MCQ's

Sr. No	Questions	Answer
01	This enzyme is not used in genetic engineering a) Ligase b) Phosphatase c) Polymerase d) Lipase	**b)phosphatase**
02	_____ is the founder of modern genetic a) Drawin b) Weismann c) Robert Koch d) Mendel	**d) Mendal**
03	____ sensors are based on the principal of sound of vibration a) Optical b) piezoelectric c) Calorimetric d) Poteninometric	**b) Piezoelectric**
04	An enzyme that cleaves of DNA at specific site is called_____ a)Restriction endonucleases b)trypsin c) pepsin d) none of the above	**a) Restriction endonucleases**
05	_____ seals the cut of two DNA molecules. a) DNA ligase b) Lipase c) Trypsin d) All of the above	**a) DNA ligase**
06	Ligation involves the use of _____ a) Linkers b) Adapters c) Both (a) and (b) d) None of the above.	**c) Both (a) and (b)**
07	_____ is important feature of a vector a) Unique selectable marker b) Origin of replication c) Multiple cloning site d) All of the above	**d) All of the above**
08	_____ blotting method is used for DNA a) Western b) Southern b) Northern d) All of the above	**b)Southern**
09	Who invented PCR a) Kary Mullis b) Watson c) E.M.Southern	a**) Kary Mullis**

	d) Meselson	
10	_____ method is used for screening of transformed cells a)Blue-White Screening b)SDS-PAGE c)Sangers method d)None of the above	**a)Blue-White Screening**
11	Immunity acquired from mother to foetus is _____ a)Active immunity b)Passive immunity c)Innate immunity d)All of the above	**b) Passive immunity**
12	Anaphylactic shock is which type of hypersensitivity reactions_____ a)Type I hypersensitivity b)Type II hypersensitivity c)Type III hypersensitivity d)Type IV hypersensitivity	**a)Type I hypersensitivity**
13	ELISA means _____ a)Enzyme linked immunosorbent assay b)Enzyme linked immobilized sorbent assay c)Enzyme loving immunosorbant assay d)None of the above	**c) Enzyme loving immunosorbant assay**
14	Active immunity may be gained by _____ a)Vaccines b)Toxoids c)Natural pathogens d)All of the above	**d) All of the above**
15	Gelatin sponge is used for _____ a)Vaccination b)Anticoagulant c)Haemostat d)Blood group indentification	**c) Haemostat**
16	_____ developed western blotting a)Towbin b)Thomas c)Alwine d)Roy	**a) Towbin**
17	_____ is prokaryotic micro-organisms a)Algae b)Fungi c)Virus d)Rickettsiae	**d) Rickettsiae**
18	Associated proteins with DNA are _____ a)Lipoproteins b)Glycoproteins c)Histones d)All of the above	**c) Histones**
19	_____ is the energy production area in prokaryotes a)Golgi apparatus	**d) Mitochondria**

	b)Endoplasmic reticulum c)Cytoplasmic membrane d)Mitochondria	
20	Steroidal transformation mainly occurs at _____ phase. a)Growth b)Death c)Transformation d)None of the above	**c) Transformation**
21	_____ is the basic function of the fermenter. a)Recovery of product b)Medium Sterilization c)Provision of optimum growth conditions d)None of the above	**c) Provision of optimum growth conditions**
22	____ cm. Is the largest diameter for glass fermenter a)20 b)50 c)80 d)60	**d) 60**
23	_____ institute grades the steel a)SAIL b)BIRAC c)AISI d)None of the above	**c)AISI**
24	Air-lift fermenter uses____ a)Impeller for mixing b)Differential density for mixing c)Both A and B d)None of the above	**b)Differential density for mixing**
25	____ help to control temperature inside the bioreactor a)Sparger b)Impeller c)pH Sensor d)Internal Coils	**d)Internal Coils**

