

Fill in the blanks

1. Streptococcal antigens were discovered by
(Lancefield).
2. Germ theory of disease was proposed by (Koch).
3. is the father of medical microbiology (Koch).
4. The term microbiology was coined by (Louis Pasteur).
5. Disease producing microorganisms are called (pathogens).
6. Prokaryotic organisms with peptidoglycan cell wall are called
..... (Bacteria).
7. Mushrooms, yeasts and molds constitute a group called
(fungi).
8. A group of unicellular or multicellular eukaryotic microorganisms
that obtain nourishment by photosynthesis is called
(algae).
9. The science which deals with study of microorganisms is called
..... (microbiology).
10. Immunology is the branch of microbiology (medical).
11. A group of unicellular eukaryotes which obtain nourishment by
ingestion or absorption are called (protozoa).
12. Non cellular, parasite entities consisting of a nucleic acid core
and surrounded by a protein coat is called(viruses).
13. First observation of live microorganisms was made by (van
Leeuwenhoek).
14. Father of microbiology is considered(Louis Pasteur).

TRUE OR FALSE

1. Disease producing microorganisms are called pathogen (true)
2. Archaea are a group of eukaryotic organisms (false)
3. Peptidoglycan cell wall is found only in bacteria (true)
4. Protozoa is a group of unicellular eukaryotes with animal like
nutrition (true)
5. Flat worms and round worms are unicellular animal parasites
collectively known as helminths (true)

6. The first vaccine to prevent cholera was developed by Louis Pasteur (false)
7. Pure culture technique devised by Koch (1881) (true).
8. Phagocytosis was discovered by Metchnikoff (1884) (true)
9. Diphtheria antitoxin was discovered by Ehrlich (1890) (false)
10. Streptomycin was discovered by Fleming, chain and florey (1943) (false)
11. Antibody were discovered by Edelman and Porter (1962) (true)
12. Prions (infectious proteins) were discovered by Prusiner (true)
13. Algae absorb organic materials from their environment (false).

MULTIPLE CHOICE QUESTIONS

1. Which of the following is not a characteristic of bacteria
 - a. Are prokaryotes
 - b. have peptidoglycan cell walls
 - c. have the same shape
 - d. grow by binary fission. (c)
2. Which of the following is the most important element of Koch's germ theory of disease? The animal shows disease symptoms when
 - a. The animal has been in contact with a sick animal
 - b. Microorganism is observed in the animal
 - c. A microorganism is inoculated into the animal
 - d. A microorganism can be cultured from the animal (c)
3. Which of the following is a beneficial activity of organisms
 - a. Some microorganisms are used as food for humans
 - b. Some microorganisms use carbon dioxide
 - c. Some microorganisms provide nitrogen for plant growth
 - d. All these above (d)
4. Methanogens, extreme halophiles and extreme thermophiles belong to the group of microorganisms
 - a. Bacteria

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- b. Archaea
- c. Fungi
- d. Protozoa (b)

5. Which of the following is not the main domain of organisms as proposed by Carl Woese (1978) ?

- a. Prokarya
- b. Bacteria
- c. Archaea
- d. Eukarya (a)

6. Study of the fungi is called

- a. Parasitology
- b. Mycology
- c. Phycology
- d. Microbiology (b)

7. One of the following does not match

- a. Van leeuwenhoek (1673) – first observer of live microorganisms
- b. Pasteur (1876) – proposed germ theory of disease
- c. Koch (1882) – discovered mycobacterium tuberculosis
- d. Fleming, chain and florey (1928) – discovered penicillin (b)

Match the following

Column - 1	Column - 2
a. Developed vaccine against small pox	Jenner
b. Discovered penicillin	Fleming
c. Disproved spontaneous generation	Pasteur
d. First to use disinfectants in surgery	Lister
e. First to observe bacteria	Van Leeuwenhoek
f. First to observe and name cells in plant material	Hook
g. Proved that microorganisms can cause disease	Koch
h. Studied transformation in bacteria	Griffith
i. Classified streptococci based on antigens in their cell walls	Lancefield
j. Discovered prions (infectious proteins)	prusiner

Match the following

Column - 1	Column - 2
Study of causative agent of Hantavirus pulmonary syndrome	Virology
Study of the production of human proteins by bacteria	Biotechnology
Study of fungus candida albicans	Mycology
Developing gene therapy for a disease	Microbial genetics
Study of the bacterium E.coli	Bacteriology

