1. Common myeloid progenitor gives all of the following except……:

A. Leukocytes

B. Natural killer cells

C. Erythrocytes

D. Platelets

2. Which of the following gives plasma cells

A. T lymphocytes

B. B lymphocytes

C. Natural killer cells

D. Neutrophils

3. Common Lymphoid progenitor gives all of the following except……

A. T lymphocytes

B. B lymphocytes

C. Neutrophils

D. Natural killer cells

4. Regarding stem cells which of the following is false…….

A. They are undifferentiated cells

B. They have the ability to self renewal

C. They are non-potent cells

D. They could be used in the generation of cells and tissues for cell-based therapies

5. Stem cells can be used for the treatment of all of the following except…..

A. Leukemia

B. Cardiovascular disease

C. Spinal cord injuries

D. Type II diabetes mellitus

1. B	2. B	3. C	4. C	5. D

6. Which of the following is a primary lymphoid organ.....:

A. Bone marrow,

B. Lymph nodes

C. Spleen.

D. Tonsils

7. Secondary lymphoid organs include all of the following except.....

A. Lymph nodes

B. Spleen.

C. Peyer`s patches

D. Thymus gland

8. .....is the site of B cells maturation

A. Thymus gland

B. Bone marrow,

C. Lymph nodes

D. Spleen.

9. .....is the site of T cells maturation

A. Thymus gland

B. Bone marrow,

C. Lymph nodes

D. Spleen.

10. .....is the site of hematopoiesis

A. Thymus gland

B. Bone marrow,

C. Lymph nodes

D. Spleen

6. A	7. D	8. B	9. A	10. B

11. .....is the site of T cells synthesis

A. Thymus gland

B. Bone marrow,

C. Lymph nodes

D. Spleen

12. Which of the following represents T cells education center

A. Thymus gland

B. Bone marrow,

C. Lymph nodes

D. Peyer`s patches

13. In positive selection of T cells .....

A. Cells recognize and efficiently bind self peptides

B. Cells are autoreactive

C. Cells undergo apoptotic cell death

D. Cells are selected to grow

14. In negative selection of T cells .....

A. Cells are able to recognize and bind to self MHC or to peptide + MHC molecules

B. Cells are selected to grow

C. Cells are autoreactive

D. Cells enter circulation as mature naïve T cells

15. Selection processes of T cells occur in .....

A. Thymus gland

B. Bone marrow,

C. Lymph nodes

D. Peyer`s patches

11. B	12. A	13. D	14. C	15. A

16. Sites where naive mature recirculating lymphocytes will first be exposed to their specific antigens include all of the following except

A. Lymph nodes

B. Spleen.

C. Peyer`s patches

D. Thymus gland

17. Regarding lymphocytes all of the following is true except .....

A. They arise from stem cells in the bone marrow

B. They are mediators of innate immunity,

C. They can be distinguished by surface proteins (CD) and a number

D. They develop into B cells or T cells, depending on site of maturation

18. Mediators of humoral immunity are.....?

A. B lymphocytes

B. T lymphocytes

C. Natural killer cells

D. Neutrophils

19. Mediators of cell mediated immunity are.....?

A. B lymphocytes

B. T lymphocytes

C. Natural killer cells

D. Neutrophils

20. Cells of innate immunity are.....

A. B lymphocytes

B. T lymphocytes

C. Natural killer cells

D. Neutrophils

16. D	17. B	18. A	19. B	20. C

21. .....is the site of maturation of B-lymphocytes:

A. Thymus gland

B. Bone marrow,

C. Lymph nodes

D. Spleen

22. B-lymphocytes represent .....of total blood lymphocytes?

A. 10-15%

B. 10%

C. 75-80%

D. 5%

23. Phenotype markers of B-lymphocytes include all of the following except.....?

A. CD19

B. CD21

C. CD3

D. Class II MHC

24. When B-lymphocytes are stimulated by antigen they differentiate into.....?

A. Plasma cells

B. Memory B cells

C. Mast cells

D. A & B

25. B cell receptor can recognize .....antigens

A. Protein

B. Polysaccharide,

C. lipid

D. All of the above

21. B	22. A	23. C	24. D	25. D

26. .....represents the majority of blood lymphocytes:

A. B-lymphocytes

B. T-lymphocytes

C. Natural killer cells

D. Eosinophils

27. Phenotype markers of T-lymphocytes include all of the following except..... ?

A. TCR,

B. CD3,

C. CD4

D. Fc receptors

28. Regarding Helper T cells all of the following is true except?

A. They help B lymphocytes to produce antibodies

B. They help macrophage activation to destroy ingested microbes.

C. They contain CD8 marker on their surface

D. They divide into Th1 & Th2 according to cytokine profile

29. All of the following are functions of cytotoxic T cells except..... ?

A. Antibody secretion

B. Kill virus-infected cells.

C. Kill tumor cells.

D. Rejection of allografts

30. Which of the following cells suppress the immune response.....

A. Plasma cells

B. Th1 cells

C. T regulatory cells

D. Cytolytic T cells

26. B	**27. D**	**28. C**	**29. A**	**30. C**

31. TCR can recognize …….antigens

A. Protein

B. Polysaccharide,

C. Lipid

D. Nucleic acid

32. TCR consists of ……. polypeptide chains

A. 3

B. 2

C. 4

D. 5

33. T-lymphocytes?

A. Recognize antigen directly

B. Recognize lipid antigens

C. Recognize antigen only in the form of peptide fragments + MHC molecules

D. They are fewer than B-lymphocytes

34. CD4+ cells recognize peptide + class……MHC molecules

A. I

B. II

C. III

D. IV

35. Phenotype markers of NK cells include……

A. Class II MHC

B. CD 8

C. CD 16

D. Fc receptor for IgM

31. A	**32. B**	**33. C**	**34. B**	**35. C**

36. Regarding NK cells which of the following is true .....

A. They are small lymphocytes with numerous cytoplasmic granules

B. They comprise about 20% of blood lymphocytes

C. They express TCR on their surface

D. They detect abnormal host cells and target them for destruction

37. NK cells produce.....which activate macrophages

A. IFN-γ

B. IFN α

C. - IL

D. 2 IL

6

38. Which of the following is responsible for Antibody-dependent cellular cytotoxicity?

A. Plasma cells

B. NK cells

C. T regulatory cells

D. Cytotoxic T cells

36. D	37. A	38. B

1. Antigen Presenting Cells include all of the following except……:

A. Dendritic cells. B. Macrophages. C. T-helper cells D. B lymphocytes

2. Antigen Presenting Cells are present in……..

A. Epithelium of the skin,

B. Epithelium of gastrointestinal tract

C. Epithelium of respiratory tract

D. All of the above

3. All of the following are functions of antigen Presenting Cells except……

A. Capture and transport antigens to the peripheral lymphoid tissues

B. Process antigens

C. Present the peptides derived from antigens to T lymphocytes

D. Kill tumor cells

4. In class II MHC pathway of antigen processing which of the following is true…….

A. Concerned with intracellular microbes

B. Proteins are degraded by proteosomes

C. Concerned with protein antigen taken from extracellular environment

D. The resulting peptides are presented to CD8+ cells

5. In class II MHC pathway proteins are degraded by …..

A. Lysosomal proteases

B. Proteosomes

C. Peroxisomes

D. Golgi apparatus

1. C	2. D	3. D	4. C	5. A

6. Phagocytes include all of the following except……:

A. Monocytes

B. Basophils

C. Macrophages

D. Neutrophils

7. The most numerous leukocytes in the blood are……

A. Neutrophils

B. Basophils

C. Eosinophils

D. Monocytes

8. Which of the following is correct regarding monocytes

A. They are small binucleated cells

B. They are present in the tissues

C. They ingest microbes in the blood.

D. They are more numerous than neutrophils

9. The tissues residents of monocytes are ……

A. Neutrophils

B. Macrophages

C. B lymphocytes

D. Basophils

10. Increase number of neutrophils in blood indicates……

A. Acute infection

B. Chronic infection

C. Parasitic infestation

D. Hypersensitivity

6. B	7. A	8. C	9. B	10. A

11. Regarding neutrophils all are true except……..

A. Also called polymorphonuclear leukocytes (PMNs)

B. Very effective at killing bacteria

C. They can only ingest microbes in the circulation

D. The most numerous leukocytes in the blood

12. Migration of phagocytic cells from the blood through the endothelial wall of blood vessels to the tissues is called……