MCQ's	
Questions	**Answers**
1. Hirudin is obtained from the transgenic plant (A) Brassica napus (B) Hibiscus rosasinesis (C) Raphanus sativus (D) Vinca rosea	Answer: (A)
2. Bt Cotton is (A) Cloned plant (B) Transgenic plant (C) Hybrid plant (D) Mutated plant	Answer: (B)
3. Dolly sheep was genetically similar to (A) The mother from which nucleated fertilized egg was taken (B) The mother from which nuclear DNA of udder cell was taken (C) The surrogate mother (D) Both surrogate mother and nuclear donor mother	Answer: (B)
4. Genome is (A) Genes on nuclear DNA (B) Nuclear DNA + mitochondrial DNA (C) Nuclear DNA + chloroplast DNA (D) Nuclear DNA + Mitochondrial DNA + Chloroplast DNA	Answer: (D)
5. A technique of using very small metal particles coated with desired gene in the gene transfer is called (A) Electroporation (B) Microinjection (C) Liposome (D) Biolistics	Answer: (D)
6. The complete set of chromosomal and extrachromosomal genes of an organisms is called (A) Genome (B) Gene pool (C) Gene bank (D) Gene library	Answer: (A)
7. The study of all the proteins coded by the genome is called (A) Proteome (B) Proteomics (C) Genome (D) Protein formation	Answer: (B)
8. Sequencing of genomic DNA is included under (A) Structural genomics	Answer: (A)

(B) Functional genomics (C) Proteomics (D) Transgenesis	
9. Gene expression, regulation and phenotype production are studied in second phase of genome analysis called (A) Structural genomics (B) Functional genomics (C) Proteomics (D) Transmeiosis	Answer: (B)
10. A flowering plant lily have _____ more DNA than humans (A) 10 times (B) 15 times (C) 18 times (D) 13 times	Answer: (C)
11. In forensic science which of the following is used? (A) Bacterial cloning (B) DNA foot printing (C) DNA fingerprinting (D) DNA cloning	Answer: (C)
12. DNA fingerprinting is based on (A) Occurance of VNTR's (B) Knowledge of human karyotype (C) Cloned DNA (D) Recombinant DNA	Answer: (A)
13. VNTRs represnets- (A) New terminal regions in DNA (B) Functional genes in the DNA (C) Split genes in the sample DNA (D) Specific non-coding sequences with unique tandem repeats	Answer: (D)
14. Which ones produce androgenic haploids in anther cultures? (A) Anther wall (B) Tapetal layer of anther wall (C) Connective tissue (D) Young pollengrains	Answer: (D)
15. Variations observed during tissue culture of some plants are known as (A) Clonal variations (B) Somatic variations (C) Somaclonal variations (D) Tissue culture variations	Answer: (C)
16. Virus free plants can be obtained through (A) Anitibiotic treatment	Answer: (D)

(B) Bordeaux micture (C) Root tip culture (D) Shoot tip culture	
17. To raising of plants from a small tissue in culture is known as (A) Macroproduction (B) Micropropagation (C) Tissue culture (D) Mass production	Answer: (B)
18. Callus is (A) Tissue that forms embryo (B) an insoluble carbohydrate (C) Unorganised actively dividing mass of cells maintained in culture (D) Tissue that growth to form embryoid	Answer: (C)
19. Biopatents are _____. (A) Right to use invention (B) Right to use biological entities (C) Right to use products (D) Right to use process	Answer: (B)
20. African plant Pentadiplandra is used as_____. (A) Low calories sweetner (B) 2000 times sweeter agent (C) Sweetner for diabetic patients (D) All of these	Answer: (D)
21. Which organism was used as bioweapon derived from_____. (A) Clostridium (B) Yerstsinia pestis (C) Fusarium species (D) Green algae	Answer: (C)
22. A set standards used to regulate own or community activity in relation to biological world is (A) Biopotency (B) Biopiracy (C) Biowar (D) Bioethics	Answer: (D)
23. Biopiracy means (A) Use of biopatents (B) Thefts of plants and animals (C) Stealing of bioresources (D) Exploitation of bioresources without authentic permission	Answer: (D)
24. Bioethcs is related to (A) Preventing biopiracy (B) Regulation of unethical activities likegene cloning in animals	Answer: (B)

(C) Preventing theft of living materials (D) Moral guidance to the problems in biology	
25. Three dimensional shape of tRNA is (A) L-shaped (B) Clover leaf-like (C) X-shaped (D) Y-shaped	Answer: (B)

1. Water insoluble enzymes can be prepared by using multifunctional agents that are bifunctional in nature and have

   A. low molecular weight

   B. high molecular weight

   C. high equivalent weight

   D. low reactivity

Answer: Option **A**

2. Functional groups of the nonessential amino acid residues that are suitable for the immobilization process are

   A. free α-, β- or γ carb oxyl groups

   B. α or β amino groups

   C. phenyl, hydroxyl, sulfhydryl or imidazole groups

   D. all of the above

Answer: Option **D**

3. Which medium is used for the production of Penicillin using immobilized cells

   A. 1% peptone medium

   B. glucose medium

   C. Yeast extract medium

   D. LB broth

Answer: Option **B**

4. Which of the following is taken as an assumption in the distributed model?

   A. The reaction occurs at every position and the kinetics of the reaction are of the same form as observed for free enzyme.