MICROORGANISMS

Fill in the blanks

- Eukaryotes includes kingdoms
- The three types of asexual spores in fungi are and the three types of sexual spores are
- The low G +C gram positive bacteria belong to phylum and the high G+C gram positive bacteria belong to phylum
- The classes of phylum proteobacteria are named as and proteobacteria.
- Organisms are classified by type in 3 domains
- The science of the classification of organism is called
- Prokaryotic relationships are determined by sequencing.
- The standard reference on bacterial classification is the
- Pathogenic dimorphic fungi are and the 3 types of sexual spores are
- The 4 main 'α' to which pathogenic fungi belong are
- Unicellular algae, slime molds, and protozoa belong to kingdom
- Spiders, mites, ticks, flies, lice etc. belong to phylum
- Flagella Leishmania and trypanosoma belong to phylum
- Bacteria which have variable shape are called
- The filamentous thallus of a fungus is called and the filaments are called

16. Two phyla of helminths are and also
17. Bacterial cell walls consist of many layers of and also contain acids
18. Gram negative bacteria have a outer membrane surrounding a thin peptidoglycan layer.
19. Plasma membrane of bacteria may have irregular infolding called
20. Flat worms flukes belong to class and tapeworms belongs to class
21. A living organism too small to be seen with naked eye is called a
22. Most bacteria have diameter μm and length μm
23. According to their staining reaction, bacteria may be or and or
24. Bacteria having single flagellum at each end are called
25. Helical and flexible bacteria are called
26. Short oval rod-shaped bacteria are called
27. Spherical bacteria occurring in clusters are called
28. are similar to flagella, except that they wrap around the cell.
29. Non motile small appendages on the surface of bacteria which are used in conjugation (passage of DNA) are called , while those which are used for attachment are called
30. Cyclospora, plasmodium and toxoplasma gondii (complex organisms) belong to phylum of protozoa.

ANSWERS

1. Protista, fungi, plantae and animalia.
2. Sporangiospores, conidiospores, chlamydospores and zygospores, ascospores and basidiospores.
3. Firmicutes; actinobacteria.
4. Alpha, beta, gamma, delta; epsilon
5. Cell

6. Taxonomy (systematics)
7. rRNA
8. bergey's manual of systematic bacteriology
9. yeast; mold
10. chlamydiae, spirochaetes, bacteroidetes, and fusobacteria
11. Protista
12. Arthropoda
13. Euglenozoa
14. Pleomorphic
15. Mycelium; hyphae
16. Platyhelminthes; nematoda
17. Peptidoglycan; NAG, NAM; aminoacids
18. Lipopolysaccharide – lipoprotein – phospholipid
19. Mesosome
20. Trematodes; cestodes
21. Microbe (microorganisms)
22. 0.2 to 2.0; 2 to 8
23. Gram positive or gram negative; acid fast or non acid fast
24. Amphitrichous
25. Spirochaetes
26. Coccobacilli
27. Cocci; bacilli; vibrio
28. Axial filaments
29. Pili; fimbriae
30. Apicomplexa

True or False

1. Comma shaped bacteria are called spirilla – false
2. Viruses contain both DNA and RNA in them – false
3. Human parvovirus B19 is single –stranded DNA non enveloped – true
4. Spherical bacteria occurring in chains are called streptococci – true

acteria

5. Parallel bundle of rod shaped bacteria is called a palisade – true
6. Cubical bacteria in group of 8 cocci are called staphylococci – false
7. Family Reoviridae is double stranded RNA (non enveloped) – true
8. Oncoviruses and HIV are + strand, single stranded RNA viruses that produce DNA – false
9. Families picornaviridae and caliciviridae are single stranded (+) RNA, non enveloped – true
10. The eukaryotic taxonomic hierarchy consists of : species, genus, family, order, class, division/phylum, domain. – true
11. The two phyla of Domain archaea are crenarchaeota and euryarchaeota – true
12. The nonproteobacteria gram negative bacteria includes phyla cyanobacterium, chlorobi and chloroflexi – true
13. Three domains of organisms are prokarya, eukarya and viruses – false
14. Prokaryotic relationships are determined by tRNA sequencing – false
15. Three domains are based on cell type, difference in rRNA, membrane lipid structure, tRNA molecules and sensitivity to antibiotics – true
16. Scabies and pediculosis are disease caused by arthropods – true
17. Most of normal flora of human body are commensals; a few are opportunistic pathogens – true
18. Most of microorganisms are pathogenic; a few are non pathogenic – false
19. Both in lag phase and stationary phase, growth rate of bacteria is zero – true
20. Endospore are formed in Bacillus and Clostridium species – true
21. Capnophilic bacteria can grow in absence of oxygen – false
22. In lag phase bacteria prepare for reproduction and grow in size – true
23. Sex pili help in conjugation of bacteria while fimbriae help in attachment to the surfaces – true

