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RAN-2003000201030065

A

F. Y. B. Sc. (Sem. - I) Examination

March - 2023

MB-102 : Fundamental of Microscopy (Microbiology)

[Total Marks: 50

સૂચના : / Instructions

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **F. Y. B. Sc. (Sem. - I)**

Name of the Subject :

☛ **MB-102 : Fundamental of Microscopy (Microbiology)**

Subject Code No.: **2003000201030065**

Seat No.:

Student's Signature

(2) This exam contains 50 multiple choice questions. Each question carries 1 mark.
(3) All questions are compulsory.

***O.M.R. Sheet* ભરવા અંગેની અગત્યની સૂચનાઓ આપેલ**
***O.M.R. Sheet*ની પાછળ છાપેલ છે.**
Important instructions to fillup O.M.R. Sheet
are given on back side of the provided O.M.R. Sheet.

SET - 2

Multiple Choice Questions

Q. 1. Select the wrong sentence about characteristic of light from the following.

A) The distance between two adjacent crest is called as wavelength.

B) Infrared waves have wavelength more than 7600 Å.

C) Visible light has wavelength between 1000 to 3850 Å.

D) Ultra violet light have wavelength between 1000 to 3850 Å.

Q. 2. Select the correct formula for the numerical aperture from the following

A) Sin μ = NA n

B) n = sin μ NA

C) NA = sin μ / n

D) NA = n sin μ

Q. 3. What is resolving power?

A) It is ability to magnify the object.

B) It is ability to minimize the object.

C) It is ability to separate distinctly two small elements in the structure of an object that are a short distance apart.

D) None of the above

Q. 4. Which among the following is type /types of objective lens?

A) Achromatic

B) Apochromatic

C) Fluorite

D) All of the above

Q. 5. The depth of focus of an objective is depend upon

A) Only Numerical aperture

B) Only Magnification

C) Both Numerical aperture and magnification

D) Only Resolution

Q. 6. What is the refractive index of mineral oil at 25 °C?

A) 1.33 B) 1.47

C) 1.51 D) 1.55

Q. 7. Select the correct sentence regarding working distance from the following?

A) Working distance is the distance between front lens of the objective and mirror.

B) Working distance is always greater than equivalent focus of objective.

C) The working distance can easily determine by noting the number of complete turns of the micrometer screw (fine adjustment) require to raise the objective from the surface of the slide to a point where microscope is in sharp focus.

D) Working distance is the distance between front lens of the objective and condenser.

Q. 8. _____ type of aberration renders a square object as and image with curved sides.

A) Distortion B) Curvature of field

C) Spherical aberration D) Astigmatism

Q. 9. In _____ aberration white light is dispersed into its constituent colors when passing through a lens.

A) Distortion B) Curvature of field

C) Spherical aberration D) Chromatic aberration.

Q. 10. What are the true character/characters of huygenian eyepiece?

A) Two simple plano convex lenses are employed.

B) Only one simple plano convex lens is employed.

C) The convex surfaces of lens is focused upwards.

D) This type of ocular is made with small field lens.

Q. 11. What is the location of condenser in light microscope?

A) It is located between objective lens and ocular lens.

B) It is located between objective lens and stage.

C) It is located under the stage of a microscope between stage and the mirror.

D) It is located below the mirror.

Q. 12. The measure of resolving power of an objective is _____.

A) Depth of focus

B) Numerical aperture

C) Magnification

D) Projection distance

Q. 13. What is the function of microscope from the following?

A) Magnify the image of an object.

B) Use to observe the object which is at far distance.

C) Use to measure the temperature of object.

D) Use for calculating weight of the object.

Q. 14. What is the refractive index of air?

A) 1.33

B) 1.0

C) 1.5

D) 1.63

Q. 15. Why light microscope is called as bright field microscope?

A) Because it forms dark image against a brighter background.

B) Because it forms bright image against a darker background.

C) Because it forms bright image against a brighter background.

D) Because it forms dark image against a darker background.

Q. 16. How microscope slide is hold on stage in bright field microscope ?

A) Mechanical stage clip

B) Simple slide clips

C) Both mechanical stage clip and simple slide clip

D) None of the above

Q. 17. Select the correct statement/statements from the following about dark field microscope.

A) Unrefracted or unreflected rays do not enter the objective.

B) Only light that has been refracted or reflacted by the specimen forms the image.

C) Dark field microscope produce detailed image of living, unstained cells and organisms.

D) All of the above

Q. 18. Which component of the dark field microscope create hollow cone of light that enters object?

A) Objective lens

B) Mechanical stage

C) Dark field stop

D) Ocular lens

Q. 19. On what basis image is formed in phase contrast microscope?

A) Based on electron dense and electron bright region.

B) Based on differences in light intensity after light pass from specimen that provide contrast.

C) Based on interaction between fluorescence compound and specimen.

D) Based on secondary electron generated from the surface of specimen.

Q. 20. What is the common use of the phase contrast microscope from the following?

A) It is used to observe shape of the living cells.

B) It is used to observe microbial motility.

C) It is used to detect bacterial structure such as endospore and inclusions.

D) All of the above.

Q. 21. Which microscope is similar to differential interference contrast microscope?

A) Scanning tunneling microscope

B) Atomic force microscope

C) Phase contrast microscope

D) Confocal microscope

Q. 22. Select correct statement / statements about differential interference contrast microscope from the following?

A) It creates an image based on differences in refractive indices and thickness of the specimen.

B) In this microscope two beams of plane-polarized light at right angles to each other are generated by prisms.

C) A live and unstained specimen can be observe using this microscope.