   B. Mass transfer through the immobilized enzyme occurs via molecular diffusion

   C. There is no mass transfer limitation at the outside surface of the spherical immobilized enzyme

D. All of the above

Answer: Option **D**

5. The immobilized enzyme produced by micro encapsulation technique provides

A. an extremely large surface area

B. smaller surface area

C. high amount of solvent

D. relatively smaller surface area

Answer: Option **A**

6. Which of the following is considered as a disadvantage to the adsorption method of immobilization?

A. It is possible to separate and purify the enzymes while being immobilized

B. The enzymes are not usually deactivated by adsorption

C. The adsorption is a reversible process

D. State of immobilization is very sensitive to solution pH, ionic strength and temperature

Answer: Option **D**

7. During the enzymatic reaction of an immobilized enzyme, the rate of substrate transfer is

A. equal to that of substrate consumption

B. more than that of substrate consumption

C. lesser than that of substrate consumption

D. is nothing to do with the substrate consumption

Answer: Option **A**

8. The immobilized technique involving chemical method is

A. covalent bond formation dependent

B. non-covalent bond formation dependent

C. both (a) and (b)

D. ionic bond formation dependent

Answer: Option **A**

9. For a steady state condition, the change of substrate concentration (dC_s/dt) is

A. zero **B.** 1

C. >1 **D.** <1

Answer: Option **A**

10. Damkohler number(N_{Da}) is

A. the ratio of the maximum reaction rate to the maximum mass transfer rate

B. the ratio of the minimum reaction rate to the maximum mass transfer rate

C. the ratio of the maximum reaction rate to the minimum mass transfer rate

D. the ratio of the minimum reaction rate to the minimum mass transfer rate

Answer: Option **A**

11. For glucose isomerization by immobilized enzyme, the reactor generally used is

A. CSTR

B. plug flow

C. packed bed

D. fluidized bed

Answer: Option **C**

12. If Damkohler number, N_{Da} >>1, the reaction rate is much greater than the mass transfer rate and the overall reaction is controlled by the rate of mass transfer. In this case, the enzyme reaction can be described as (where C_{sb} and C_s are the substrate concentration in bulk of solution and at the immobilized enzyme surface respectively. k_s mass transfer coefficient, and a is the surface area of an immobilized enzyme particles)

A. $r_p = k_s a(C_{sb}-C_s)$

B. $r_p = k_s a C_{sb}$

C. $r_p = k_s a C_s$

D. $r_p = k_s a(C_{sb}+C_s)$

Answer: Option **B**

13. The most commonly employed cross-linked polymer is the

A. polyacrylamide gel

B. collagen

C. celluloses

D. cation exchange resin

Answer: Option **A**

14. Which of the following is not the correct answer?

A. Immobilized enzyme may show selectively altered chemical properties

B. Immobilized enzyme may show selectively altered physical properties

C. Immobilized enzyme may simulate the realistic natural environment where the enzyme come from the cell

D. None of the above

Answer: Option **D**

15. Commonly employed water insoluble supports for the covalent attachment of enzyme include

A. acrylamide based polymers

B. polypeptides

C. dextran

D. all of these

Answer: Option **D**

16. Which of the following is not a physical method of immobilization?

A. Adsorption

B. Entrapment

C. Micro encapsulation

D. None of these

Answer: Option **D**

17. The support material for immobilization of cells of *Bacillus subtilis* is

A. ion exchange resins

B. gelatin

C. Anthracite

D. agarose and carbodiimide

Answer: Option **D**

18. The intraparticle mass transfer resistance can affect the rate of enzyme reaction, if enzymes are immobilized by

A. copolymerization or microencapsulation

B. crosslinking using multifunctional reagents

C. adsorption

D. all of the above

Answer: Option **A**

19. The covalent attachment of enzyme molecules is via

A. nonessential amino acids residues to water insoluble, functional supports

B. essential amino acids residues to water insoluble, functional supports

C. nonessential amino acids residues to water soluble, functional supports

D. essential amino acids residues to water soluble, functional supports

Answer: Option **A**

20. To measure the extent to which the reaction rate is lowered because of resistance to mass transfer, the effectiveness factor of an immobilized enzyme, η can be defined as