A. Attachment.

B. Chemotaxis.

C. Diapedesis.

D. Opsonization.

13. Macrophages secrete……..to activate the endothelial cells of the nearby venules

A. Histamine

B. Cytokines

C. Heparin

D. Serotonin

14. Which of the following mediate the migration of phagocytic cells from the blood to the tissues.

A. Chemokines

B. Interleukins

C. Interferon-alpha

D. Histamine

15. Opsonization occur by coating the organism by ……..

A. IgG

B. C3b

C. IL 2

D. A &B

11. C	12. C	13. B	14. A	15. D

16. Oxygen independent intracellular killing occur by .....

A. Hydrogen peroxide

B. Toxic nitric oxide

C. Lactoferrin

D. Superoxide

17. Basic proteins of lysosomal granules kill bacteria by .....

A. Damaging permeability barrier in bacteria

B. Lowering PH so preventing bacterial growth

C. Decreasing the iron available for bacterial growth

D. O2 dependent mechanisms

18. Intracellular killing by respiratory bursts can be done using.....?

A. Nuclease enzyme

B. Lactoferrin

C. Lactic acid

D. Superoxide

19. Which of the following is a major component of pus?

A. Basophils

B. B-lymphocytes

C. Neutrophils

D. Natural killer cells

20. All of the following are stages of phagocytosis except.....?

A. Chemotaxis

B. Opsonization

C. Digestion

D. Recognition

16. C	17. A	18. D	19. C	20. D

1. All of the following are eukaryotic except……:

A. Fungi

B. Bacteria

C. Parasites

D. Human cells

2. Regarding prokaryotes which of the following is correct…….

A. Their DNA is surrounded by nuclear membrane

B. They contain diploid number of chromosome.

C. Their DNA is associated with histones

D. They contain Peptidoglycan in their cell wall

3. Eukaryotes contain……S ribosomes

A. 50

B. 60

C. 70

D. 80

4. The smallest bacterium known is …….

A. Serratia marcescens

B. Staphylococcus

C. Diphtheria

D. Treponema pallidum

5. Which of the following are spiral bacteria with one curve…..

A. Staphylococci

B. Diphtheria

C. Vibrio

D. Spirochetes

1. B	2. D	3. D	4. A	5. C

6. Which of the following is not present in bacteria……:

A. Cell wall

B. Mitochondria

C. Inclusion bodies

D. Mesosome

7. Respiratory activities in human cells are associated with mitochondria while in bacteria they are associated with……..

A. Capsule

B. Fimbria

C. Cytoplasmic membrane

D. Cell wall

8. The bacterial structure that maintains rigidity and shape of the cell is……..

A. Teichoic acid

B. Peptidoglycan

C. Lipopolysaccharide

D. Lipid A

9. The toxicity of gram negative bacterial endotoxin is due to the presence of……

A. Peptidoglycan

B. Teichoic acid

C. Lipid A

D. Lipoprotein

10. Regarding chemical structure of bacterial cell wall which of the following is correct……

A. Peptidoglycan layer is thick in gram negative bacteria

B. Peptidoglycan layer represents 5-10% of the cell wall material of gram positive bacteria

C. Gram positive bacteria contain a periplasmic space which contains hydrolytic enzymes And penicillinase

D. Peptidoglycan layer consists of 1 or 2 sheets in gram negative bacteria

6. B	7. C	8. B	9. C	10. D

11. Which of the following is a special component in cell wall of gram positive bacteria

A. Lipoprotein

B. Lipid A

C. Teichoic acid

D. Polysaccharide

12. The bacterial structure responsible for staining reaction is……..

A. Cytoplasmic membrane

B. Cell wall

C. Mesosomes

D. Lipid A

13. The capsule of the following organisms is polysaccharide in composition except….

A. Meningococci

B. Pneumococci

C. Klebsiella

D. Bacillus anthracis

14. N-acetyl glucosamine and N-acetyl muramic acid are found in ……..

A. Teichoic acid

B. Glycocalyx

C. Peptidoglycan

D. Lipopolysaccharide

15. The following is a feature of Gram +ve rather than Gram-ve cell wall ……..

A. Lipid A

B. Somatic O Ag

C. Thick peptidoglycan

D. Periplasmic space

11. C	12. B	13. D	14. C	15. C

16. Ribitol or glycerol are found in the following components .....

A. Teichoic acid

B. Glycocalyx

C. Peptidoglycan

D. Endotoxin

17. Which of the following isn't a function of the bacterial cell wall.....

A. Preservation of the shape of the cell

B. Protection against high internal osmotic pressure.

C. Selective permeability of the cell

D. Plays a role in cell division

18. Capsule of B. anthracis is composed of.....?

A. Polypeptides

B. Polysaccharides

C. Ribitol phosphate

D. Lipids

19. Bacterial capsule.....?

A. Is the organ of bacterial motility

B. Determines virulence of the organism

C. Makes the organism easily phagocytosed

D. Excrete hydrolytic enzymes and toxins

20. The structure which protects bacteria from bacteriophages is.....

A. The cell wall

B. The flagella

C. The pili

D. The capsule

16. A	17. C	18. A	19. B	20. D

21. Bacteria that have tuft of flagella at one pole of the cell is called……:

A. Monotrichous

B. Amphitrichous

C. Lophotrichous

D. Peritrichous

22. Bacterial motility is accomplished by…….?

A. Fimbria

B. Flagella

C. Pseudopodia

D. Capsule

23. Which of the following structure is not found in gram positive bacteria……?

A. Cell wall

B. Teichoic acid

C. Peptidoglycan

D. Outer membrane

24. Flagella distributed all over the entire cell is known as…..?

A. Monotrichous

B. Amphitrichous

C. Lophotrichous

D. Peritrichous

25. All of the following are true concerning pili except….

A. They mediate bacterial adhesion to each other and host cells

B. They may be involved in bacterial conjugation

C. Their antigen is called H antigen

D. They are important virulence factors

21. C	**22. B**	**23. D**	**24. D**	**25. C**

26. Regarding bacteria which of the following is true:

A. Their size is measured by nanometer

B. Diphtheria are spherical in shape

C. Saprophytic bacteria are free living in soil, air and water.

D. Gram positive bacteria are stained red with gram stain

27. Which of the following bacteria is not stained by gram stain..... ?

A. Staphylococcus

B. Clostridium tetani

C. Streptococcus

D. Mycobacterium

28. Mycobacterium TB is stained by.....?

A. Ziehl-Neelsen stain.

B. Gram stain

C. Giemsa stain

D. Wright stain

29. Major surface Ag in gram positive bacteria is..... ?

A. Peptidoglycan

