledge area?

A Because informatics means something different in every country
B Because the term is only used in medicine
C Because it always refers to hardware
D Because informatics applies to so many broad fields that its meaning would be unclear

Informatics · Devil

4. Which of these is NOT among the qualified informatics terms listed in the lecture?

A Culinary informatics
B Dental informatics
C Bio-informatics
D Chemical informatics

Health informatics · Easy

5. Health informatics is simply the science that uses what to improve healthcare?

A Surgical instruments
B Dietary supplements
C Information technologies
D Hospital buildings

Health informatics · Medium

6. Which set of activities does health informatics involve?

A Collection, storage, analysis and dissemination of health-related data
B Manufacture, packaging, pricing and sale of medicines
C Construction, cleaning, catering and security
D Recruitment, training, payroll and promotion

Health informatics · Hard

7. Which aims match those of health informatics?

A Reducing the number of clinicians and closing laboratories

B Improving healthcare delivery, patient outcomes and medical research

C Replacing patient records with paper charts

D Increasing the size of hospitals

Health informatics · Devil

8. How does imaging informatics relate to health informatics?

A It is the parent field from which health informatics came

B It is unrelated to health informatics

C It has replaced health informatics

D It is one of several branches that together make up health informatics

History of health informatics · Easy

9. In which decades did early attempts at a total hospital information system begin?

A The 1920s and 1930s

B The 2000s and 2010s

C The 1850s and 1860s

D The 1970s and 1980s

History of health informatics · Medium

10. Which pairing describes the two approaches to hospital information systems?

A Personal computers for all staff, or paper charts for patients

B Cloud servers for imaging, or tape drives for pharmacy

C A single mainframe for all applications, or individual minicomputers sharing patient data

D Fax machines for referrals, or telephones for results

Answers — Set 1 · Q1–10

1. B — It covers information systems, data management and computational techniques.

2. C — Informatics is multidisciplinary.

3. D — Qualifiers such as health, dental or imaging make the meaning specific. Basic Imaging Informatics · Unit 1a · Question Bank 4

4. A — It does not appear among the listed examples.

5. C — It applies information technologies to healthcare.

6. A — These support clinical decision-making and patient care.

7. B — These are the stated aims.

8. D — It is a subset alongside medical, dental, nursing and pharmacy informatics.

9. D — Computers were first investigated for healthcare then.

10. C — Both approaches appeared in the 1970s to 1980s.

2. Set 2 · Q11–20

History of health informatics · Hard

11. What did the individual minicomputers in specific application areas share?

A A single set of patient data

B A single set of billing codes only

C One shared printer

D One shared mainframe operator

History of health informatics · Devil

12. Which order of events is correct?

A Personal computers, then total hospital systems, then connected networks, then AMIA formed

B Total hospital information systems, then personal computers, then AMIA formed, then connected networks

C AMIA formed, then total hospital systems, then personal computers, then connected networks

D Connected networks, then personal computers, then AMIA formed, then total hospital systems