A. reaction rate/rate if not slowed by diffusion

B. rate if not slowed by diffusion/ reaction rate

C. actual reaction rate/ rate if not slowed by diffusion

D. rate if not slowed by diffusion/ actual reaction rate

Answer: Option **C**

21. Which is not the method for producing immobilized enzymes with multifunctional reagents?

A. Enzymes are adsorbed on the surface active support followed by intermolecular cross linking

B. Functional groups are introduced on the support to react co-valently with enzymes

C. Enzymes are cross linked intermolecularly

D. None of the above

Answer: Option **D**

22. The immobilization technique involving physical method is

A. covalent bond formation dependent

B. non-covalent bond formation dependent

C. both (a) and (b)

D. ionic bond formation dependent

Answer: Option **B**

23. Which of the following is the commonly employed adsorbents?

A. Calcium carbonate

B. Alumina

C. Celluloses

D. All of these

Answer: Option **D**

24. Various techniques are available for determining the effective diffusivity of solute in gel. Thin disk method uses

A. a diffusion cell with two compartments divided by a thin gel

B. a diffusion cell with two compartments

C. a diffusion cell with two compartments plus by a thin gel

D. a diffusion cell with two compartments multiply by a thin gel

Answer: Option **A**

25. The effectiveness factor increases with the

A. increase of diffusivity and decreased with the increase of particle size

B. increase of diffusivity and increased with the increase of particle size

C. decrease of diffusivity and decreased with the increase of particle size

D. increase of diffusivity and decrease with the decrease of particle size

Answer: Option **A**

1. The approach (s), which is/are currently followed to produce human monoclonal antibodies, is/are known as

   A. transformation of antigen specific B lymphocytes (EBV)

   B. hybridization of 6-thioguanine-resistant human plasmacytoma with immune human lymphocytes

   C. combination of EB Vand hybridoma techniques

   D. all of these

   Answer: Option **D**

2. Some cross reactions with monoclonal antibodies (MAbs) can occur. Unexpected cross reactions occur more frequently with

   A. Ig MAbs

   B. IgG

   C. IgA

   D. IgE

   Answer: Option **A**

3. Preliminary clinical results with a humanized antibody against the interleukin-2 receptor have suggested the

   A. absence of human immune response against murine proteins (HAMA) response

   B. presence of HAMA response

   C. poor recognition of immunoglobulin, Ig constant regions

   D. all of the above

   Answer: Option **A**

4. The cross linkage of antigens by antibodies is known as

A. agglutination

B. complement fixation

C. a cross reaction

D. all of these

Answer: Option **A**

5. In monoclonal antibody technology, tumor cells that can replicate endlessly are fused with mammalian cells that produce an antibody. The result of this cell fusion is a

