W 105 Western Lab Testing and Radiology

Long-Answer Questions

Section A: Basic Principles of Diagnostic Testing

1. **Define a diagnostic test and explain its main clinical uses.**

2. **Explain sensitivity and specificity in diagnostic testing.**

3. **Differentiate between true-positive, true-negative, false-positive, and false-negative results.**

4. **Explain positive and negative predictive values.**

5. **What is a reference interval, and how should it be interpreted?**

6. **Explain the difference between screening, diagnostic, and monitoring tests.**

7. **Explain the importance of pre-test probability.**

8. **What factors should be considered before ordering a diagnostic test?**

Section B: Laboratory Procedures

9. **Describe the correct process of patient identification and specimen collection.**

10. **Explain pre-analytical, analytical, and post-analytical errors.**

11. **Explain the importance of patient preparation before laboratory testing.**

12. **What is haemolysis, and how can it affect laboratory results?**

13. **Explain the meaning and management of a critical laboratory value.**

Section C: Common Laboratory Tests

14. **Explain the components and clinical uses of a complete blood count.**

15. **Explain how laboratory tests help investigate anaemia.**

16. **Explain the selection and interpretation of blood-glucose tests.**

17. **Explain renal-function testing.**

18. **Explain the interpretation of common liver-related tests.**

19. **Explain the selection and interpretation of thyroid-function tests.**

20. **Explain the components and clinical importance of a lipid profile.**

21. **Explain the role and limitations of cardiac troponin testing.**

22. **Explain the clinical use of electrolyte testing.**

23. **Explain the use of urinalysis in clinical practice.**

24. **Explain the purpose and interpretation of coagulation tests.**

Section D: Therapeutic Drug Monitoring

25. **Define therapeutic drug monitoring and explain its purposes.**

26. **Explain peak and trough drug concentrations.**

27. **What factors influence therapeutic drug concentrations?**

Section E: Microbiology

28. **Explain the principles of microbiological test selection.**

29. **Explain the importance of correct specimen collection in microbiology.**

30. **Compare culture and molecular testing in microbiology.**

31. **Explain antimicrobial-susceptibility testing.**

Section F: Imaging Selection and Ordering

32. **Explain the principles of selecting an appropriate imaging investigation.**

33. **Describe the essential information that should appear on an imaging request.**

34. **Explain radiation protection in diagnostic imaging.**

35. **Explain the use, advantages, and limitations of plain X-ray.**

36. **Explain the principles, uses, and risks of computed tomography.**

37. **Explain the principles, uses, and limitations of ultrasound.**

38. **Explain the principles, uses, and safety considerations of MRI.**

39. **Explain PET imaging and its major clinical applications.**

Section G: Regional Imaging

40. **Explain the approach to chest imaging.**

41. **Explain the selection of imaging for abdominal conditions.**

42. **Explain the use of imaging in urinary-system disorders.**

43. **Explain the role of imaging in gastrointestinal disorders.**

44. **Explain the selection of imaging for musculoskeletal conditions.**

45. **Explain the imaging approach to head-and-neck disorders.**

46. **Compare CT and MRI in neuroimaging.**

Section H: Imaging Anatomy and Pathology

47. **Explain the basic appearance of air, fat, soft tissue, and bone on X-ray and CT.**

48. **Explain how anatomy and pathology are recognised on imaging.**

Section I: Electrocardiography and Diagnostic Tools

49. **Explain the basic waves and intervals of a normal ECG.**

50. **Explain diagnostic algorithms, nomograms, and tables and discuss their limitations.**

50 Short-Answer Questions

A. Basic Principles of Diagnostic Testing

1. **What is a diagnostic test?**
2. **What is the main purpose of a screening test?**
3. **What is test sensitivity?**
4. **What is test specificity?**
5. **What is a false-positive result?**
6. **What is a false-negative result?**
7. **What is a laboratory reference interval?**
8. **What is pre-test probability?**
9. **Why should unnecessary diagnostic tests be avoided?**

B. Laboratory Procedures

10. **What should be done before collecting a laboratory specimen?**
11. **When should a specimen be labelled?**
12. **What is a pre-analytical error?**
13. **What is haemolysis?**
14. **Why do some laboratory tests require fasting?**
15. **What is a critical laboratory value?**

C. Common Laboratory Tests

16. **What does a complete blood count measure?**

17. **What does a low haemoglobin level indicate?**

18. **What may an increased white blood cell count indicate?**

19. **What is the primary function of platelets?**

20. **What does HbA1c measure?**

21. **What is the clinical use of serum creatinine?**

22. **What is eGFR?**

23. **What is the significance of albumin in urine?**

24. **What do ALT and AST indicate?**

25. **What may an increased bilirubin level cause?**

26. **What is commonly used as the initial laboratory test for thyroid function?**

27. **What is cardiac troponin?**

28. **What does a lipid profile include?**

29. **What are electrolytes?**

30. **What is the purpose of urinalysis?**

D. Therapeutic Drug Monitoring and Microbiology

31. **What is therapeutic drug monitoring?**

32. **What is a trough drug level?**

33. **Which drugs are most likely to require therapeutic monitoring?**

34. **What is a microbiological culture?**

35. **Why should a microbiology specimen be collected before antimicrobial treatment?**

36. What is antimicrobial-susceptibility testing?

37. What is PCR in microbiology?

E. Imaging and Radiology

38. What information should be included in an imaging request?

39. What is the main principle of selecting an imaging test?

40. What is plain X-ray mainly used for?

41. What is computed tomography?

42. State one advantage and one limitation of ultrasound.

43. What is MRI?

44. What is PET imaging?

45. What is commonly the initial imaging test for many chest complaints?

46. Which imaging test is commonly used first for suspected gallstones?

47. Which imaging techniques are commonly used for urinary stones?

48. Which imaging method is usually performed first for a suspected fracture?

49. Compare CT and MRI in basic neuroimaging.

F. Basic ECG and Diagnostic Tools

50. What are the basic ECG waves, and what do diagnostic algorithms provide?

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