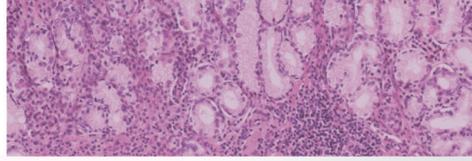


Chapter 1

Microscope

VIVA VOCE

Q.1. Who is the father of microscope?

- Antonie van Leeuwenhoek (1675) is called 'father of microscope'. He invented a simple light microscope.

Q.2. What is the difference between simple and compound light microscopes?

- A simple microscope consists of a single convex lens or a single set of lenses for magnifying objects. A compound light microscope consists of two sets of lenses, one near the sample (objective lens) and the second lens near the eye (eyepiece).

Q.3. List the parts of compound light microscopes.

The compound light microscope consists of:

1. Optical parts: Sources of light, condenser, objective lenses, and eyepiece.
2. Nonoptical parts: Arm, coarse and fine adjustment, nosepiece, stage, microscopic tube, and base.

Q.4. What is the function of substage condenser?

- Substage condenser gathers light and focuses it on the sample to be viewed. Aperture/iris diaphragm controls the amount of light passing through the condenser. Position of condenser can be adjusted (up and down movements) to focus the light critically.

Q.5. What are different powers of objective lenses?

- The objective lenses have different magnification powers, such as 4X (scanning objective), 10X (low power), 40X (high power), 100X (mostly called oil immersion).

Q.6. What is focal length of microscope?

- Focal length is the distance between the center of lens and point at which the light rays converge to form a clear image of the specimen.

Q.7. What is numerical aperture?

- Numerical aperture denotes the light gathering capacity of a lens.
  - $NA = n \sin \theta$
  - Here, n = refractive index of the medium between objective lens and specimen and θ is the half-angle of the maximum cone of light.

Q.8. What is electron microscope?

- The electron microscope utilizes the beam of electrons (instead of light) to illuminate the sample. It can detect minute samples such as viruses, and atoms, but are not suitable for living tissue. They utilize electromagnetic lenses and the specimen (<100 nm thick) is mounted on a grid.

Multiple Choice Questions

Q.1. Microscope that utilizes physical probe for the formation of surface images is _____ .

A. Compound light microscope
B. Electron microscope
C. Scanning probe microscope
D. Fluorescence microscope

Q.2. Which of the following microscope is useful for immunohistochemistry?

A. Simple light microscope
B. Scanning probe microscope
C. Fluorescence microscope
D. All of the above

Q. 3. Which of the following microscope is useful for observing birefringent substances such as bone and teeth?

A. Phase-contrast microscope
B. Polarized light microscope
C. Scanning probe microscope
D. Fluorescence microscope

Q.4. All of the following are the optical parts of the compound light microscope *EXCEPT:*

A. Condenser
B. Objective lenses
C. Eyepiece
D. Nosepiece

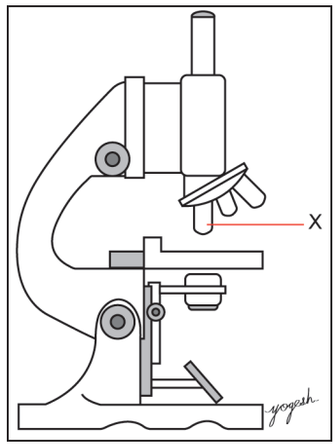
Q.5. All of the following are the non-optical parts of a compound light microscope *EXCEPT:*

A. Condenser
B. Arm
C. Coarse and fine adjustment
D. Nosepiece

Q.6. The ability of a microscope to distinguish between the closest two points as a separate entity is known as _____ .

A. Focal length
B. Magnification
C. Numerical aperture
D. Resolution

Q.7. Identify the marked structure X:



A. Condenser
B. Objective lens
C. Eyepiece
D. Nosepiece

Q.8. _____ is an indicator of the capability of the lens to magnify or diverge parallel rays.

A. Focal length
B. Magnification
C. Numerical aperture
D. Resolution

Q.9. Light gathering capacity of a lens is denoted by _____ .

A. Focal length
B. Magnification
C. Numerical aperture
D. Resolution

Q.10. A defect in expected functioning of the lens or optical system is called _____

A. Focal length
B. Magnification
C. Aberrations
D. Resolution

Q.11. All of the following microscopes are suitable for living tissue *EXCEPT:*

A. Compound light microscope
B. Electron microscope
C. Scanning probe microscope
D. Fluorescence microscope

Answers

1. **C.** Scanning probe microscope (*Ref:* Page 3)
2. **D.** All of the above (*Ref:* Page 3)
3. **B.** Polarized light microscope (*Ref:* Page 3)
4. **D.** Nosepiece (*Ref:* Page 4)
5. **A.** Condenser (*Ref:* Page 4)
6. **D.** Resolution (*Ref:* Page 5)
7. **B.** Objective lens (*Ref:* Page 5)
8. **A.** Focal length (*Ref:* Page 5)
9. **C.** Numerical aperture (*Ref:* Page 5)
10. **C.** Aberrations (*Ref:* Page 5)
11. **B.** Electron microscope (*Ref:* Page 6)

Reference: Textbook of Human Histology, 2/e, Yogesh Sontakke.

Chapter 1: *eSmartQuiz*

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