24. Gram positive bacteria produce exotoxins while negative bacteria produce endotoxins – true
25. Arthrospores and conidia are formed in filamentous bacteria – true
26. Mesosomes help in attachment and replication of DNA and cell division – true
27. Endospores are formed in *Bacillus* and *Clostridium* species – true
28. Peptidoglycan comprises 90% of cell wall in gram negative bacteria – false
29. The cell wall of gram negative bacteria is sensitive to penicillin – false
30. Bacterial capsules are usually made up of mucopolysaccharides – true

MULTIPLE CHOICE QUESTIONS

1. *Aspergillus* and *Penicillium* belong to which phylum of the kingdom fungi ?
- Zygomycota
 - ascomycota
 - anamorpha
 - basidiomycota (b)
2. Which of the following does not belong to kingdom protista ?
- Sponges
 - slime molds
 - unicellular algae
 - protozoa (a)
3. Orthomyxoviridae, bunyaviridae and arenaviridae families belong to which of the following group of viruses ?
- Double-stranded RNA
 - Single –stranded (-) RNA, multiple strand type
 - Single-stranded (-) RNA, one strand type
 - Single-stranded (+) RNA, non enveloped (b)

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4. Which of the following is not a sexual spore of fungi?
- Chlamydospore
 - zygospore
 - ascospore
 - basidiospore (a)
5. A tuft of flagella is present at one end of a bacterial cell; this condition is called
- Monotrichous
 - amphitrichous
 - lophotrichous
 - peritrichous (c)
6. Which part of the flagellum is embedded in the cell envelope of a bacterium?
- Filament
 - hook
 - basal body
 - both 'b' and 'c' (c)
7. The largest group in classification of organism is
- Phylum
 - kingdom
 - domain
 - class (c)
8. Which of the following is not the domain as proposed by Carl Woese?
- Eukarya
 - prokarya
 - bacteria
 - archaea (b)

- ?
- a. Cell type
- b. difference in rRNA
- c. membrane lipid structure and sensitivity to antibiotics
- d. all the above (d)
10. Which of the following provides the passage of DNA from one bacterial cell to another during their conjugation ?
- a. Flagella
- b. pili
- c. fimbriae
- d. both 'b' and 'c' (b)
11. Which of the following is the function of mesosome in bacteria ?
- a. Respiration
- b. cell division
- c. sporulation
- d. all of the above (d)
12. Dimorphic, yeast like with pseudohyphae and reproducing only a sexually (fungi) such as candida belong to the phylum
- a. Zygomycota
- b. ascomycota
- c. anamorpha
- d. basidiomycota (c)
13. The largest group in classification of organism is
- a. Phylum
- b. kingdom
- c. domain
- d. class (c)
14. Which of the following characteristic is not used in bacterial classification in Bergey's manual ?
- a. Gram stain reaction

characters

- b. cellular morphology
- c. biochemical testing and serology
- d. oxygen requirements and nutritional properties (c)

15. Orders caulobacteriales, rickettsiales, rhizobiales and rhodospirillales belong to which of the following classes of proteobacteria?

- a. Alpha
- b. beta
- c. gamma
- d. epsilon (b)

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16. Bacteria with filamentous and branched body are called

- a. Vibrios
- b. spirilla
- c. spirochetes
- d. actinomycetes (d)

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17. Bacteria which grow best between 0°C and 30°C temperature are called

- a. Psychrophilic
- b. mesophilic
- c. thermophilic
- d. hyperthermophilic (a)

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18. Spherical bacteria present in chains are called

- a. Streptococci
- b. staphylococci
- c. streptobacilli
- d. sarcinae (a)

Column 1	Column 2
a. <i>Listeria</i> , staphylococcus	Bacteroidales (e)
b. <i>Enterococcus</i> , <i>Streptococcus</i>	Actinomycetales (c)
c. <i>Corynebacterium</i> , <i>Gardnerella</i> , <i>Mycobacterium</i>	Bacillales (a)
d. <i>Borrelia</i> , <i>Leptospira</i> , <i>Treponema</i>	Spirochaetales (d)
e. <i>Bacteroides</i> , <i>Prevotella</i>	Lactobacillales (b)

Column 1	Column 2
a. Single spherical bacterium	Spirilla (f)
b. Spherical bacterial cells in groups of eight forming a cube	Streptobacillus (d)
c. Spherical bacterial cell in clusters	Micrococcus (a)
d. Rod-shaped cells in end to end chain	Staphylococcus (c)
e. Two rod shaped cell united end to end	Diplobacillus (e)
f. Spiral shaped bacteria	Sarcina (b)