A. hybridoma

B. myeloma

C. natural killer cell

D. lymphoblast

Answer: Option **A**

6. An example of mosaic antigen is

A. virus

B. bacteria

C. a hapten

D. protein

Answer: Option **A**

7. T cells are the source of

A. interleukin

B. interferon

C. lymphotoxin

D. all of these

Answer: Option **D**

8. The primary B cell receptor is

A. IgD **B.** IgG

C. IgA **D.** IgE

Answer: Option **A**

9. It is highly valued if the lymphocytes derived from the lymph node or tonsil tend to undergo fusion at

A. high frequencies

B. moderate frequencies

C. low frequencies

D. at no frequency

Answer: Option **A**

10. Small simple molecules are

A. poor antigens

B. rich antigens

C. moderate antigens

D. heterophilic antigens

Answer: Option **A**

11. The EBV-hybridoma technique

A. immortalizes the donor Bcells

B. facilitates the proliferation of antigen specific B cells

C. gives much higher hybridization frequencies

D. all of the above

Answer: Option **D**

12. Helper T cells assist in the functions of

A. certain B cells

B. certain T cells

C. certain B cells and other T cells

D. none of the above

Answer: Option **C**

13. In immuno-inflammatory diseases such as hemolytic anaemia, eczema etc.,

A. T8 cells are greatly reduced

B. T8 cells are greatly increased

C. T4 cells are greatly reduced

D. T4 cells are greatly increased

Answer: Option **A**

14. Which of the following is incorrect?

A. MAbs can be used to diagnose or treat diseases

B. MAbs can be used in tumor scanning

C. MAbs canbe used in cancer diagnosis

D. MAbs can not be used in such non-infectious diseases as those of endocrine system

Answer: Option **D**

15. The antigen-specific lymphocytes can be immortalized by which of the following method?

A. Transfection with tumor derived DNA

B. Hybridization with a suitable lymphoid tumor cell

C. Transformation following infection by Epstein-Barr virus (EB V)

D. All of the above

Answer: Option **D**

16. A cytokine that stimulates the activity of B and T cells is

A. lymphotoxin

B. interlukin-2

C. interlukin-1

D. all of these

Answer: Option **B**

17. Which type of cell actually secrets antibodies?

A. plasma cells

B. T cells

C. macrophages

D. dendritic cells

Answer: Option **A**

18. Which of the following is correct?

A. rabbits do not make myelomas whereas mice are unable to synthesize antibodies

B. rabbits do not make myelomas whereas mice are able to synthesize antibodies

C. rabbits make myelomas whereas mice are unable to synthesize antibodies

D. rabbits make myelomas whereas mice are able to synthesize antibodies

Answer: Option **A**

19. The Ig locus is about

A. 2/3rd of all hybridomas

B. l/3rd of all hybridomas

C. l/2nd of all hybridomas

D. 1/4th of all hybridomas

Answer: Option **A**

20. The hybrid cells can be propagated

A. in tissue culture

B. as ascites in peritoneal cavity of mice

C. both (a) and (b)

D. none of these

Answer: Option **C**

21. T_C cells are important in controlling

A. virus infections

B. allergy

C. autoimmunity

D. all of these

Answer: Option **D**

Multiple choice Question

1. Yield coefficient represents

   A. total biomass or product produced

   B. conversion efficiency of a substrate into product

   C. conversion rate of a substrate into biomass or product

   D. production time of biomass or product

   Answer: Option **B**

2. The lowest biomass yield in a culture of *Escherichia coli* will be in

   A. an aerated batch culture containing a initial high concentration of glucose

   B. an aerated batch reactor containing an initial low concentration of glucose

   C. an aerated fed-batch reactor having a low glucose concentration

   D. an aerated continuous reactor having a low glucose concentration

   Answer: Option **A**

3. When two populations compete for a single growth limiting substrate in a continuous fermenter, which organism would not be washed out?

   A. Organism maintaining the highest substrate concentration

   B. Organism maintaining the lowest substrate concentration

   C. Both (a) and (b)

   D. Organism maintaining the moderate substrate concentration

   Answer: Option **B**

4. The continuous cultures are not widely used in industry because

   A. they are not suited for the production of secondary metabolites

   B. contamination or mutation can have a disastrous effect on the operation

   C. the government will not approve the licensing of pharmaceuticals produced in

continuous cultures

D. all of the above

Answer: Option **D**

5. The lowest yield of ATP /is in

A. fermentation

B. aerobic respiration

C. anaerobic respiration

D. same in (a), (b) and (c)

Answer: Option **A**

6. Mixing in an anaerobic sludge blanket reactor is due to

A. rapid change in water temperatures throughout the reactor

B. release of gases by the microbial populations

C. swimming of microbes

D. none of the above

Answer: Option **B**

7. In batch culture, protogon is produced from peptone during the stationary phase with a yield of 0.4 protogon mg per g of peptone. If it is to be produced in a chemostat at a dilution rate of 0.5 h^{-1} from a medium containing 10 $g.l^{-1}$ of peptone, then the rate of protogon synthesis would be