B. Teichoic acid

C. Lipopolysaccharide

D. Cytoplasmic membrane

30. Major surface O Ag in gram negative bacteria is .....

A. Peptidoglycan

B. Teichoic acid

C. Lipopolysaccharide

D. Lipoprotein

26. C	**27. D**	**28. A**	**29. B**	**30. C**

31. Penicillin target……..of bacteria

A. Cell wall

B. Cytoplasmic membrane

C. Capsule

D. Glycocalyx

32. Which of the following is responsible for biosynthesis of cell wall & membrane lipids?

A. Flagella

B. Cytoplasmic membrane

C. Capsule

D. Glycocalyx

33. Polysaccharide containing material lying outside the bacteria cell?

A. Cytoplasmic membrane

B. Capsule

C. Glycocalyx

D. Nuclear body

34. Which of the following assist pathogenic bacteria in penetration through a viscid mucous secretion

A. Glycocalyx

B. Flagella

C. Mesosome

D. Fimbriae

35. Regarding nuclear body which of the following is correct……

A. It is a true nucleus

B. It is surrounded by nuclear membrane

C. It is made of RNA

D. Consists of single very long thin thread of chromosome folded on itself.

31. A	32. B	33. C	34. B	35. D

36. Which of the following differs fimbriae from flagella .....

A. Fimbriae are present in motile strains only

B. Fimbriae are less numerous than flagella

C. Fimbriae are much shorter and thinner than flagella

D. Fimbriae are originated from cytoplasm.

37. Ordinary pili are responsible for.....

A. Bacterial adhesion to each other and to host cells

B. Bacterial virulence

C. Bacterial conjugation

D. A & B

38. Which of the following is responsible for bacterial conjugation.

A. Cell wall

B. Cytoplasmic membrane

C. Sex pili

D. Ordinary pili

39. Which of the following is considered colonization antigen in bacteria.

A. Cytoplasmic membrane

B. Ordinary pili

C. Sex pili

D. Nuclear body

36. C	37. D	38. C	39. B

1. Regarding bacterial spores which of the following is incorrect.....:

A. They are formed under certain unfavorable conditions as starvation and desiccation,

B. They are formed in vitro

C. Sporulation is a means of reproduction

D. The spore has no metabolic activity

2. Which of the following is a spore forming organism.....

A. Clostridium tetani

B. Pseudomonas

C. Klebsiella

D. E.coli

3. Site of spore formation is .....

A. Central,

B. Sub terminal

C. Terminal

D. All of the above

4. Regarding sporulation which of the following is correct .....

A. It begins when nutritional conditions are favorable.

B. The nuclear material in the cell divides and moves to both poles

C. Cortex formation by deposition of Dipicolinic acid and calcium

D. Forespore is made by cell wall invagination

5. Which of the following is the last step of sporulation.....

A. The nuclear material in the cell moves to one pole

B. Rest of bacterial cells undergoes autolysis

C. Formation of spore coat.

D. Release of endospores

1. C	2. A	3. D	4. C	5. B

6. Zero growth rate is observed during which of the following phases……:

A. Lag phase

B. Logarithmic phase

C. Stationary phase

D. Phase of decline

7. Bacteria could be inhibited efficiently by antibiotic in…….

A. Lag phase

B. Logarithmic phase

C. Stationary phase

D. Phase of decline

8. The invasive period in vivo correlates with…….

A. Lag phase

B. Exponential phase

C. Stationary phase

D. Phase of decline

9. Bacteria that are…….can grow only in presence of free O2

A. Microaerophilic

B. Obligatory anaerobes

C. Obligatory aerobe

D. Facultative anaerobes

10. Which of the following bacteria is an obligatory aerobe……

A. Mycobacterium Tuberculosis

B. Staphylococcus aureus

C. Clostridium spp

D. Lactobacillus spp

6. A	7. B	8. B	9. C	10. A

11. Most of pathogenic bacteria are.....

A. Microaerophilic

B. Obligatory anaerobes

C. Obligatory aerobe

D. Facultative anaerobes

12. Which of the following grows best in the presence of a minimal amount of oxygen.....

A. Mycobacterium Tuberculosis

B. Staphylococcus aureus

C. Helicobacter pylori

D. Clostridium spp

13. Bacteria that are .....can tolerate oxygen and grow in its presence even though they cannot use it....

A. Microaerophilic

B. Aerotolerant anaerobes

C. Obligatory anaerobes

D. Facultative anaerobes

14. Clostridium spp is.....

A. Microaerophilic

B. Aerotolerant anaerobes

C. Obligatory anaerobes

D. Facultative anaerobes

15. Obligatory anaerobes cannot grow in the presence of oxygen, due to lack of .....

A. Hydroxy acid oxidase enzyme

B. Catalase enzyme

C. Acid phosphatase enzyme

D. Amino acid oxidase enzyme

11. D	12. C	13. B	14. C	15. B

16. Which of the following is needed in very minute amounts for bacterial structure or as a catalytic for growth .....

A. Carbon,

B. Nitrogen,

C. Magnesium

D. Nucleotides

17. Which of the following is a major element for bacterial growth.....

A. Phosphorus,

B. Nitrogen

C. Sulphur,

D. Vitamins

18. All of the following are basic elements for bacterial nutrition except.....?

A. Carbon,

B. Water,

C. Calcium

D. Vitamins

19. Staphylococcus aureus is considered.....?

A. Autotrophic bacteria

B. Heterotrophic bacteria

C. Obligatory aerobe

D. Obligatory anaerobes

20. Autotrophic bacteria is.....

A. Bacteria that assimilate inorganic chemicals (CO_2) as the only source of carbon.

B. Bacteria that require organic sources of carbon.

C. Bacteria that can grow well in presence or absence of O_2

D. Bacteria that can grow in absence of O_2 and cannot grow in the presence of oxygen

16. D	17. B	18. D	19. B	20. A

21. Capnophilic bacteria……:

A. Bacteria that grow below the minimum temperature

B. Bacteria that grow above the minimum temperature

C. Bacteria that require higher concentrations of CO2 (5-10%) to be provided in the culture media for stimulation of growth

D. Bacteria that require organic sources of carbon

22. Regarding bacterial growth which of the following is true……..?

A. Low content of water is essential for bacterial cultivation.

B. Most bacteria require higher concentrations of CO2 for stimulation of growth

C. Most of the pathogenic bacteria grow at pH of 2.5

D. Optimum growth of the organism is usually at 37°C for most of pathogenic bacteria

23. psychophilic means……?