Column 1	Column 2
a. Science of the classification of organisms	Order (f)
b. The evolutionary history of a group of organisms	Class (h)
c. A group of related genera	Domain (e)
d. A group of related phyla	Phylum/division (g)
e. A group of related kingdoms	Phylogeny (b)
f. A group of related families	Taxonomy (a)
g. A group of related classes	Kingdom (d)
h. A group of related orders	Family (c)

Column 1	Column 2
a. Order campylobacteriales	Beta proteobacteria (d)
b. Order pasteurales, enterobacteriales, vibrionales etc	Alpha proteobacteria (e)
c. order bdellovibrionales	Gamma proteobacteria (b)
d. order burkholderiales and neisseriales	Epsilon proteobacteria (a)
e. order caulobacteriales, rickettsiales, rhizobiales etc	Delta proteobacteria (c)

FILL IN THE BLANKS

- Small fluid – filled lesions on the skin are called and larger than 1 cm are called (vesicles) (bullae)
- Flat, reddened lesions on the skin are called (macules)
- Raised lesions on the skin are called and raised lesions containing pus are called (papules) (pustules)
- Pathogen of impetigo, folliculitis and toxic shock syndrome is (staphylococcus aureus)
- Pathogen of necrotizing and erysipelas is (streptococcus pyogenes)
- Acne is caused by the bacterium (propionibacterium acnes)
- Chicken pox and shingles are caused by (varicella zoster virus)
- Fungal skin disease caused by three pathogens is (ringworm – tinea)
- Skin disease caused by mite is and infestation of lice is called (scabies) (pediculosis)
- Two diseases of the eye caused by chlamydia trachomatis are and (inclusion conjunctivitis) (trachoma)
- Viral keratitis is caused by virus and protozoan keratitis is caused by ... (herpes simplex type 1) (acanthamoeba spp.)
- Three bacteria which cause meningitis are (Haemophilus influenzae, neisseria meningitidis and streptococcus pneumoniae)
- Two important viral diseases of the nervous system are and

- 126
14. Two diseases of the nervous system caused by clostridium spp are and (tetanus) (botulism)
 15. Two prion diseases of the nervous system are disease and disease (creutzfeldt jakob) (kuru)
 16. The pathogen causes puerperal sepsis and pericarditis (streptococcus pyogenes)
 17. Subacute bacterial endocarditis is caused by and acute bacterial endocarditis is caused by (alpha hemolytic streptococci) (staphylococcus aureus)
 18. Pathogen of anthrax is and that of gangrene is (bacillus anthracis) (clostridium perfringens)
 19. Typhus and rocky mountain spotted fever are caused by different species of (rickettsia)
 20. Dengue and yellow fever are caused by the same virus (arbovirus)
 21. Dental caries are primarily caused by and periodontal disease is primarily caused by (streptococcus mutans) (porphyromonas spp)
 22. Pathogen of malaria is that of chagas disease is and that of toxoplasmosis is (plasmodium spp) (trypanosoma cruzi) (toxoplasma gondii)
 23. Bacterial enterogastritis is caused by species of six types of bacteria namely ...ssw..... (vibrio) (escherichia coli) (camphylobacter) (yersinia) (clostridium perfringens) (bacillus cereus)
 24. Pathogen of gonorrhea is that of syphilis is (neisseria gonorrhoeae) (treponema pallidum)
 25. Pathogen of cholera is and that of typhoid fever is (vibrio cholerae) (salmonella typhi)
 26. The pathogen of strep throat and scarlet fever is and that of diphtheria is (streptococcus pyogenes) (corynebacterium diphtheriae)
 27. Tuberculosis is caused by and of Q fever is caused by (mycobacterium tuberculosis and M.bovis) (coxiella burnetii)

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28. Helminthic diseases of the digestive system include (tapeworms, hydatid disease, pinworms, hookworms, ascariasis, trichinosis)

29. Three types of bacterial pneumonia are ... and one type of fungal pneumonia is (pneumococcal, mycoplasmal and chlamydial) (pneumocystis type)

30. Pyelonephritis is caused by and kidney disease leptospirosis is caused by (E.coli) (leptospira interrogans)

TRUE OR FALSE

1. Roseola is caused by human herpes virus 6 and candidiasis is caused by candida albicans (true)
2. Skin warts are caused by papillomavirus spp (true)
3. Rubella is caused by rubella virus and german measles is caused by measles virus (false)
4. Listeriosis is caused by listeria monocytogenes and leprosy is caused by mycobacterium leprae (true)
5. Neonatal ophthalmia is caused by neisseria gonorrhoeae (true)
6. Chlamydia trachomatis may cause nongonococcal urethritis (NGU), pelvic inflammatory disease (PID) and lymphogranuloma venereum (LGV) (true)
7. Giardiasis, cryptosporidiosis and cyclospora diarrheal infection are protozoan diseases of the digestive system (true)
8. Peptic ulcer disease is caused by helicobacter pylori and bacillary dysentery is caused by shigella spp. (true)
9. Ergot poisoning and aflatoxin poisoning are the bacterial diseases of the digestive system (false)
10. Cystitis is caused by E.coli and staphylococcus saprophyticus (true)
11. Schistosomiasis and swimmer's itch are helminthic diseases of the cardiovascular and lymphatic system (true)
12. Histoplasmosis , coccidioidomycosis, and blastomycosis are the fungal diseases of the respiratory system (true)
13. Cryptococcosis is a bacterial disease of the nervous system (false)