A. 0 $g.l^{-1}h^{-1}$

B. 0.5 $g.l^{-1}h^{-1}$

C. 1 $g.l^{-1}h^{-1}$

D. 2 $g.l^{-1}h^{-1}$

Answer: Option **A**

8. Formation of end product by *Lactococcus lactis* will become non-growth associated as

lactic acid accumulates because

A. cells will redirect ATP to anabolism

B. cells will redirect NAD^+ to anabolism

C. cells will redirect ATP to facilitate the diffusion of lactic acid and H^+ out of the cells

D. cells will redirect ATP to the active transport of lactic acid and H^+ out of the cells

Answer: Option **D**

9. Which of the following would not be subjected to the "glucose effect"?

A. *Aspergillus fumigatus*

B. *Saccharomyces cerevisiae*

C. *Escherichia coli*

D. *Aspergillus niger*

Answer: Option **C**

10. Immobilized cell reactors for wastewater treatment have the advantage of having/being

A. higher cell concentration

B. more stable and prevent washout

C. higher dilution rate before the cells washout

D. all of the above

Answer: Option **D**

1. A DNA nucleotide chain has AGCTTCGA sequence of other chain would be
(a) TCGAAGCT
(b) GCTAAGCT
(c) TAGCATAT
(d) GATCCTAG
Answer: (a)
2.A nucleoside is formed of
(a) Pentose sugar, phosphate and nitrogen base
(b) phosphate and nitrogen base
(c) Pentose sugar and phosphate
(d) Pentose sugar and nitrogen base
Answer: (d)
3.A nucleotide is formed of
(a) Purine, Pyrimidine and phosphate
(b) Purine, Sugar and phosphate
(c) Nitrogen base, Sugar and phosphate
(d) Pyrimidine, Sugar and phosphate
Answer: (c)
4.A riboside is
(a) Base + phosphate
(b) Ribose + phosphate
(c) Ribose + phosphate + base
(d) Ribose + base
Answer: (d)
5.A segment of DNA has 120 adenine and 120 cytosine bases. The total number of nucleotides present in the segment is
(a) 120
(b) 240
(c) 60
(d) 480
Answer: (d)
6.A Strand of DNA has base sequence CATGACTAG. The base sequence on the other strand would be
(a) CAT TAG GAC
(b) GTA CTG ATC
(c) GAT GTC ATC
(d) TAC ACT GCT
Answer: (b)
7.A totipotent cell means
(a) An undifferentiated cell capable of developing into a system or entire plant
(b) An undifferentiated cell capable of developing into an organ
(c) An undifferentiated cell capable of developing into complete embryo
(d) Cell which lacks the capability differentiate into an organ or system
Answer: (a)
8.Adenine is
(a) Purine
(b) Pyrimidine

(c) Nucleoside
(d) Nucleotide
Answer: (a)
9.Amino acid binding site of tRNA is
(a) 5'end
(b) Anticodon loop
(c) DHU loop
(d) -CCA 3'end
Answer: (d)
10. Anticodon occurs in
(a) tRNA
(b) mRNA
(c) mtRNA
(d) rRNA
Answer: (a)
11.Bacterial plasmid contains
(a) RNA
(b) RNA + protein
(c) DNA
(d) Photosynthetic structures
Answer: (c)
12.Base pairs present in one turn of DNA are
(a) 12
(b) 11
(c) 10
(d) 9
Answer: (c)
13.Best method to determine paternity is
(a) Protein analysis
(b) Chromosome counting
(c) Gene counting
(d) DNA finger printing
Answer: (d)
14.Callus is
(a) Tissue that forms embryo
(b) An insoluble carbohdrate
(c) Tissue that grows to form embryoid
(d) Unorganised actively dividing mass of cells maintained in culture
Answer: (d)
15.Chemical Knives/ molecular scissors of DNA are
(a) Restriction endonucleases
(b) Polymerases
(c) Ligases
(d)Transcriptases
Answer: (a)
16.Chemofusion and electrofusion are employed in
(a) Eugenics

(b) Protoplast fusion
(c) Cloning
(d) Mutations
Answer: (b)
17.Choose the correct statement
(a) DNA is hereditary material
(b) RNA is hereditary material
(c) DNA is hereditary material but where it is absent RNA can function as hereditary material
(d) Both DNA and RNA are hereditary materials
Answer: (c)
18.Development of shoot and root in tissue culture is determined by
(a) Cytokinin and auxin ratio
(b) Enzymes
(c) Temperature
(d) Plant nutrients
Answer: (a)
19.
Distance between two base pairs of DNA is
(a) 34 nm
(b) 3.4 nm
(c) 0.68 nm
(d) 0.34 nm
Answer: (d)
20.
Distance between two strands of DNA is
(a) 34 Å
(b) 20 Å
(c) 3.4 Å
(d) 340 Å
Answer: (b)