A. Bacteria that grow below the minimum temperature

B. Bacteria that grow above the minimum temperature

C. Bacteria that require higher concentrations of CO2 (5-10%) for stimulation of growth

D. Bacteria that tolerate alkaline media

24. Which of the following bacteria is alkalophilic…..?

A. Lactobacillus

B. Vibrio cholera.

C. Klebsiella

D. Pseudomonas

25. Which of the following bacteria is acidophilic ….

A. Lactobacillus

B. Vibrio cholera.

C. Klebsiella

D. Pseudomonas

21. C	22. D	23. A	24. B	25. A

26. Regarding bacterial enzymes all of the following is true except.....:

A. Proteolytic enzymes act on protein

B. Sccharolytic enzyme act on CHO

C. Bacterial dehydrogenase is a respiratory enzyme

D. Oxidase enzyme act on Lipids

27. Which of the following bacteria produces golden yellow endopigment..... ?

A. Serratia marcescens

B. Staphylococcus aureus.

C. Pseudomonas aeruginosa

D. E.coli

28. Serratia marcescens produces.....?

A. Red endopigment

B. Red exopigment

C. Blue exopigment

D. Yellow endopigment

29. Pseudomonas aeruginosa produces blue pigment called..... ?

A. Fluorescens

B. Riboflavin

C. Pyocyanin

D. Biliverdin

30. Pseudomonas aeruginosa produces.....

A. Red endopigment

B. Yellow exopigment

C. Blue endopigment

D. Golden yellow endopigment

26. D	**27. B**	**28. A**	**29. C**	**30. B**

31. Regarding bacterial pigments which of the following is true

A. Endopigment diffuses into the surrounding medium

B. Exopigment remains bound to the body of the organism

C. Endopigments are demonstrated on a liquid media.

D. Bacterial pigments play a role in bacterial respiration and also have antibacterial action.

32. Which of the following bacteria produces hemolysin?

A. Staphylococcus aureus

B. Streptococci

C. E.coli

D. Pseudomonas

33. Which of the following bacteria produces leucocidins?

A. Staphylococcus aureus

B. Streptococci

C. E.coli

D. A & B E. Pseudomonas

34. Regarding exotoxin which of the following is true……

A. It is secreted mainly by gram -ve bacteria

B. It is a Lipopolysaccharides in nature

C. It is thermolabile

D. The gene that codes it is present on chromosome

35. Regarding endotoxin which of the following is true ……

A. It is highly toxic and antigenic compared with exotoxin

B. Its action is non specific

C. It is diffusible outside bacteria

D. It is detoxicated by 0.3% formalin

31. D	32. A	33. D	34. C	35. B

36. Bacteria multiply by ……..

A. Mitosis

B. Simple binary fission

C. Meiosis

D. Budding

37. Aerobic bacterial growth on fluid media may give ……..

A. Surface pellicle

B. Uniform turbidity

C. Sediment leaving relatively clear medium

D. None of the above

38. Uniform turbidity occur when……..bacteria grow on fluid media.

A. Aerobic

B. Anaerobic

C. Facultative anaerobic

D. Microaerophilic

39. Which of the following correlate with symptoms and signs in vivo.

A. Lag phase

B. Logarithmic phase

C. Stationary phase

D. Phase of decline

40. Which of the following correlate with convalescent period in vivo.

A. Lag phase

B. Logarithmic phase

C. Stationary phase

D. Phase of decline

41. The rate of division equals the rate of death in……..

A. Lag phase

B. Logarithmic phase

C. Stationary phase

D. Phase of decline

36. B	37. A	38. C	39. C	40. D	41. C

1. Regarding prokaryotic genome which of the following is correct……:

A. It consist of a diploid circular DNA molecule.

B. It consists of a haploid linear DNA molecule

C. It ranges from 580-4600 Kbp

D. There is no extra chromosomal element

2. All of the following is correct regarding prokaryotic DNA except……..

A. It is a single copy of DNA

B. It is circular in shape

C. Plasmids are present

D. It is present within the nucleus

3. Which of the following is correct concerning prokaryotic m.RNA ……..

A. It is monogenic

B. Its translation begins during transcription

C. It undergoes major Post transcriptional modifications

D. It is stable not affected by nucleases

4. All of the following are Post transcriptional modifications of eukaryotic m.RNA except……

A. Methylation

B. Polyadenylation,

C. Capping

D. Splicing.

5. Which of the following is correct regarding prokaryotic DNA replication …..

A. It only occurs during S phase of cell cycle

B. It is unidirectional

C. It originates at one point (Ori C)

D. There are several termination sites

1. C	2. D	3. B	4. A	5. C

6. Number of DNA polymerases in prokaryotic DNA replication is……:

A. 1

B. 2

C. 3

D. 4

7. Which type of topoisomerase is concerned with eukaryotic DNA replication ……

A. Type I

B. Type II

C. Type III

D. Type IV

8. Which of the following is correct regarding eukaryotic DNA replication ……

A. It is a continuous process

B. It occurs in the cytoplasm

C. It proceeds in two opposing directions at the same time

D. Formed Okazaki fragments are shorter than that of prokaryotic DNA repliction

9. Regarding prokaryotic transcription all of the following is correct except……

A. It is done by only one type of RNA Polymerase

B. It occurs inside the cytoplasm

C. Nascent RNA introns are present

D. Translation occurs simultaneously

10. Extrachromosomal elements of prokaryotes include all of the following except ……

A. Plasmid.

B. Transposons.

C. Bacteriophage

D. Peristome

6. B	**7. A**	**8. D**	**9. C**	**10. D**

11. Regarding plasmids which of the following is correct.....

A. They are pieces of DNA that exist at the end of the chromosome

B. Their replication is dependent on the chromosome

C. They are present in eukaryotes

D. The largest plasmid is about 3000 Kbp

12. Stringent plasmids is.....copies / cell.

A. 1-2

B. 10-15

C. Up to 50

D. Up to 100- 200

13. Up to 50 copies/cell of plasmids is considered ....

A. Stringent plasmids

B. Low copy number plasmids

C. High copy number plasmids

D. Extremely high copy number plasmids

14. If two plasmids carry the same origin of replication .....

A. The cell can maintain them

B. They can't be maintained in the same cell

C. They are considered compatible plasmids

D. None of the above

15. The most common shape of plasmids is .....

A. Covalently closed circular form

B. Semicircular form

C. Linear

D. Star shaped form

11. D	12. A	13. C	14. B	15. A

16. Which of the following forms of plasmid is transient …….

A. Covalently closed circular form

B. Semicircular form

C. Linear

D. Star shaped form

17. Which of the following forms of plasmid is unstable and attacked by exonucleases. …….

A. Covalently closed circular form

B. Semicircular form

C. Linear

D. Star shaped form

18. Broad host range plasmids can replicate in……..?

A. One bacterium

B. Few closely related bacteria.

C. Few unrelated bacteria

D. Wide range of bacteria.

19. Non–conjugative plasmids ……..?

A. Can mobilize from one cell to another

B. Cannot be mobilized

C. Propagate in two different host species

D. Have the tra genes

20. Plasmids which propagate in two different host species (yeast and bacteria).

A. Conjugative plasmids

B. Non–conjugative plasmids

C. Shuttle vector

D. Narrow host range plasmids

16. B	17. C	18. D	19. B	20. C

21. Regarding F- plasmid which of the following is correct……:

A. It presents naturally but designed artificially

B. It is used as vectors in gene cloning

C. It presents naturally in bacterial and some yeast cells

D. It is designed by adding antibiotic resistant markers or DNA sequence to be target of restriction endonucleases.

22. ……are considered movable elements or jumping genes?

A. Transposons

B. Non–conjugative plasmids

C. Narrow host range plasmids

D. Stringent plasmids

23. The simplest form of transposons is ……?

A. Composite transposons

B. Insertion sequence

C. Non – composite transposons

D. None of the above

24. Insertion sequence transposons encode for…..?

A. Antibiotic resistance

B. Virulence factors

C. Catabolic enzymes

D. Proteins needed for its own transposition

25. …….encodes for kanamycin resistance.

A. Tn 5

B. Tn 10

C. Tn 3

D. Tn 7

21. C	**22. A**	**23. B**	**24. D**	**25. A**

26. Non – composite transposons …..:

A. Contain 2 IS at both ends and central piece of DNA

B. Carry the same repeats at their ends

C. Have no IS at their ends

D. Encode only proteins needed for its own transposition.

27. Tn 3 ……. ?

A. Encodes for tetracycline resistance.

B. Carry ampicillin resistance gene

C. Carry streptomycin and trimethoprim resistance

D. Encodes for kanamycin resistance.

28. Non – composite transposons …….?

A. Encodes for transposition proteins

B. Carry genes for antibiotic resistance,

C. Carry genes for catabolic enzymes.

D. All of the above

29. ……. encodes for tetracycline resistance?

