University of Baghdad
College of Science
Department of Biotechnology
Date: 22 / 6 / 2017

Competition exam for MSc candidates in Biotechnology 2017-2018

NO. :

Q1: Choose the correct answer: : (60 mark)

Pathogenic bacteria

1-Monotrichous and Peritrichous bacteria differ in

a.Their nutrition requirements
b.Spores formed per cell
c.Number and position of the flagella

2-The anti streptolysin O titre is raised in infections caused by:

a.Streptococcus pneumoniae
b.Streptococcus pyogenes
c.Streptococcus sanguis

3-Characteristics of a bacterial capsule include:

a.All bacteria have one
b.It is what cause the gram stain reaction.
c.It is an important mechanism for protecting a bacteria against ingestion by microphages

4-The *Vibrio vholerae*

a.Is strongly anaerobic

b.Grows best at 25^{o}c
c.Has a marked tolerance for alkaline pH

Immunology

5-Natural killer cells are members of which of the following families of leukocytes?

a.Basophils b.Eosinophil c.Lymphocytes d.Monocytes

6-Red blood cells are derived from :

a.Granulocytic lineage cells. b.Lymphocytic lineage cells.
c.Monocytic lineage cells. d.Myeloid lineage cells.

7- The thymus is the site of initial differentiation for :

a. B cells. b.Erythrocytes. c. Hematopoietic stem cells. d.T cells.

8-Which of the following naive cells load peptide fragments into MHC class II molecules?

a. CD4+ T cells b. CD8+ T cells c. Dendritic cells d. Monocyte

Cytogenetics

9-The protein that located around DNA molecules is named ----------

a.Fibronectin b.Gelatin c.Collagen d.Histone

10-DNA is replicated during----------.

a.Interphase b.Mitosis c.Meiosis d.Cytokinesis

11-Identify the correct order organization of genetic material from largest to smallest.

a.Genome, chromosome, gene, nucleotide. b.Gene, chromosome, nucleotide, genome.
c.Chromosome, gene, genome, nucleotide. d.Chromosome, genome, nucleotide, gene.

.

12-Alpha satellite DNA is localized at ---------

.

a.Telomeres. b.Centromere. c.Dark G-band. d.Light G-band.

Animal tissue culture

13-A ----------is that stage of the culture following isolation of the cells, but before the subculture.

a.Primary culture b.Secondary culture c. Tertiary culture d. Transformed culture

14-The quality of virus that is propagate in culture cell is usually expressed in ----------

a. Colony forming unit b. Viral antigen c. Conjugated with antibody d. All

15-Recombinant tissue plasminogen activator (t-PA) produced by cell line----------

a. CHO-K1 b.BHK c.WI-38 d. None of them

16- In general, cells grow through a limited number of cell generation, usually between 20 and 80 cell population doubling time then its enters the ----------

a. Senescence phase b. Death phase c. Arrest phase d. Stationary phase

Basics of biotechnology

17- Probiotics are:

a. Cancer inducing microbes. b. Safe antibiotics
c. New kind of food allergens d. Live microbial food supplement

18- The use of insulin hormone to purify its receptor is an example of :

a. Ione exchange chromatography. b. Affinity chromatography.
c. Gel filtration chromatography d. Ligand mediated chromatography

19-Which of the following microb is widely used in the removal of industrial wastes :

a. *Trichoderma* sp.. b.*Aspergillus niger*.
c. *Pseudomonas putida* d. All of these

20- In anaerobic (withiut O2) environment , sugar (CnH2nOn) in dough is converted into:

a. Glucose b. Water. c. Alcohol d. Carbon monoxide

Environmental microbiology

21-When toxic chemicals inter the bacteria, inhibit one or more enzymes of pathways involved in ----------.

a.Anabolism or catabolism process
b. Growth process
c. Energy consuming process.

22-Anoxygenic: Referring to activity that contributes to the anaerobic environment.

a.Anoxygenic b. Aerophilic c. Aerobic

23----------: The process by which microorganisms form mineral phases.

a.Biotransformation b. Biomineralization c.Biomagnification

24----------: Organisms that live in and have adapted to extreme conditions of pH, temperature, or salinity.

a.Extremophiles b. Psychrophiles c. Mesophiles

Industrial microbiology and fermentation

25-The toxic effects of some medium components can be avoided by using.....

a.Fed Batch culture b.Continuous culture c.Batch culture d.SSF

26-*Saccharomyces cerevisiae* produces high biomass yields at low glucose concentrations and high dissolved oxygen concentrations. Which of the following should be followed for maximizing its biomass productivity?

a.Batch fermenter with a high initial glucose concentration
b.Continuous fermenter with a low initial glucose concentration
c.Fed batch fermenter
d.All of the above

27-In Fed Batch culture:

a.Substrates are added to the system all at once and runs until product is harvested
b.Nutrients are continuously fed into the reactor and the product is siphoned off during the run
c.Afresh nutrient is fed into the fermentor during the fermentation without the removal of the culture fluid
d.None of these.