1. Which of the following could be used to grow viruses in the laboratory?
   A) chicken eggs
   B) cell culture
   C) bacteria
   D) white blood cells
   E) all of the choices could be used
   Answer: E
2. Which of these diseases could NOT be treated with antibiotics?
   A) Chlamydia
   B) plague
   C) influenza
   D) scarlet fever
   E) anthrax
   Answer: C
3. Similarities between the archaea and eukarya include:
   A) same ribosomal proteins
   B) similar tRNA
   C) similar initiation of transcription
   D) similar rRNA sequences
   E) all of the choices are correct similarities
   Answer: E
4. Which of these is the best description of a virus?
   A) a noncellular living organism
   B) one of the smallest bacteria known
   C) a member of the kingdom Virusae
   D) a cell at the boundary between living and nonliving things
   E) chemical complexes of RNA or DNA protected by protein
   Answer: E
5. Pasteur chose the Latin root word for "virus" meaning
   A) extremely small.
   B) non-living.
   C) poison.
   D) contagious.
   E) particle.
   Answer: C
6. The innermost portion of a virus's structure is made up of
   A) a membranous envelope.
   B) both DNA and RNA.
   C) either DNA or RNA.
   D) a protein capsid.
   E) a protein spore coat.
   Answer: C
7. Many animal parasites and bacterial disease agents infect a fairly broad range of hosts, but viruses are often very specific to one type of tissue in one or a few species because
   A) a virus must be recognized and "taken in" by a host cell.
   B) viral proteins must match host cell proteins in order to adhere to the cell.
   C) some viruses may have evolved from nucleic acids from these host cell genomes.
   D) host cells differ in the DNA or RNA they will replicate.
   E) All of the choices are correct.

Answer: E

8. If a virus is termed "latent", this means it
   A) cannot be a retrovirus.
   B) has not entered a lytic cycle.
   C) has not entered a lysogenic cycle.
   D) is gaining a new envelope via "budding."
   E) is easy to develop immunity against it.

   Answer: B

9. Some, but not all, viruses contain _____, located on their outer surface.
   A) a membranous envelope
   B) both DNA and RNA
   C) either DNA or RNA
   D) a protein capsid
   E) a protein spore coat

   Answer: A

10. In order to infect a cell, a virus must
    A) inject its protein into the cell while the nucleic acid remains attached to the host cell surface.
    B) have a special protein on its surface that can interact with a protein on the surface of the host cell.
    C) actively burrow through the cell wall or cell membrane of the host cell to reach the cell's nucleus.
    D) produce a special extension of its cytoplasm when it comes into contact with the appropriate host cell.
    E) dissolve its own capsid in order to release its nucleic acid.

    Answer: B

11. The viral infection cycle that will most rapidly cause cell destruction is called the _____ cycle.
    A) lysogenic
    B) lysozyme
    C) lytic
    D) lysol
    E) lysosome

    Answer: C

12. The viral infection cycle that will cause the viral DNA to become integrated into the bacterial DNA is called the _____ cycle.
    A) lysogenic
    B) lysozyme
    C) lytic
    D) lysol
    E) lysosome

    Answer: A

13. Which statement is NOT true about a retrovirus?
    A) It may cause cancer or AIDS.
    B) It contains reverse transcriptase.
    C) It is known to cause diseases only in animals, not in humans.
    D) It has the capacity to integrate cDNA into the host DNA of the cell it infects.
    E) It has the ability to produce a copy of DNA from an RNA segment.