History of health informatics · Easy

13. In which year was the American Medical Informatics Association formed?

A 1895

B 1990

C 1980

D 1995

History of health informatics · Medium

14. What characterises the current era of healthcare informatics that began in 1995?

A Mainframes only, with paper records throughout

B Isolated computers with no network connections

C Fast computers, linked networks and free-flowing clinical data

D Computers confined to research laboratories alone

History of health informatics · Hard

15. What does ubiquitous computing give clinicians?

A Access only inside the hospital from fixed terminals

B Access only to their own patients' printed charts

C Access only after office hours

D Access to information anytime and anywhere from any internet-connected device

History of health informatics · Devil

16. Which statement about the 1980s to 1994 period is correct?

A Smaller, stronger computers let practitioners buy their own

B Mainframes were replaced by the internet and mobile phones

C AMIA was founded to ban clinical computing in hospitals

D Computers stayed too large to leave central computer rooms

Informatics · Easy

17. Informatics also studies the impact of information systems. Which kinds of impact are listed?

A Chemical, thermal and magnetic

B Seasonal, tidal and lunar

C Aesthetic only

D Mental, social, legal and economic

Informatics · Medium

18. Why is computing often the only way to make information beneficial?

A Because paper records are banned in all hospitals

B The volume of information in any field is too large to handle otherwise

C Because computers are always cheaper than hiring people

D Because information is only valuable when encrypted

Health informatics · Hard

19. Health informatics acquires, structures and uses data and automated systems in which activity?

A Hospital building design

B Staff uniform selection

C Patient care decision-making

D Laboratory glassware washing

Informatics · Devil

20. Which statement best distinguishes informatics from merely using computers?

A It studies the application of IT in a field and its impact on society

B It is the manufacture of computer hardware and devices

C It is the study of programming languages only, not their use

D It is the use of computers for word processing and printing

Answers — Set 2 · Q11–20

11. A — They were separate systems linked through shared patient data.

12. B — 1970s to 80s, 1980s to 1994, 1990, then 1995 onwards.

13. B — Informatics training and research became a high US priority.

14. C — Information is available anytime, anywhere.

15. D — Computing and the internet are everywhere. Basic Imaging Informatics · Unit 1a · Question Bank 7

16. A — Personal computers began to be used as clinical tools.

17. D — These are the listed impacts.

18. B — The volume of information demands computation.

19. C — It supports clinical decisions.

20. A — It combines application with study of impact.

3. Set 3 · Q21–30

Imaging informatics · Easy

21. Imaging informatics is a subset of which field?

A Agricultural informatics
B Health informatics
C Chemical informatics
D Engineering informatics

Imaging informatics · Medium

22. Which activities does imaging informatics specifically deal with?

A Acquiring, storing, analysing and interpreting medical images
B Manufacture and sale of imaging machines worldwide
C Training of radiographers in anatomy and physics only
D Construction and design of radiology departments

Imaging informatics · Hard

23. Which technologies does imaging informatics use to improve diagnostic accuracy and treatment planning?

A Film darkrooms, chemical developers and light boxes
B Pagers, fax machines and paper files
C Typewriters, carbon copies and filing cabinets
D Artificial intelligence, machine learning and data analytics

Imaging informatics · Devil

24. Which statement matches the Radiology Key definition of imaging informatics?

A The use of radiation to treat cancers within a hospital network
B The manufacture of efficient and accurate scanners for a network of clinics
C Using IT to deliver efficient, accurate, reliable imaging services in a network
D The use of paper records and film to store reliable images

Imaging informatics · Easy

25. What was imaging informatics previously called?

A Radiology informatics
B Nursing informatics
C Pharmacy informatics
D Dental informatics

Imaging informatics · Medium

26. Which alternative names are given for imaging informatics?

A Pharmacy informatics and nursing informatics
B Bio-informatics and chemical informatics
C Dental informatics and agricultural informatics
D Radiology informatics and medical imaging informatics

Imaging informatics · Hard

27. Which processes does medical imaging informatics address?

A Image generation and printing only, without storage or security

B Storage and billing only, without display or perception

C Image generation, processing, management, transfer, storage, display and security