A. Tn 5

B. Tn 10

C. Tn 3

D. Tn 7

30. …….carry streptomycin and trimethoprim resistance

A. Tn 5

B. Tn 10

C. Tn 3

D. Tn 7

26. C	**27. B**	**28. D**	**29. B**	**30. D**

1. .....is the transfer of genetic material from parental organism to progeny

A. Horizontal gene transfer

B. Vertical gene transfer

C. Lateral gene transfer

D. Conjugation

2. A form of gene transfer in which 2 cells come in direct contact and DNA is transferred from one cell to the other ....

A. Conjugation

B. Transduction

C. Transformation

D. Transposition

3. Type of lateral gene transfer that is mediated by bacteriophage .....

A. Conjugation B. Transduction C. Transformation D. All of the above

4. One of the following requires cell to cell contact

A. Conjugation

B. Transduction

C. Transformation

D. Transposition

5. Conjugation occurs most frequently in.....

A. Gram positive bacilli

B. Gram positive cocci

C. Gram negative bacilli

D. Gram negative cocci

1. B	2. A	3. B	4. A	5. C

6. Which of the following requires donor cell to contain F plasmid …….:

A. Conjugation

B. Transduction

C. Transformation

D. Transposition

7. Regarding generalized transduction which of the following is correct ……..

A. Bacteriophage DNA is integrated inside the bacterial DNA at a specific region

B. It occurs during the lytic cycle of bacteriophage

C. It occurs with the lysogenic bacteriophage

D. All of the above

8. When a particular gene is transferred via a temperate bacteriophage, the process is called……..

A. Transformation

B. Generalized transduction

C. Specialized transduction

D. Transposition

9. Natural transformation can occur in ……

A. S. pneumoniae

B. Staph aureus

C. Pseudomonas

D. E.coli

10. Transformation by laboratory induced competence can be done by adding……..solution

A. Sodium chloride

B. Calcium chloride.

C. Calcium acetate

D. Sodium acetate

6. A	7. B	8. C	9. A	10. B

11. A method of gene transfer in which direct uptake of DNA by recipient cell occurs either naturally or artificially in the lab. ……..

A. Conjugation

B. Transduction

C. Transformation

D. Transposition

12. Regarding molecular cloning all of the following is correct except ……..

A. It is the process of reunion between 2 pieces of DNA

B. It can occur in nature in certain bacteria

C. It produces a recombinant DNA molecule

D. Hepatitis B- vaccine is produced by this process

13. Which of the following is not required for DNA cloning ….

A. DNA ligase

B. A vector

C. Restriction endonuclease enzyme

D. Methylases

14. Which of the following can be used as a host cell in molecular cloning ……..

A. S. pneumoniae

B. Staph aureus

C. E.coli

D. Pseudomonas

15. Which of the following can be produced by molecular cloning ……..

A. Endorphins

B. Growth hormone

C. Insulin

D. All of the above

11. C	12. B	13. D	14. C	15. D

16. An advanced technique to generate many copies of a single DNA molecule. .....

A. Polymerase chain reaction

B. DNA hybridization

C. Southern blotting

D. Northern blotting

17. Which of the following is not an importance of PCR .....

A. Diagnosis of microbial disease B. Diagnosis of genetic diseases. C. Purification of isolated protein D. Taxonomy and evolutionary purposes