14. Cat scratch disease is caused by *Borrelia burgdorferi* and Lyme disease is caused by *Bartonella henselae* (false) 5.
15. Common cold is caused by coronaviruses and rhinoviruses (true)
16. Legionellosis and pertussis are the viral diseases of the respiratory system (false)
17. Burkitt's lymphoma and infectious mononucleosis are caused by Epstein Barr virus (true) 6.
18. Rheumatic fever, tularemia and brucellosis are the bacterial diseases of the cardiovascular and lymphatic systems (true)

MULTIPLE CHOICE QUESTIONS

1. Which of the following disease is caused by *Chlamydia trachomatis*? 7.
- a. Trachoma
 - b. nongonococcal urethritis
 - c. lymphogranuloma venereum
 - d. all the above (d)
2. Which of the following is the least harmful bacterium to humans? 8.
- a. *Lactobacillus*
 - b. *Nocardia*
 - c. *Chlamydia*
 - d. *Mycoplasma* (a)
3. *Rickettsia prowazekii* causes which of the following diseases? 9.
- a. Murine typhus
 - b. epidemic typhus
 - c. Brill-Zinsser disease
 - d. both b and c (d)
4. Which of the following is a mismatch between a spirochaete and the disease caused by it?
- a. *Leptospira* spp – leptospirosis
 - b. *Borrelia burgdorferi* - yaws
 - c. *Borrelia recurrentis* – relapsing fever
 - d. *Treponema pallidum* – syphilis (b)

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5. Which of the following is a rickettsial disease?
a. *Coxiella burnetii*
b. *Rickettsia australis*
c. *Bartonella quintana*
d. *Bartonella bacilliformis* (a)
6. Common cold are caused by
a. Rhinoviruses
b. coronaviruses
c. adenoviruses, coxsackie viruses, respiratory syncytial viruses and orthomyxoviruses
d. all the above (d)
7. Which of the following hepatitis virus is a hepadnavirus?
a. HAV
b. HBV
c. HCV
d. HDV (b)
8. Which of the following viral infection to mother in the last trimester of pregnancy may cause stillbirth or congenital defects in the child?
a. Measles
b. mumps
c. rubella
d. chicken pox (c)
9. Amoebic dysentery is caused by
a. *Amoeba proteus*
b. *Entamoeba histolytica*
c. *Balantidium coli*
d. *Giardia lamblia* (b)

10. Which of the following species of mycobacterium causes TB?
- M.africanum
 - M.tuberculosis
 - M.bovis
 - both b and c (d)
11. Find out a mismatch between the following protozoans and the disorders caused by them
- Balantidium - diarrhea
 - Giardia lamblia - diarrhea, abdominal pain, a chronic fatigue syndrome
 - Trypanosoma brucei - toxoplasmosis
 - Plasmodium spp - malaria (c)
12. Which of the following enterobacteria is a common commensal in human intestine but some strains can cause hemolytic uremic syndrome, produce shiga toxin causing urinary tract infections and neonatal meningitis ?
- Escherichia coli
 - Klebsiella
 - salmonella
 - shigella (a)
13. Which of the following disease is not caused by clostridia ?
- Tetanus and gas gangrene
 - Food poisoning /gastroenteritis/botulism
 - Typhoid and paratyphoid
 - Necrotising enteritis and antibiotic associated diarrhea and colitis (c)
14. Which of the following causes gas gangrene ?
- Clostridium tetani
 - C.botulinum
 - C.perfringens
 - all of the above (c)