D Display and perception only, without storage or security

Imaging informatics · Devil

28. With which disciplines does medical imaging informatics overlap?

A Agronomy, geology, astronomy, linguistics and music

B Electrical engineering, computer sciences, medical physics and psychology

C Law, accounting, marketing and sociology only, with no sciences

D Veterinary science, forestry, oceanography and anthropology

Imaging informatics · Easy

29. In which discipline has imaging informatics evolved chiefly?

A Dermatology

B Cardiology

C Radiology

D Pathology

Imaging informatics · Medium

30. Which specialities, besides radiology, are named as using medical imaging informatics?

A Pathology, cardiology, dermatology and surgery

B Only ophthalmology and optometry clinics

C Only psychiatry and psychology services

D Only forensic medicine and toxicology

Answers — Set 3 · Q21–30

21. B — It deals specifically with medical images within health informatics.

22. A — It covers the image data cycle.

23. D — Advanced technologies are named in the lecture. Basic Imaging Informatics · Unit 1a · Question Bank 9

24. C — It is about delivering imaging services through information technology.

25. A — It evolved chiefly in radiology.

26. D — These are the lecture's alternative names.

27. C — It is a broad sub-field of medical informatics.

28. B — These are the overlapping disciplines listed.

29. C — Radiology is the main home of the field.

30. A — Most clinical disciplines generate digital images.

4. Set 4 · Q31–40

Imaging informatics · Hard

31. Why does imaging informatics matter beyond radiology?

A Only radiologists generate any digital images

B Most clinical disciplines generate digital medical images as well

C Digital images are made only in research laboratories

D Clinical disciplines avoid digital images

Imaging informatics · Devil

32. Which list gives the scope of imaging informatics as set out in the lecture?

A Data acquisition, data deletion, data analysis and data pricing

B Data storage, data entry, data marketing and data sharing

C Data acquisition, data compression, data pricing and data deletion

D Data acquisition, data storage, data analysis and data sharing

Imaging informatics · Easy

33. What is the specific goal of imaging informatics?

A To increase the number of images taken per patient

B To replace radiologists with automated machines everywhere

C To reduce the purchase cost of scanners only

D To improve patient care through better, accessible imaging data

Imaging informatics · Medium

34. Which three significances of imaging informatics are listed?

A Improved diagnosis, treatment planning and research

B Improved catering, parking and cleaning

C Improved sales, advertising and branding

D Improved uniforms, signage and lighting

History of imaging informatics · Hard

35. Which sequence of imaging milestones is correct?

A PACS in 1895, X-rays in the 1970s, then digital imaging in the 1980s

B X-rays in 1895, digital imaging in the 1970s, then PACS in the 1980s

C Digital imaging in 1895, PACS in the 1970s, then X-rays in the 1980s

D X-rays in the 1970s, PACS in the 1980s, then digital imaging in 1895

History of imaging informatics · Devil

36. A student says digital imaging began in the 1980s with PACS. What is the correction?

A Digital imaging began in 1895 with the discovery of X-rays

B PACS was developed in the 1970s before digital imaging

C Digital imaging came in the 1970s and PACS followed in the 1980s

D Both began in the 1990s, with the first hospital networks

History of imaging informatics · Easy

37. Who discovered X-rays in 1895?

A Willard Frank Libby

B Gilbert Newton Lewis

C Wilhelm Conrad Roentgen

D James Prescott Joule

History of imaging informatics · Medium

38. Imaging informatics developed around the same time as which other development?

A Electronic health records

B The telephone

C The printing press

D Antibiotics

Imaging informatics · Hard

39. Which two tools work together to help ensure the accuracy of medical imaging?

A Film darkrooms and manual chemical developers

B Data mining of databases and computer-aided diagnostics

C Fax machines and handwritten paper referrals

D Light boxes and printed anatomy wall charts

Imaging informatics · Devil

40. What was SIIM formerly called?

A The Society for Medical Imaging Technologists

B The Society for Digital Radiography Education

C The Society for Radiology Information Research

D The Society for Computer Applications in Radiology

Answers — Set 4 · Q31–40

31. B — Its growth affects health and medicine broadly.

32. D — These are the four scope elements.

33. D — Patient care is the goal.