D) All of the above

Q. 23. What is the function of exciter filter in fluorescence microscope?

A) Remove short wavelength light.

B) Remove short as well as long wavelength light.

C) Remove long wavelength light.

D) It generate light

Q. 24. What is the function of barrier filter in fluorescence microscope?

A) Blocks ultraviolet radiation but allows visible light.

B) Blocks visible light but allows ultraviolet radiation

C) Allow and block visible light simultaneously.

D) Allow and block ultraviolet light simultaneously.

Q. 25. Which fluorochrome compound is used to stains DNA?

A) Rhodamine B) Methylene blue

C) Acridine orange D) Saffranin

Q. 26. Select correct statement about confocal microscope from the following?

A) Confocal microscope use laser beam.

B) Major component of the confocal microscope is an aperture placed above the objective lens.

C) Aperture eliminate stray light from parts of the specimen that lie below and above the plane of focus.

D) All of the above.

Q. 27. What is/are the application of confocal microscope?

A) Study of biofilm.

B) Observation of viruses.

C) Observation of viroid.

D) Observation of DNA structure.

Q. 28. What is the best resolution of transmission electron microscope?

A) 5 nm B) 50 nm

C) 0.05 nm D) 0.5 nm

Q. 29. Select the correct statement from the following for transmission electron microscope.

A) Wavelength of electrons is 100000 times longer than light use for illumination in electron microscope.

B) Wavelength of electrons is 100000 times shorter than light use for illumination in electron microscope.

C) Phase ring is use in transmission electron microscope.

D) Electromagnetic lens is not used in transmission electron microscope.

Q. 30. What should be the thickness of the specimens used for observation in transmission electron microscope?

A) 1-2 nm B) 10-20 nm

C) 0.1-1 nm D) 20-100 nm

Q. 31. In TEM , specimen is mounted on _____.

A) Metal grid B) Glass slide

C) Cellulose membrane D) Silica gel

Q. 32. _____ chemical is used in negative staining for sample preparation in electron microscopy.

A) Safranin B) Methylene blue

C) Phosphotungstic acid D) Albert stain

Q. 33. What is the method of changing the magnification in Transmission electron microscope?

A) Adjust glass lens position mechanically.

B) Adjust stage position mechanically.

C) Adjusting thickness of the specimen mechanically.

D) Adjust current to the magnetic lens.

Q. 34. In scanning electron microscope, the number of secondary electrons reaching the detector depends on _____.

A) Nature of specimen surface.

B) Amount of light striked.

C) Thickness of the specimen.

D) None of the above

Q. 35. In which of the following microscopic technique sample is kept frozen while being examined?

A) Scanning electron microscopy

B) Phase contrast microscopy

C) Electron cryotomography

D) Dark field microscopy

Q. 36. _____ microscope measures surface features of an object by moving sharp probe over the object surface?

A) Phase contrast microscope

B) Dark field microscope

C) Scanning electron microscope

D) Scanning probe microscope

Q. 37. Gerd Binning and Heinrich Rohrer has invented _____ microscope

A) Phase contrast microscope

B) Scanning tunneling microscope

C) Fluorescence microscope

D) Dark field microscope

Q. 38. What is the medium of travel of electron in Transmission electron microscope?

A) Air

B) Water

C) Solid surface

D) High vacuumed

Q. 39. In shadowing technique (sample preparation technique in electron microscopy) specimen is coated with thin film of platinum at _____ angle.

A) 90°

B) 60°

C) 45°

D) 80°

Q. 40. Select correct sentences from the following about dyes.

A) Dye is a compound that contain chromophore group as well as auxochrome group.

B) Dye is a compound that only contain chromophore group.

C) Dye is a compound that only contain Auxochrome group.

D) Dye is a compound that neither contain chromophore group nor auxochrome.

Q. 41. Which among the following is acidic auxochrome group?

A) OH

B) NH_2

C) Both OH and NH_2

D) None of the above.

Q. 42. Which among the following is azine group containing dye?

A) Phenazine

B) Neutral red

C) Safranine

D) All of the above

Q. 43. Which among the following is azo group containing dye?

A) Thiazine
B) Neutral red
C) Methyl orange
D) Safranin

Q. 44. Which among the following is yellow color dye?

A) Neutral red
B) Methyl orange
C) Safranin
D) Picric acid

Q. 45. Which among the following statement explain physical theory of staining?

A) Staining is done by reaction between two substances without the formation of new compound.

B) Staining is done due to reaction between acidic component of the stain with basic component of the cell.

C) Staining is done due to reaction between basic component of the stain with acidic component of the cell.

D) Staining is done by formation of new compound.

Q. 46. Nucleus of the cell react with _____ stain.

A) Acidic
B) Basic
C) Neutral
D) Both acidic and basic

Q. 47. What is the function of auxochrome group in dye?

A) It provide color to the dye.

B) It provide electrolytic dissociation to the dye.

C) It provide both Color and electrolytic dissociation.

D) Auxochrome group has no function in dye.

Q. 48. Acidic dyes ionized to give the dye portion of the molecule a _____ electrical charge.

A) Negative
B) Positive
C) Both Positive and negative
D) Zero

Q. 49. Which among the following is strongly acidic group?

A) NH_2 B) OH

C) SO_2OH D) H

Q. 50. Select the correct sentence from the following about staining

A) Acidic stain color nuclei of the cell.

B) Basic stain color cytoplasm of the cell.

C) Acidic stain color metachromatic granule.

D) Acidic stain mainly color cytoplasm.

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SPACE FOR ROUGH WORK