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15. Which of the following is caused by Neisseria and gonorrhoea ?
- Urthethritis , prostatitis, epididymitis etc in males
 - Vaginitis, cervicitis, bartholinitis, endometritis, salpingitis in females
 - Septic arthritis, ulcerative endocarditis, ophthalmia neonatorum
 - All of the above (d)
16. Which of the following is sporulating, non motile, encapsulated and causes food poisoning ?
- Clostridium tetani
 - C. botulinum
 - C. perfringens
 - all of the above (b)
17. Which of the following enterobacteria causes pneumonia, urinary tract infections , septicemia, ankylosing spondylitis and soft tissue infections ?
- Escherichia coli
 - Klebsiella
 - Salmonella
 - Shigella (b)
18. Which of the following vibrios causes 95% of sea food related deaths ?
- Vibrio cholerae
 - V. parahaemolyticus
 - V. vulnificans
 - V. fischeri (c)
19. The human pathogen of typhus abdominalis, transmitted by contact, infected food, water or flies make 3 -5% of infected persons permanent carriers of the pathogen is :
- Salmonella enteridis
 - S. paratyphi

20. Which of the pseudomonads is an emerging opportunistic pathogen of nosocomial infections ?

- a. *Pseudomonas aeruginosa*
- b. *P. chlorophis*
- c. *P. fragi*
- d. *P. fluorescens* (a)

MATCH THE FOLLWING

Column 1	Column 2
a. Toxic shock syndrome; fever, rash, shock	<i>Propionibacterium acnes</i> (d)
b. Necrotizing fascitis; extensive tissue destruction	<i>Varicella zoster virus</i> (h)
c. Otitis externa; superficial infection of external ear canal	<i>Rubella virus</i> (g)
d. Acne; inflammatory lesions due to sebum accumulation	<i>Microsporum</i> (f)
e. Warts; a horny projection of the skin due to cell proliferation	<i>pseudomonas aeruginosa</i> (c)
f. Ringworm; skin lesions of varied appearance; on scalp may cause loss of hair	<i>staphylococcus aureus</i> (a)
g. German measles; mild disease resembling measles	<i>papillomavirus</i> (e)
h. Shingles; vesicles smaller to chicken pox: typically on one side of waist and scalp or upper chest	<i>streptococcus pyogenes</i> (b)

Column 1	Column 2
a. Plague; transmitted by fleas from a reservoir in rats	<i>Arbovirus</i> (e)
b. Cat scratch disease; systemic infection, prolonged fever; may be fatal	<i>Rickettsia typhi</i> (d)

c. Lyme disease; a tickborne disease in areas of high deer populations; may cause cardiac and neurological problems	<i>Yersinia pestis</i> (a)
d. Endemic murine typhus; a fleaborne disease; rodents are the reservoir	<i>Borrelia burgdorferi</i> (c)
e. Dengue; a mosquito borne disease; rarely fatal but painful symptoms;	<i>Bartonella henselae</i> (b)

FILL IN THE BLANKS

- Two types of differential staining are staining and staining. (gram) (acid fast)
- The staining used to color only certain parts of bacterial is called staining and that which is used to make microbial capsule visible is called ... staining. (special) (negative)
- The maximum magnification of a compound microscope is (2000X)
- A substance used to improve bonding between the stain and the specimen is called a (mordant)
- The process for using heat or alcohol to kill and attach microbes to a slide is called (fixing)
- The resolution power of a light microscope is ($0.2\mu\text{m}$)
- In a microscope, metallic platform with a hole in the center and two clips for holding a slide is called (stage)
- A thin film or material used for microscopic examination is called (smear)
- The process of coloring a microorganism with a dye to make some structures more visible is called (staining)
- A curved handle used to carry the microscope is called (arm)
- A wire with a loop at the tip and attached to handle for the transfer of microbial culture to another medium is

12. (40X) (100X) (10X)
13. A device that holds different objectives with different magnify powers is called a (nose piece)
14. A device between the mirror and the object to increase or decrease the aperture size through which light passes is called an (iris diaphragm)
15. A lens placed at the upper end of body tube with usually 10X magnification is called an or (eye piece) (ocular)

TRUE OR FALSE

1. Microbial capsule are made visible by negative staining. (true)
2. In gram staining, alcohol is a mordant and iodine is decolorizer. (false)
3. Use only one hand to carry to carry the microscope by its arm. (false)
4. Wipe the lens with a clean finger tip (false)
5. The device which is used to concentrate the light rays on an object is called iris diaphragm (false)
6. An immersion oil is used for using 40X objective. (false)
7. The fine adjustment knob is used to view the finer details of the objects or specimen (true)
8. Bacteria are usually positively charged and are stained with an acidic dye (false)
9. In acid fast staining, bacteria are first stained with carbol fuchsin, decolorized and then stained with methylene blue. (false)
10. When the immersion oil objective is used a drop of immersion oil must be placed first on the object (true)

MULTIPLE CHOICE QUESTIONS

1. Capsules of bacterial cells can be observed by
 - a. Simple staining
 - b. gram staining
 - c. negative staining
 - d. acid fast staining (c)