34. A — They help detect disease, plan treatment and support research.

35. B — These are the lecture's early developments.

36. C — PACS built on earlier digital technology.

37. C — Roentgen discovered X-rays.

38. A — Both aimed to improve efficiency and reliability of services.

39. B — They support accurate image analysis.

40. D — SIIM is the subspecialty society supporting imaging informatics, with global influence.

5. Set 5 · Q41–50

Roles in radiology · Easy

41. Who is responsible, among other things, for ensuring images reach the radiologist from the modalities?

A The scheduler

B The PACS administrator

C The billing officer

D The referring clinician

Roles in radiology · Medium

42. Which of these is listed as part of a radiologist's workday that falls under imaging informatics?

A Servicing the X-ray tube and generator

B Mixing contrast media for injection

C Cleaning and restocking the scanner room

D Justifying an examination to a third-party payer

Roles in radiology · Hard

43. What does the lecture say about image interpretation in the radiologist's work?

A It may be the core of the value, but it is only one element of the job

B It is the only task that a radiologist ever performs

C It is unrelated to informatics and its tools

D It is performed by the PACS administrator alone

Roles in radiology · Devil

44. Why are all practising radiologists affected by informatics, even in private practice?

A Only academic radiologists use computers in practice

B Informatics is optional for those in private practice

C PACS and speech recognition are becoming ubiquitous in practice

D Vendors choose software without consulting radiologists

Roles in radiology · Easy

45. Which personnel need tools to give them complete patient histories and document their interventions efficiently?

A Radiologic technologists

B Radiologic nurses

C PACS administrators

D Billing personnel

Roles in radiology · Medium

46. Which personnel need communication tools and infrastructure to correct image quality problems?

A Schedulers

B Billing personnel

C Radiologic technologists

D Referring clinicians

Roles in radiology · Hard

47. Why do schedulers and billing personnel benefit from informatics?

A It lets them interpret the images directly themselves

B It removes the need for patient histories in requests

C It replaces the PACS administrator's role entirely

D It coordinates clinician and radiologist on the reason for the exam

Roles in radiology · Devil

48. Which pairing of personnel and need is correct?

A PACS administrator: routing images to radiologists; nurses: histories and documentation

B PACS administrator: complete histories; nurses: routing of images

C Technologists: billing coordination; schedulers: image quality correction

D Billing staff: image routing; radiologists: scheduling

Components of imaging informatics · Easy

49. What are ontologies in imaging informatics?

A The basic communications lexicons

B The scanners used in the department

C The patient waiting lists

D The imaging contrast agents

Components of imaging informatics · Medium

50. What do standards provide in imaging informatics?

A A published list of approved software vendors

B A yearly schedule for staff training sessions

C A pathway to ensure systems can interoperate

D A method for pricing imaging examinations

Answers — Set 5 · Q41–50

41. B — This is a key part of the PACS administrator's job.

42. D — Communication tasks like this fall under informatics.

43. A — Informatics supports many other tasks too.

44. C — They must understand the merits of different technologies.

45. B — The lecture links these needs to nurses.

46. C — They must perform their jobs efficiently and fix quality problems.

47. D — A clear reason supports scheduling and payment.

48. A — It matches the lecture's descriptions.

49. A — They provide common terms for communication.

50. C — Systems must exchange information reliably.

6. Set 6 · Q51–60

Components of imaging informatics · Hard

51. Which pairing of component and role is correct?

A Computers and networking: the lexicon; PACS infrastructure: interoperability

B Ontologies: the image archive; standards: the information highway

C Standards: image display; ontologies: computer networking

D Computers and networking: the information highway; PACS: distribution, analysis and archive

Components of imaging informatics · Devil

52. Which description fits the lifecycle of a radiology exam in the lecture?

A From image acquisition to image deletion only, without a report

B From the initial order to report distribution and action by the referring physician