    Answer: C

14. One bacterial cell passes DNA to a second cell in the process of
    A) transformation.
    B) transduction.
    C) conjugation.
    D) infection.
    E) replication.
    Answer: C
15. Bacterial cells pick up free pieces of DNA from the medium–pieces that were secreted by live bacteria or released from dead bacteria–in a process called
    A) transformation.
    B) transduction.
    C) conjugation.
    D) infection.
    E) replication.
    Answer: A
16. Bacteriophages carry portions of bacterial DNA from one cell to another in a process called
    A) transformation.
    B) transduction.
    C) conjugation.
    D) infection.
    E) replication.
    Answer: B
17. Which statement is true about prokaryotes?
    A) They contain a nucleus.
    B) They lack ribosomes.
    C) They usually lack a cell wall.
    D) They divide by mitosis.
    E) They contain a single circular DNA molecule as the genetic material.
    Answer: E
18. The Latin terms for "break" and "in two" underlie the term
    A) transduction.
    B) binary fission.
    C) conjugation.
    D) transformation.
    E) retrovirus.
    Answer: B
19. Which of these is a correct description of a form of genetic recombination in bacteria?
    A) Crossing-over occurs between paired chromosomes in meiosis.
    B) Conjugation occurs when a cell passes DNA to another cell by means of a sex pilus.
    C) Transformation occurs when a bacteriophage carries a bit of DNA from a previous host cell to a new host cell.
    D) Transduction occurs when a live bacterium picks up DNA from dead bacteria that have shed it into the environment of the living cell.
    E) All of these are correct statements.
    Answer: B
20. Which definition of a relationship between bacteria and other organisms is NOT correct?
    A) A parasitic bacterium is one that can cause disease in a plant or animal.

B) A symbiotic relationship is one in which the bacterium is usually free-living, but may become associated as a parasite in an animal under certain conditions.
C) A mutualistic relationship is one in which each of the associated organisms derives benefit.
D) A commensalistic bacterium lives on or in another organism without doing it any harm or any good, but the bacterium derives a benefit.
E) Symbiotic bacteria may live in plant root nodules or the human intestines.

Answer: B

21. Variation in a strain of bacteria
A) does not occur, since bacteria are asexual.
B) is mainly provided by endospores.
C) is produced by genetic recombination, primarily through crossing-over.
D) mainly occurs from mutations, which are rapidly replicated and selected in a haploid system.
E) is hidden within the many recessive genes and polygenic traits that reside in the diploid genome.

Answer: D

22. Prokaryotes which oxidize inorganic compounds to obtain their energy are
A) obligate anaerobes.
B) facultative anaerobes.
C) chemoautotrophs.
D) photoautotrophs.
E) saprophytic heterotrophs.

Answer: C

23. Prokaryotes are now divided into the
A) archaea and cyanobacteria.
B) bacteria and cyanobacteria.
C) photosynthetic bacteria and chemosynthetic bacteria.
D) archaea and bacteria.
E) autotrophs and heterotrophs.

Answer: D

24. Methanogens and halophiles are
A) members of the bacteria domain.
B) members of the achaea domain.
C) immunoviruses.
D) members of the eukarya domain.
E) parasitic archaea.

Answer: B

25. Which of the following is a characteristic of the photosynthetic cyanobacteria?
A) does not release oxygen
B) contains only photosystem I
C) contains a unique form of chlorophyll
D) uses hydrogen or hydrogen sulfide as an electron donor
E) contains pigments that may mask the chlorophyll and cause the bacteria to be red or black in color

Answer: E

26. To be sure you have sterilized water, you must boil it for a long time in a pressure cooker because
A) bacteria are facultative anaerobes.
B) some bacteria produce very resistant endospores.

C) peptidoglycan is resistant to boiling water.
D) bacteria can otherwise regenerate living cells from nonliving.
E) some bacteria are aerobic

Answer: B

27. To which of the following domains do viruses belong?
A) Bacteria
B) Archae
C) Eukarya
D) Protista
E) None of these

Answer: E

28. Which of the following is not true of viruses?
A) they are obligate intracellular parasites
B) a specific virus will only infect a specific cell type
C) they most likely evolved after cells
D) they can mutate
E) All of the choices characterize viruses.

Answer: E

29. Which of the following characterize prions?
A) prions are simply protein molecules
B) they cause Cruetzfeld-Jakob disease
C) prions are linked to spongiform encephalopathy and scrapie
D) they can cause normal protein to change shape
E) All of the choices are correct.

Answer: E

30. Prokaryotic cells are characterized by
A) the lack of an organized nucleus.
B) cells that can move by flagella.
C) the lack of membrane-bound organelles.
D) typically having a cell wall.
E) All of the choices are correct.

Answer: E