2. Which of the following is correct?
- Always keep the microscope in box or under cover when not in use
 - Use alcohol/chemical for cleaning the microscope.
 - Do not expose the microscope to source of heat
 - Do not touch the glass with fingers, wipe them with lens paper moistened with xylol. (b)

3. The intensity of the light through or upon the object for specimen is regulated by
- The objective lens
 - iris diaphragm
 - the condenser
 - the mirror (b)

4. The stain malachite green will stain
- Cell wall
 - flagella
 - capsule
 - endospores (d)

5. Mycobacterium species are usually studied by using
- Simple staining
 - gram staining
 - acid fast staining
 - special staining (c)

MATCH THE FOLLOWING

Column 1	Column 2
1. Stains gram positive bacteria	Methylene blue (7)
2. Used as a mordant in gram staining	Acid alcohol (6)
3. Use as a decolorizing agent	Negative staining (8)
4. Used as a counter stain in gram staining	Carbol fuchsin (5)

5. Used to stain acid fast bacteria	Malachite green (5)
6. Used as a decolorizer in acid fast staining	Safranin (4)
7. Used as a counter stain in acid fast staining	Iodine (2)
8. Used to differentiate capsules of bacterial cell	Crystal violet (1)
9. Used to stain endospores	Alcohol- acetone. (3)

TRUE OR FALSE

1. The source of tetanus and anthrax disease is water (f)
2. Bovine TB, brucellosis, streptococcus are transmitted through milk (f)
3. If the disease spreads through instruments of a physician, it is called iatrogenic transmission (t)
4. The source of HIV, HBV, HCV and syphilis is blood (t)
5. The temperature at which a microbe grows best is called the maximum growth temperature. (f)
6. Infectious like impetigo, ringworm and herpes simplex spread by contact directly or with contaminated fomites. (t)
7. Chicken pox, measles, mumps and small pox exit the body via respiratory tract during coughing or sneezing (t)
8. Most bacteria grow best at pH 5.5 (f)
9. Introduction of microbes into a culture medium to initiate growth is known as inoculum (t)
10. Culturing in candle jars is a special technique to grow capnophilic bacteria (f)
11. Sabourand's dextrose agar is used to isolate salmonella typhi (f)
12. Blood agar medium, EMB medium and Mac Conkey agar medium are examples of complex media (f)
13. Streak plate method is commonly used to obtain pure culture (t)
14. Lyophilization is quick freezing of bacterial suspension at -54 to -72°C followed by vacuum dehydration (t)

15. Serial dilution method is used to obtain the optimum number of colonies for the plate count method. (t)
16. A plate count may be done by either the pour plate method or spread plate method (t)
17. Acid production or oxygen consumption are used to measure metabolic activity for indirectly estimating bacterial numbers (f)
18. Bacterial numbers can be estimated indirectly by measuring turbidity at the suspension using spectrophotometer (t)
19. Pathogens of gas gangrene, tetanus, hepatitis B and rabies have the parenteral route of entry in the body (t)
20. Chlamydia, herpes, syphilis and gonorrhea have gastro intestinal portal entry (f)
21. Pathogens of measles and small pox enter into the body through skin (f)
22. Portals of entry of anthrax are skin, respiratory tract and gastrointestinal tract (t)

FILL IN THE BLANKS

1. The transmission of disease through instruments, diagnostic or therapeutic procedures is calledtransmission (iatrogenic)
2. The contaminated objects used by the patients are called (fomites)
3. Pathogens exit the GI tract via and (feces, saliva)
4. Pathogens exit the respiratory tract during or (coughing, sneezing)
5. The ability of the microbe to stick together or to the surface is called (adherence)
6. The infectious dose for 50% of the inoculated host is called(ID50)
7. The portals of entry of pathogens are (mucous membrane, skin and the parenteral route)
8. The ability of a pathogen to produce a disease by overcoming the defenses of the host is called.... And its degree or extent is called

9. Indirect methods of estimating bacterial number are by measuring and (turbidity, metabolic activity and dry weight) 2.
10. Specially designed slide for direct microscopic count of bacteria in a suspension is called counter (petroff hausser)
11. Statistical estimation technique of counting the number of bacteria in a suspension is called method. (most probable number (MPN)) 3.
12. Plate counts are reported as number of Units (colony forming)
13. Any material prepared for the growth of bacteria in the laboratory is called a (culture medium)
14. Aerobes, facultative anaerobes and aerotolerant anaerobes must have enzymes and Or (superoxide dismutase, catalase or peroxidase) 4.
15. Can grow in hypertonic solution (halophiles)
16. Most bacteria grow best at pH value between And (6.5, 7.5)
17. According to preferred temperature ranges, microorganisms are classified as, And (psychophiles, mesophiles and thermophiles)
18. Insects which transmit human diseases are called (vectors)
19. Diseases transmitted from man to man are called and animals to man are called (anthroponoses, zoonoses)
20. Sources of infection within the body are called sources and those present outside the body are called Sources (endogenous, exogenous)