C From billing to payment only, without any imaging steps

D From patient registration to discharge only, across the hospital

Imaging modalities · Easy

53. Which modality uses X-rays to visualise bones and detect fractures?

A Ultrasound

B Magnetic resonance imaging

C Nuclear medicine

D X-ray radiography

Imaging modalities · Medium

54. Which modality uses strong magnetic fields and radio waves to generate images?

A Computed tomography

B Magnetic resonance imaging

C Mammography

D Fluoroscopy

Imaging modalities · Hard

55. A clinician needs detailed images of the spinal cord and brain. Which modality is ideal?

A Magnetic resonance imaging, which images soft tissues in detail

B Plain X-ray radiography, which shows soft tissue best

C Mammography, which images the nervous system

D Fluoroscopy, which images only the skeleton

Imaging modalities · Devil

56. A patient needs real-time moving images to guide a catheter insertion. Which modality is used?

A Mammography, using low-dose X-rays

B Ultrasound with a static image only

C Fluoroscopy, using continuous X-ray beams

D Nuclear medicine, using a single scan

Imaging modalities · Easy

57. Which modality is commonly used to monitor fetal development in obstetrics?

A Computed tomography

B Mammography

C Nuclear medicine

D Ultrasound

Imaging modalities · Medium

58. Which modality combines X-ray images from different angles into cross-sectional slices?

A Ultrasound

B Fluoroscopy

C Computed tomography

D Magnetic resonance imaging

Imaging modalities · Hard

59. Which modality uses small amounts of radiotracers that emit gamma rays?

A Nuclear medicine (PET and SPECT)