18. Fluorescence Rhodamine labelled probe can be detected by .....?

A. Autoradiography

B. UV radiation

C. Enzyme product color.

D. None of the above

19. All of the following are types of probe labels except .....?

A. Radioactive isotopes p32

B. Biotin-Avidin

C. Digoxin- Antidigoxin

D. Agar

20. Which of the following is an importance of DNA probe

A. Diagnosis of microbial disease

B. Diagnosis of genetic diseases.

C. Medico legal purposes

D. All of the above

16. A	17. C	18. B	19. D	20. D

21. A hybridization technique in which a DNA probe binds to an RNA target molecule……:

A. Southern blotting

B. Northern blotting

C. Western blotting

D. None of the above

22. Which of the following hybridization techniques uses an antibody as a probe?

A. Southern blotting

B. Northern blotting

C. Western blotting

D. All of the above

23. Which of the following detects a DNA sequence by a DNA probe……?

A. Southern blotting

B. Northern blotting

C. Western blotting

D. All of the above

24. In western blotting the probe binds to…..?

A. An RNA target molecule

B. A DNA target molecule

C. A protein target molecule

D. None of the above

21. B	**22. C**	**23. A**	**24. C**

1. Viruses are characterized by all of the following except……:

A. They are the smallest infectious agents

B. They range from 20 to 300 nm in diameter

C. They contain two types of nucleic acid

D. They are not cells.

2. Which of the following is a property of viruses……..

A. They contain few number of ribosomes

B. They are obligate intracellular parasites

C. They can grow in artificial medium

D. All of the above

3. Viruses can be detected by ……..

A. Ordinary light microscope

B. Dark ground microscope

C. Fluorescent microscope

D. Electron microscope

4. Viral capsid is made up of……

A. Capsomers

B. Protomers

C. Spikes

D. Virions

5. All viruses contain …..

A. DNA & RNA

B. Capsid

C. Envelope

D. Ribosomes

1. C	2. B	3. D	4. A	5. B

6. The basic structure of virus is……:

A. Envelope + DNA

B. Envelope + RNA

C. Capsid + envelope

D. Nucleocapsid

7. Which of the following is responsible for viral shape (symmetry) ……

A. Nucleic acid

B. Envelope

C. Capsid

D. Spikes

8. Which of the following is not a function of capsid ……

A. Protects the viral genome against inactivation by nuclease enzymes.

B. Makes the virus sensitive to ether & detergents

C. Has a role in viral replication

D. Determines the antigenicity of the virus.

9. Viral envelope is formed of……

A. Nucleoproteins

B. Lipopolysaccharides

C. Lipoproteins

D. Phosphoproteins

10. Lipid part of viral envelope is derived from ……

A. Host cell membrane

B. Host cell receptors

C. Host cell nucleus

D. Viral capsid

6. D	7. C	8. B	9. C	10. A

11. In viral replication, the step which directly follows penetration is……..

A. Uncoating

B. Viral gene expression

C. Viral nucleic acid synthesis

D. Assembly

12. Glycoproteins projections in some viruses are derived from…..

A. Viral capsid

B. Viral nucleic acid

C. Viral envelope

D. None of the above

13. Viral capsid has a role in which step of viral replication….

A. Attachment

B. Penetration

C. Assembly

D. Viral gene expression

14. In non-enveloped viruses penetration occurs by……..

A. Crossing the plasma membrane directly

B. Endocytosis.

C. Fusion with cell membrane

D. A & B

15. In enveloped viruses penetration occurs by……..

A. Crossing the plasma membrane directly

B. Endocytosis.

C. Fusion with cell membrane

D. All of the above

11. A	12. C	13. A	14. D	15. C

16. Viral assembly means .....

A. Release of nucleic acid from the capsid

B. Adsorption to a specific receptor

C. Enclosure of viral nucleic acid within the protein coats

D. Fusion of viral envelope with host cell membrane

17. Enveloped viruses are released from host cell by .....

A. Endocytosis

B. Budding

C. Rupture of the cell membrane

D. Diffusion

18. Non-enveloped viruses are released from host cell by .....?

A. Endocytosis

B. Budding

C. Rupture of the cell membrane

D. Diffusion

19. Latent viral infection means .....?

A. Virus is secreted in host body after recovery

B. Virus is completely eliminated from host body

C. Host cell death

D. Viral genome remains inside a host cell without production of progeny viruses

20. Effects of viral infection in which host cell survive but altered antigenically .....

A. Lytic infection

B. Persistent infection

C. Abortive infection

D. Latent infection

16. C	17. B	18. C	19. D	20. B

21. In lytic viral infection which of the following occurs……:

A. Host cell death

B. Host cell survive but altered antigenically

C. No production of progeny viruses

D. Viral genome is present inside a host cell without production of progeny viruses.

22. Production of progeny viruses doesn't occur in……..?

A. Lytic infection

B. Persistent infection

C. Abortive infection

D. All of the above

23. Which of the following is an oncovirus ……?

A. Adenovirus

B. Human Papilloma virus

C. Rota virus

D. Herpes zoster virus

24. Viral nucleic acid can be detected by …..?

A. Electron microscope

B. Light microscope.

C. Radioimmunoassay

D. PCR

25. Electron microscope is used to detect…….

A. Viral antigens

B. Viral envelope

C. Viral particles

D. Viral inclusion bodies

21. A	22. C	23. B	24. D	25. C

26. Viral inclusion bodies can be detected by …..:

A. Electron microscope

B. Light microscope.

C. ELISA

D. PCR

27. Viruses can be cultivated on all of the following except……. ?

A. Tissue cultures

B. Embryonated egg

C. Nutrient agar

D. Animal inoculation

28. Type of tissue culture that is derived from tumor cell …….?

A. Primary cell lines

B. Semi-continuous cell line

C. Human diploid cell lines

D. Continuous cell lines

29. Semi-continuous cell line is derived from……..?

A. Tumor cells

B. Organ fragments

C. Human embryo lung.

D. None of the above

30. Which of the following is an example of primary cell lines

A. Monkey kidney

B. Fibroblasts

C. HELA cells.

D. None of the above

26. B	**27. C**	**28. D**	**29. C**	**30. A**

31. Fibroblasts derived from human embryo lung is an example of.....:

A. Primary cell lines

B. Animal inoculation

C. Human diploid cell lines

D. Continuous cell lines

32. Which of the following viruses can be cultivated on embryonated egg..... ?

A. Epstein Barr virus

B. Influenza virus

C. Adenovirus

D. Herpes simplex virus

33. Antiviral antibodies can be detected by all of the following except.....?

A. Enzyme Linked Immunosorbent Assay

B. Radioimmunoassay

C. Immunofluorescence

D. Light microscope

34. Parvoviridae are.....?

A. Non-enveloped dsDNA viruses

B. Enveloped dsDNA viruses C.

Non-enveloped ssDNA viruses D.

Non-enveloped dsRNA viruses

35. Reoviridae are.....

A. Enveloped negative ssRNA viruses

B. Non-enveloped positive ssRNA viruses

C. Enveloped dsRNA viruses

D. Non-enveloped dsRNA viruses

31. C	32. B	33. D	34. C	35. D

36. Parvoviridae causes which of the following…..:

A. Hepatitis B

B. Warts

C. Fifth disease

D. Yellow fever

37. Reoviridae causes which of the following ……. ?

A. Lassa fever

B. Gastroenteritis

C. Hepatitis C

D. Rabies

36. C	37. B

1. Regarding fungi which of the following is correct……:

A. They are prokaryotic organisms

B. They have true nuclei surrounded by nuclear membrane

C. They lack cell wall

D. All of the above

2. Which of the following is a component of fungal cell wall……..

A. Lipopolysaccharides

B. Teichoic acid

C. Ergosterol

D. Chitin

3. Chitin is a polymer of……..

A. N-acetyl glucosamine

B. N-acetyl galactosamine

C. N-acetyl Mannosamine

D. None of the above

4. Cell membrane of fungi contains……

A. Cholecalciferol

B. Glucans

C. Ergosterol

D. All of the above

5. Fungi are divided into three main groups based on…..

A. Number of nuclei

B. Cell morphology

C. Cell receptors

D. Route of infection

1. B	2. D	3. A	4. C	5. B

6. Regarding yeasts which of the following is correct……:

A. They are round to oval multi-cellular fungi

B. They reproduce by budding or fission

C. The progenitor remains attached to mother cell giving a chain of elongated yeast cell called pseudohyphae.

D. All of the above

7. Which of the following is an example of yeasts……..

A. Cryptococcus neoformans

B. Candida

C. Aspergillous spp.

D. Histoplasma capsulatum

8. Regarding candida which of the following is correct……..

A. They cause systemic mycosis

B. They reproduce sexually

C. The progenitor remains attached to mother cell giving a chain of elongated yeast cell called pseudohyphae

D. They are yeasts

9. Which of the following is a yeast like ……

A. Coccidioides

B. Candida

C. Aspergillous spp.

D. Histoplasma capsulatum

10. Which of the following is an example of filamentous fungi ……

A. Coccidioides

B. Candida

C. Aspergillous spp.

D. Histoplasma capsulatum

6. B	7. A	8. C	9. B	10. C

11. Regarding hyphae which of the following is correct……..

A. They are tubular, branching structure

B. They are always septated

C. They can grow as yeast during infection in the body

D. Coccidioides are an example

12. The part of the hyphae that anchor the colony is …..

A. Aerial hyphae

B. Vegetative hyphae

C. Pseudohyphae

D. None of the above

13. Aerial hyphae is the part of the hyphae that project above and …….

A. Absorb nutrients

B. Move the fungus from a place to another

C. Carry the reproductive structure

D. All of the above

14. Dimorphic fungi can grow as molds or filaments ……..

A. On incubating culture at 37 °C.

B. During infection in the body

C. When inoculated at room temperature.

D. A & B

15. On incubating culture at 37 °C, dimorphic fungi can grow as ……..

A. Molds

B. Filaments Endocytosis.

C. Yeast like

D. Yeast

11. A	12. B	13. C	14. C	15. D

16. Which of the following exist either as yeast or as filaments depending on the condition of growth.

A. Cryptococcus neoformans

B. Candida

C. Aspergillous spp.

D. Histoplasma capsulatum

17. Which of the following is a dimorphic fungi……..

A. Cryptococcus neoformans

B. Candida

C. Coccidioides

D. Aspergillous spp.

18. The main method of reproduction in fungi is……..?

A. Sexual Reproduction

B. Asexual reproduction

C. All of the above

D. None of the above

19. During sexual reproduction of fungi which of the following occurs……..?

A. Haploid cells of compatible strains mate to form transient diploid

B. Fragmentation of hyphae & each fragment grows into a new individual fungus

C. Fission of cell into 2 daughter cells

D. None of the above

20. During sexual reproduction of fungi, the transient diploid undergoes…….to form sexual spores

A. Mitosis

B. Meiosis

C. Fission

D. Budding

16. D	17. C	18. B	19. A	20. B

21. Method of reproduction in candida is……:

A. Sexual reproduction

B. Fragmentation of hyphae

C. Fission of cell into 2 daughter cells

D. Budding of cells

22. Which of the following is an opportunistic fungi ……..?

A. Histoplasma capsulatum

B. Candida

C. Coccidioides

D. All of the above

23. Which of the following affects immunocompromised individuals ……?

A. Histoplasma capsulatum

B. Candida

C. Coccidioides

D. All of the above

24. Which of the following is a primary pathogenic fungi …..?

A. Cryptococcus neoformans

B. Candida

C. Coccidioides

D. Aspergillous spp

25. Which of the following affects immunocompetent individuals …….

A. Cryptococcus neoformans

B. Candida

C. Histoplasma capsulatum

D. Aspergillous spp

21. D	**22. B**	**23. B**	**24. C**	**25. C**

26. Mycosis means diseases caused by ……:

A. Viruses

B. Fungi

C. Bacteria

D. Flies

27. Superficial mycosis is caused by…….. ?

A. Pityriasis versicolor

B. Tinea capitis

C. Histoplasma capsulatum

D. Coccidioides

28. In cutaneous mycosis, fungal infection involves…….?

A. Outermost layers of skin and hair

B. Deeper layers of epidermis, hair and nail

C. Dermis, muscle and fascia.

D. Many organ systems.

29. Tinea ungium affects……..?

A. Scalp & hair

B. Beard hair.

C. Nails

D. Between toes

30. ……..affects non-hairy smooth skin

A. Tinea capitis

B. Tinea barbae;

C. Tinea pedis

D. Tinea corporis

26. B	**27. A**	**28. B**	**29. C**	**30. D**

31. Tinea cruris affects…..:

A. Scalp & hair

B. Beard hair.

C. Groin & moist areas

D. Between toes

32. ……affects scalp & hair ?