MULTIPLE CHOICE QUESTIONS

1. Which of the following provides pathogens the ability of adherence to the host ?
- a. Adhesions (ligands on the surface)
 - b. fimbriae
 - c. biofilms
 - d. all of the above (d)

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2. Virulence of microbe can be expressed as

- a. ID 100
- b. ID 50
- c. LD 50
- d. 'b' or 'c' (d)

3. Which of the following specimens should be rejected ?

- a. Unlabelled or improperly labelled
- b. Specimen leaked or in cracked container
- c. Visually apparent contamination of the specimens
- d. All of the above (d)

4. Which of the following helps in the exit of pathogens from the body ?

- a. Coughing or sneezing
- b. saliva and feces
- c. secretions of vagina or penis and urine
- d. all of the above (d)

5. Which of the following diseases has transplacental transmission?

- a. cholera, typhoid, amoebiasis and dysentery
- b. Malaria and yellow fever
- c. Rubella and AIDS
- d. TB and influenza (c)

6. The portal of entry of hook worm larvae and the fungi that can grow on keratin is

- a. Gastrointestinal tract
- b. genitourinary tract
- c. skin
- d. parenteral route (c).

7. Which of the following is an indirect method of measurement of microbial growth ?

- b. measuring turbidity by spectrophotometer
 - c. filtration method
 - d. most probable number (MPN) method. (b)
8. Which of the following methods is used for long term storage of bacteria ?
- a. Refrigeration
 - b. deep freezing
 - c. lyophilization
 - d. both 'b' and 'c' (d)
9. Which of the following methods is commonly used to obtain a pure culture ?
- a. Lawn plate method
 - b. streak plate method
 - c. stab plate method
 - d. stroke plate method (b)
10. Which of the following culture media is designed to increase numbers of desired microbe in mixed culture ?
- a. Selective
 - b. differential
 - c. enrichment
 - d. reducing (c)
11. Which of the following culture media is used for the growth of chemoautotrophs, photoautotrophs and microbiological assays?
- a. Chemically defined
 - b. complex
 - c. selective
 - d. differential (a)
12. Which of the following enzymes must be present in aerobes, facultative anaerobes and aerotolerant anaerobes ?
- a. Superoxide dismutase

- b. catalase
- c. peroxidase
- d. both a and either 'b' or 'c' (d)

13. Which of the following types of bacteria will grow in hypertonic solution?

- a. Psychrophiles
- b. halophiles
- c. mesophiles
- d. facultative anaerobes (b)

14. Which of the following requirements for growth of microbes is chemical in nature?

- a. Temperature
- b. the pH
- c. oxygen
- d. osmotic pressure (c)

15. The source of diseases like cholera, typhoid, dysentery, polio and campylobacter is

- a. Soil
- b. water
- c. food
- d. blood (b)

16. E.coli bacterium causes urinary infection; the source of it is

- a. Endogenous
- b. animals
- c. insects
- d. food (a)

MATCHING THE ITEMS BETWEEN COLUMN 1 AND COLUMN 2.

Column 1	Column 2
a. Cholera , typhoid, diarrhea, dysentery, salmonella	Blood (d)
b. Botulism, amoebiasis, dysentery	Insect vectors (e)
c. Bovine TB, brucellosis, streptococcus infection	Food (b)
d. HIV, HBV, HCV, malaria	Water (a)
e. Yellow fever, malaria, dengue	Milk (c)

Column 1	Column 2
a. Cold loving microbes	Capnophiles (e)
b. Moderate temperature loving microbes	Thermophiles (c)
c. Heat loving microbes	Aerotolerant anaerobes (f)
d. High salt tolerant microbes	Facultative anaerobes (g)
e. Microbes requiring high concentration of carbon dioxide for growth	Psychrophiles (a)
f. Aerobes which can also grow in absence of carbon dioxide	Halophiles (d)
g. Anaerobes which can also grow in presence of carbon dioxide	Mesophiles (b)

Column 1	Column 2
a. Exact chemical composition of culture medium is known	Enrichment media (g)
b. Exact chemical composition varies slightly	Selective medium (e)
c. Oxygen is removed chemically when microbe is incubated	Differential medium (f)

d. A specific condition for the growth of a microbe is provided	Chemically defined (a)
e. Suppression of growth unwanted microbes	Reducing (c)
f. Differentiation of colonies of desired microbes from others	Complex medium (b)
g. Designed to increase numbers of designed in a mixed culture	Special medium (d)