B Mammography of the breast

C Ultrasound of soft tissue

D Plain X-ray radiography of bones

Imaging modalities · Devil

60. Which pairing of modality and principle is correct?

A Ultrasound: radio waves; MRI: X-rays from several angles

B Ultrasound: sound waves; nuclear medicine: radiotracers emitting gamma rays

C CT: sound waves; fluoroscopy: magnetic fields and radio waves

D Mammography: gamma rays; MRI: sound waves bounced from organs

Answers — Set 6 · Q51–60

51. D — It matches the lecture's descriptions.

52. B — It shows the infrastructure needed for patient-centric care.

53. D — It is commonly used for bones, infections and pneumonia.

54. B — It aligns hydrogen atoms and disturbs them with radio waves.

55. A — MRI is ideal for the brain, spinal cord, muscles and joints.

56. C — It gives real-time moving images of the interior.

57. D — It uses high-frequency sound waves.

58. C — Slices can be reconstructed into 3D images.

59. A — Special cameras detect the gamma rays.

60. B — Both match the lecture.

7. Set 7 · Q61–70

Imaging modalities · Easy

61. X-ray radiography is commonly used to diagnose which pair of conditions?

A Pneumonia and arthritis

B Brain tumours and strokes only

C Fetal anomalies and twin pregnancies

D Thyroid disease and diabetes

Imaging modalities · Medium

62. On what principle does X-ray radiography create images?

A Tissues emit gamma rays after an injection

B Different tissues absorb X-rays at varying rates

C Tissues reflect high-frequency sound

D Tissues align hydrogen atoms in a magnetic field

Imaging modalities · Hard

63. Which statement about X-ray imaging is correct?

A X-rays are high-frequency sound waves reflected from tissues

B X-rays are radio waves that disturb hydrogen atoms

C X-rays are electromagnetic radiation that form images from varying absorption

D X-rays are gamma rays emitted by radiotracers inside the body

Imaging modalities · Devil

64. How does CT differ from a plain X-ray examination?

A CT uses high-frequency sound waves instead of X-rays

B CT uses strong magnetic fields instead of X-rays

C CT produces only one flat projection of the body

D CT combines many X-ray images from several angles into slices

Imaging modalities · Easy

65. What does CT stand for?

A Cellular Tracing

B Contrast Testing

C Cardiac Transmission

D Computed Tomography

Imaging modalities · Medium

66. CT is used for diagnosing which of these?

A Only simple fractures of the wrist bone

B Only monitoring of fetal growth in pregnancy

C Cancers, cardiovascular diseases and internal injuries

D Only routine breast cancer screening tests

Imaging modalities · Hard

67. What kind of information does CT provide, according to the lecture?

A Detailed views of internal organs, bones and tissues

B Only the surface temperature of the skin

C Only the electrical activity of the heart

D Only the blood group of the patient

Imaging modalities · Devil

68. Which set of applications matches MRI in the lecture?

A Pneumonia, fractures and arthritis only

B Neurological disorders, musculoskeletal injuries and tumours

C Fetal development, heart function and liver evaluation

D Catheter guidance, stent placement and biopsy

Imaging modalities · Easy

69. MRI is ideal for imaging which type of tissue?

A Only dense bone

B Only air-filled lung

C Only dental enamel

D Soft tissue

Imaging modalities · Medium

70. What does the strong magnetic field do in MRI?

A It aligns hydrogen atoms in the body

B It makes the body radioactive

C It heats the skin to boiling

D It converts sound into images

Answers — Set 7 · Q61–70

61. A — It also visualises bones and detects fractures and infections.

62. B — Varying absorption creates contrast.

63. C — This is the principle in the lecture.

64. D — The slices can be reconstructed into 3D images.

65. D — It is a tomographic technique using X-rays.

66. C — CT gives detail on organs, bones and tissues.

67. A — It shows internal anatomy in slices.

68. B — MRI is ideal for soft tissues.

69. D — Examples are brain, spinal cord, muscles and joints.

70. A — Radio waves then disturb the alignment.

8. Set 8 · Q71–80

Imaging modalities · Hard

71. What do the radio waves do in MRI?

A They deliver a radioactive tracer to tissues to be imaged

B They bounce off tissues to form echoes for display

C They disturb hydrogen alignment, producing signals for images

D They provide a continuous X-ray beam through the body

Imaging modalities · Devil

72. Which statement correctly describes ultrasound?

A Gamma rays from radiotracers are captured by special cameras

B Sound waves enter the body, bounce off tissues and are captured as images

C X-rays from many angles are combined into slices

D Strong magnets align hydrogen atoms in the body

Imaging modalities · Easy

73. How does ultrasound create an image?

A X-rays are absorbed by tissues

B Radio waves are emitted by hydrogen atoms

C Gamma rays are emitted by radiotracers

D Sound waves bounce off tissues and are captured

Imaging modalities · Medium

74. Besides obstetrics, which areas use ultrasound, according to the lecture?

A Only neurological imaging of the brain and spinal cord

B Heart function in cardiology and abdominal organs like the liver

C Only skeletal imaging of fractures and joint damage

D Only breast screening and mammographic follow-up

Imaging modalities · Hard

75. For which procedures is fluoroscopy often used?

A Detecting early breast cancer in screening clinics

B Monitoring fetal growth during routine pregnancy care

C Guiding catheters, visualising the GI tract and joint injections

D Mapping gamma-ray emissions from injected radiotracers

Imaging modalities · Devil

76. Which statement about nuclear medicine is correct?

A It includes PET and SPECT, with gamma rays detected by special cameras

B It includes PET and CT, with X-rays detected by films

C It uses strong magnets and radio waves

D It uses high-frequency sound waves bounced off organs

Imaging modalities · Easy

77. What is mammography primarily used for?

A Assessing fetal development in pregnancy

B Guiding catheters in real time during procedures

C Early detection and diagnosis of breast cancer

D Imaging the spinal cord and nerve roots

Imaging modalities · Medium

78. What type of X-rays does mammography use?

A High-dose continuous beams only

B Low-dose X-rays

C Gamma rays from radiotracers

D Radio waves

Imaging modalities · Hard

79. Which abnormalities does mammography help identify?

A Fractures and joint damage in the skeleton

B Fetal heartbeat irregularities

C Brain tumours and strokes

D Tumours, cysts and other abnormalities in breast tissue

Interventional radiology · Devil

80. What is the main benefit of interventional radiology?

A It guides minimally invasive procedures, cutting open surgery

B It replaces image guidance with large open surgery

C It avoids using X-ray, CT, MRI and ultrasound

D It increases patient recovery time after surgery

Answers — Set 8 · Q71–80

71. C — The signals form the final image.

72. B — Echoes form the image.

73. D — Echoes are converted into images.

74. B — These are the other applications named.

75. C — It gives real-time moving images during procedures.

76. A — Radiotracers are introduced into the body.

77. C — It examines breast tissue.

78. B — It is a specialised X-ray technique.

79. D — It is used for breast examination.

80. A — Angioplasty, stent placement, tumour ablation and biopsy are examples.