A. Tinea capitis

B. Tinea barbae;

C. Tinea pedis

D. Tinea corporis

33. Systemic mycosis is caused by…….?

A. Cryptococcus neoformans

B. Candida

C. Histoplasma capsulatum

D. Aspergillous spp

34. Opportunistic mycosis is caused by all of the following except……..?

A. Cryptococcus neoformans

B. Coccidioides

C. Candida

D. Aspergillous spp

35. Subcutaneous mycosis involve infection involving all of the following except…….

A. Dermis,

B. Muscle

C. Fascia.

D. Epidermis

31. C	32. A	33. C	34. B	35. D

General Microbiology (Written)

(L1 General Bacteriology)

☒ Compare between prokaryotes & Eukaryotes

	prokaryotes	Eukaryotes
Nuclear membrane	Absent	Present
Chromosomal No.	One copy (Haploid)	Two copies (Diploid)
Histones	No histones	Histones with DNA
Ribosome	70S	80S
Peptidoglycan	Present	Absent
Mitosis	Absent	Present
Membrane bound organelles	Absent	Present

☒ Enumerate surface structures of bacteria. 3C

- ✓ Capsule
- ✓ Cell wall
- ✓ Cytoplasmic membrane

☒ Enumerate 4 functions of cell wall.

1. Preservation of the shape of the cell.
2. Toxicity.
3. Antigenic character
4. Staining reaction.

☒ Compare between cell wall in gram +ve & gram –ve bacteria

	gram +ve	gram -ve
Special Components	☒ Teichoic acid: Either ribitol or glycerol.	☒ Outer membrane: ➢ Lipoprotein ➢ Lipopolysaccharide (LPS): 1. lipid A = Endotoxin 2. Polysaccharide=somatic antigen ☒ Periplasmic space - Between cytoplasmic membrane and outer membrane. - Contain hydrolytic enzymes and penicillinase.

☒ Mention function of Periplasmic space.

Contain hydrolytic enzymes and penicillinase.

☒ Enumerate 2 functions of cytoplasmic membrane.

1. Electron transport and oxidative phosphorylation.
2. Excretion of hydrolytic enzymes and toxins.

☒ Enumerate 2 functions of capsule.

1. Determining virulence of the organism.
2. Antigenic.

☒ Enumerate types of bacterial flagellation. (types of flagella)

- Monotrichous
- Amphitrichous
- Lophotrichous
- Peritrichous

☒ Enumerate 2 functions of flagella.

1. organ of Motility
2. highly antigenic (H-antigens)

☒ **Enumerate 2 functions of fimbriae.**

1. Ordinary pili → adhesion to each other and to host cells.
2. Sex pili → conjugation

☒ **Difference between fimbriae & Flagella**

1. Occur in motile as well as non-motile strains.
2. More numerous "100-500" per cell.
3. Much shorter and thinner.
4. More or less straight, flagellae are spiral.

☒ **Enumerate 4 structures that have antigenic characters.** 2C + 2F

1. Cell wall.
2. Capsule
3. Flagella
4. Fimbriae

(L2 General Bacteriology)

☒ **Mention function of bacterial spore.**

1. The spore is a resting cell, highly resistant to desiccation, heat and chemical agents.
2. Sporulation is not a means of reproduction.

☒ **Compare between Autotrophic bacteria & Heterotrophic bacteria**

Autotrophic bacteria	Heterotrophic bacteria
Assimilate inorganic chemicals (CO_2) as the only source of carbon.	That require organic sources of carbon.
These are usually saprophytic bacteria.	Pathogenic bacteria belong to this group.

☒ **Compare between:**

Obligatory aerobe	Facultative anaerobes
Can grow only in presence of free O_2	Can grow well in presence or absence of O_2.
Ex: Mycobacterium Tuberculosis	Most of pathogenic bacteria belong to this group (S.aureus).

☒ **Compare between:**

Obligatory anaerobes	Microaerophilic
Grow in absence of O_2 and cannot grow in the presence of oxygen	Grow best in the presence of a minimal amount of oxygen (2-10%)
Ex: Clostridium spp	Helicobacter pylori (H.pylori)

☒ Give an example:

Alkalophilic Bacteria	V.cholera.
Alkalophilic Bacteria	Lactobacillus.
Facultative anaerobes	S.aureus
Microaerophilic	H.pylori
Obligatory aerobe	Mycobacterium Tuberculosis (TB)
Obligatory anaerobes	Clostridium spp

☒ Compare between: مهم جدًا

	Endopigment	Exopigment
Character	☒ Remains bound to the body of the organism and do not diffuse into the surrounding medium. ☒ They are demonstrated on a solid media.	☒ Diffuses into the surrounding medium.
Examples	Red pigment: Serratia marcescens. Golden yellow: Staphylococcus aureus.	Pseudomonas aeruginosa produces: Blue pigment called pyocyanin. Yellow pigment called fluorescens.
Function	Play a role in bacterial respiration and also have antibacterial action.	

☒ **Compare between:**

The Lag Phase	Logarithmic (Exponential) phase
a. No multiplication. b. Bacteria increase in size and prepare for reproduction. c. Correlate with incubation period in vivo.	a. The division occurs at a maximum. b. Correlate with invasive period in vivo. c. In this stage, bacteria could be inhibited efficiently by antibiotic.

☒ **Compare between:**

Stationary phase	Phase of decline
a. The rate of division equals the rate of death, the ultimate number of the living organisms remains stationary. b. The diminution of the rate of growth due to: i. Exhaustion of nutrients. ii. O2 Starvation. iii. Accumulation of toxic materials. c. Correlate with symptoms and signs in vivo.	a. The number of the organism begin to decrease. And the rate of death more than the rate of growth. b. Correlate with convalescent period in vivo.

☒ **Mention different bacterial products.** مهم جدًا

1. Bacterial enzymes
2. Bacterial Pigments.
3. Bacterial toxins
4. Other products: Hemolysin, Leucocidins, Coagulase.

☒ Differences between Exotoxin and Endotoxin: مهم جدًا

	Exotoxins	Endotoxins
Antigenicity & toxicity	Highly	Less
Gene code it	On plasmid or transferred by bacteriophage	On chromosome
Diffusibility	Diffusible outside bacteria	Non diffusible
Source	G + ve mainly & G-ve	G – ve
Preparation	Growing the organism in fluid media.Then filtrated through a bacterial filter. The filtrate contains the toxin.	Disintegration of the organism
Structure	Protein	Lipopolysaccharides (LPS)
Specificity	specific in action	nonspecific
Effect of heat (60-80C)	Thermolabile (destroyed)	Thermostable
Effect of 0.3%formaline	Detoxicated	Not detoxicated

(L3 Genetics)

☒ compare between Prokaryotic versus Eukaryotic DNA

DNA	Prokaryotic	Eukaryotic
Number of copies inside the cell	Single copy (haploid)	2 copies (diploid)
Shape	Circular	Linear
Location	Freely in the cytoplasm (within the nucleoid)	Within a nucleus
Presence of histones (DNA binding proteins)	No	bound to histone proteins
Presence of repetitive DNA and introns (non-coding DNA)	Little repetitive DNA and no introns	contain large amounts of repetitive DNA and introns
Extra chromosomal elements (plasmids)	Present	Absent

☒ Mention Three main classes of RNA molecules

1. Messenger RNA (m RNA)
2. Transfer RNA (t RNA)
3. Ribosomal RNA (r RNA)

☒ Mention Post transcriptional modifications

1. Polyadenylation
2. capping
3. splicing.

☒ compare between Prokaryotic versus Eukaryotic mRNA

mRNA	Prokaryotes	Eukaryotes
Number of encoded proteins	Polygenic/poly-cistronic (single mRNA code for different proteins)	Monogenic/mono- cistronic (single mRNA code for one protein)
Beginning of mRNA translation	during transcription	mRNA is first transported to the cytoplasm and starts translation
Life span	Very short	Much longer (stable)
Post transcriptional modifications	Minor	Major: Polyadenylation, capping and splicing.

☒ compare between Prokaryotic versus Eukaryotic transcription

transcription	Prokaryotes	Eukaryotes
RNA Polymerase	One type	3 types
Location	Cytoplasm	Nucleus
Relation to translation	Occur simultaneously	Transcription occurs before translation: RNA is first transcribed in the nucleus and then translated in the cytoplasm
Promoter	3 different elements	Many different elements
Nascent RNA introns	Absent	Present

☒ compare between Prokaryotic versus Eukaryotic DNA replication

DNA replication	Prokaryotes	Eukaryotes
Time	Continuous	During S phase of cell cycle
Location	Cytoplasm	Nucleus
Origin	At one point (Ori C)	At multiple points
Direction	Unidirectional الكليه عدلتها خلت الاتنين نفس الاجابه	
DNA polymerases	2	4 or more
Topo-isomerases	type II called DNA gyrase, that cut both DNA strands	type I topoisomerases, that cut a single strand of DNA
Okazaki fragments	longer	Shorter
Termination	Single termination site	Several termination sites

☒ Mention extrachromosomal elements

1. Plasmid.
2. Transposons.
3. Bacteriophage.

☒ Mention types of plasmid according to copy number per cell

1. Stringent plasmids: 1-2 copies / cell.
2. Low copy number plasmids: 10-15/copies/cell.
3. High copy number plasmid: up to 50 copies/cell.
4. Extremely high copy number plasmid: up to 100- 200 copies/cell

☒ compare types of plasmid according to Shape of plasmids

Covalently closed circular (CCC) form	Semicircular form	Linear
most common form, ds completely closed circular forms.	transient form, one strand is completely closed, the other strand is opened.	Double stranded linear DNA, unstable, attacked by exonucleases.

☒ Mention types of plasmid according to Moving plasmids from cell to cell

1. Conjugative plasmids
2. Non Conjugative plasmids
3. Shuttle vector

☒ Mention Importance of plasmids

1. Plasmids encode gene products.
2. Plasmids act as a vector in molecular biology for gene therapy and DNA vaccines.

(L4 Genetics)

☒ **Mention Types (Mechanisms) of horizontal gene transfer**

1. Conjugation.
2. Transduction
3. Transformation

☒ **Define Conjugation**

A form of gene transfer in which two cells come in direct contact and DNA is transferred from one cell (donor) to the other (recipient).

☒ **Define Transduction**

A form of gene transfer Mediated by bacteriophage (virus infecting bacteria).

☒ **Define Transformation**

A method of gene transfer in which direct uptake of DNA by recipient cell occurs either naturally or artificially in the lab.

☒ **Define Molecular cloning**

The process of Reunion between 2 pieces of DNA (foreign pieces) which never occurs in nature. To produce recombinant DNA molecule (Recombinant DNA technology).

☒ **Mention Importance of molecular cloning**

1. To produce vaccines (like hepatitis B- vaccine).
2. To produce drugs (endorphins).
3. To produce biologically important proteins (interferon, growth hormone or insulin).

☒ **Mention Importance of PCR / DNA probe**

1. Microbial disease (bacteria, viruses or fungi)
2. Typing of microorganisms.
3. Genetic diseases.
4. Medico legal purposes.
5. Taxonomy and evolutionary purposes.

☒ **Mention Principle of probe**

Because of the specificity of base pairing, the sequence of interest (unknown DNA or RNA) can be detected by the binding of the probe.

☒ **Mention Types of probe labels**

1. Radioactive isotopes p32 detected by Autoradiography.
2. Fluorescence Rhodamine detected by UV radiation.
3. Biotin-Avidin (streptavidin) detected by enzyme product color
4. Digoxin- Antidigoxin detected by enzyme product color

	Molecules on membrane (target)	Probe
Southern blotting	DNA	DNA
northern blotting	RNA	DNA
western blotting	protein	antibody

(L5 Virology)

☒ **Mention Functions of the capsid**

1. **Protects the viral genome against inactivation by nuclease enzymes.**
2. **Gives shape 'symmetry' of the virus (icosahedral, helical or complex)**
3. **Role in viral replication "attachment step"**
4. **Determines the antigenicity of the virus.**

☒ **Mention Functions of Viral Nucleic Acid (genome)**

It is the infectious part of the virus and codes for viral structure and nonstructural proteins.

☒ **Mention Functions of Viral envelope**

- **Lipoprotein in nature:**
  - Lipid from host cell membrane.
  - Protein is virus specific
- **Contains 'glycoproteins' which are spike-like projections on the surface of the virus, which attach to the host cell receptors during infection (attachment).**
- **Determines virus specificity & antigenicity.**

☒ **Define Assembly**

Assembly of viral nucleic acid and protein coats to form mature virus particles.

☒ **Mention Effects of viral infection on host cells**

1. **Lytic infection**
2. **Persistent infection**
3. **Abortive infection**
4. **Latent infection**
5. **Transformation and oncogenesis**

Lytic infection	Persistent infection
Host cell death	Host cell survive but altered antigenically.
Production of progeny viruses	

Abortive infection	Latent infection
No production of progeny viruses	Viral genome is present inside a host cell without production of progeny viruses.
Due to defect in either the virus or host cell (non-permissive).	Can be reactivated months or years in the future leading to productive infection

☒ **Mention 2 oncoviruses** (بيسببوا اورام)

1. Human Papilloma virus **(HPV)**
2. Epstein Barr virus **(EBV)**

☒ **Mention how to detect viruses**

a. Detection of Virus particles by **electron** microscope.
b. Inclusion bodies by **light** microscope.
c. Detection of viral **antigens** by (EIA, RIA…).
d. Detection of the viral nucleic acid by (**PCR**) and other molecular techniques.

☒ **Mention methods of viral isolation**

a. Tissue cultures
b. Embryonated egg.
c. Animal inoculation.

(L8 Mycology) أسئلة الكليه مهمه جدًا

☒ **What are the 3 main morphological groups of fungi**

a. Yeast & yeast like
b. Moulds = Filamentous fungi (hyphae).
c. Dimorphic fungi.

☒ **Mention 3 methods of asexual reproduction of fungi FBF**

a. Fragmentation
b. Fission
c. Budding.

☒ **Classify mycosis according to affected tissue or organ 3S + OC**

a. Superficial
b. Subcutaneous
c. Systemic.
d. Opportunistic
e. Cutaneous

☒ **Enumerate general criteria of mycotoxicosis**

a. Not transmissible.
b. No effect of antifungal TTT
c. Seasonal.
d. Associated with Food ingestion
e. examination of food reveals fungal growth

☒ **Describe effect of aflatoxin on man**

a. can initiate Liver cell carcinoma (HCC).
b. Immunosuppression
c. gastroenteritis.