28-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 complexity of operation
d.All of the above

Mycology

29-The main component of fungal cell wall is:

a.Pectin b.Peptidoglycan c.Chitin

30-Aspergillosis is disease occur by:

a.*Aspergillus fumigatus* b.*Aspergillus nidulans* c.*Aspergillus oryzae*

31-*Histoplasma capsulatum* is an example of :

a.Yeast b.Dimorphic fungi c.Yeast- like fungi

32-Deutromycetes reproduce:

a.Only sexually b.Only asexually c.Sexually and asexually

Biochemistry

33- Cerebrosides contain all the folloing except :

a. Galactose b. Sulphate c. Sphingosine d.Fatty acid

34- Guanidine group of argentine gives positive test with:

a. Lead acetate. b. Sakaguchi reagent.
c. Trichloroacetic acid d. Molisch's reagent

35- An essential amino acid in man is :

a. Proline b. Threonine c. Asparagine d. Tyrosine

36- A Holoenzyme is:

a. Functional unit. b. Apoenzyme. c. Coenzyme d. All of above

Molecular biology

37-Individual unit of replication are called:

a.Amplicons b.Repeat of replicons c.Replicons d.Repeat of amplicons.

38-In a DNA molecule , the:

a. Bases are covalently bonded to the sugar
b. Sugar are covalently bonded to the phosphate
c. Bases are hydrogen – bonded to one another
d. Nucleotides are covalently bonded to one another
e. All of these are correct

39- A form:

a. Normally form of the the DNA double helix
b. Normal form of the double stranded RNA
c. Found in dehydrated from
d. Rarely form of DNA

40- The form of replication that initiated by a break in one of the nucleotide strand is known as :

a.Theta replication b.Rolling circle replication
c.Bidirectional d.None of the above

Genetic engineering

41-The presence of restriction endonucleases were postulated in 1960 by :

a. Khorana b. Watson c. Crick e. Arber

42-DNA ligase , used in recombinant DNA technology is obtained from :

a. E.coli b. E.coli and also ligase encoded by T4 phage
c. Saccharomyces d. Retroviruses

43-Electrophoresis , is a technique used in DNA extraction helps to seperate :

a. DNA fragments b. Cells from DNA
c. Tissues d. RNA from DNA

44-cDNA is copied from:

a. DNA b. Protein c. mRNA d. Carbohydrates

Food microbiology

45-Because of low penetration, ---------- has been used to inactivate microorganisms on the surface of foods as well as in air and on walls, shelves, and equipment in the food handling and processing area.

a.ɣ-ray. b.X-ray. c.β-ray. d.UV-ray.

46-Contaminated raw vegetables and poor personal hygiene are considered the main causes of ---------- (intestinal protozoan). The main symptoms of the disease are acute or chronic diarrhea and abdominal pain.

a.Toxoplasmosis by *Toxoplasma gondii*. b.Giardiasis by *Giardia lamblia*.
c.Anisakiasis by *Anisakis simplex*. d.Taeniasis by *Taenia* spp.

47-Despite efforts to eliminate spoilage organisms during canning, sometimes canned foods are spoiled. This may be due to :

a.Spoilage before canning
b.Under processing during canning
c.Leakage of contaminated water through can seams during cooling
d.All of the above
e.None of the above

48-The undesirable change in food that makes it unsafe for human consumption is referred as:

a.Food decay b.Food spoilage c.Food loss d.All of the above

Animal physiology

49---------- These cells are phagocytic to defend against pathogens. They may also monitor the condition of neurons.

a. Microglia b. Ependymal c. Schwann cells

50----------are the basic structural and functional units of the urinary system.

a. Neurons b. Nephron c.Sarcomere

51---------- mechanisms are found in the regulation of blood pressure, heart rate, and internal temperature controls.

a. Antagonistic effect b. Positive feedback c. Negative feedback

52----------are one-way valves that separate the ventricles from major arteries.

a. Mitral valve b. Tricuspid valve c. Semilunar valves

Plant physiology

53-Which of the following are not bounded by double membrane?

a.Nucleus b.Chloroplast
c.Mitocondria d.Lysosome

54-Metabolic energy is required in:

a.Passive absorption of mineral salts b.Active absorption of mineral salts
c.Contact exchange of ions d.None of the above

55-Chlorosis of leaves due to nitrogen deficiency begins at first in:

a.Unfolding leaves b.Young leaves
c.Older leaves d.All of above

56-Dormancy of seeds can be broken by :

a.Scarification b.Stratification
c.Hydraulic pressure d.All of above

Secondary metabolites and Plant tissue culture

57-The capability of any living cell of a plant in generating an entire new plant is called :

a.Regeneration b.Totipotency
c.Embriogenesis d.None of the above

58-Which of the following is of great utility in tissue culture experiments?

a.Culture medium b.Andrgenesis
c-Protoplast culture d.All of the above

59-Which of the following steroids has primary function in plant?

a.Cholesterol b.Sitosterol
c.Ponasterone_A d.None of the above

60-The basic carbone skeleton of flavonoid is

a.C_6-C_3-C_6 b.$[\ C_6$-C_3-$C_6]_n$
c.$[\ C_6$-$C_3]_n$ d.C_6-C_2-C_6

Q2 Answer the following Questions: (40 mark)

Pathogenic bacteria

1-What is the principle distinction between: (x- Infection and disease formation) and (x- Acute and chronic disease)

Immunology

2-Differentiate briefly Types of Hypersensitivity

Cytogenetics

3-Compare between mitosis and meiosis.

Basis of biotechnology

4- a/ What do you understand by downstream processing?

b/ Name the enzymes that are used for disruption the bacterial cells , plants and animal cells for obtaining the genetic material?

Environmental microbiology

5-What are the advantages of bioremediation process?

Industrial microbiology and fermentation

6-In a commercial industrial process, the lag phase should be reduced or avoid as much as possible. Why? Suggest how could be minimized or avoided.

Mycology

7-List five disadvantages for fungi in our life.

Biochemistry

8- Define: Mutarotation , Hypochromic effect .

Genetic engineering

9-What is gene cloning and why do you need to clone a gene?

Secondary metabolites and Plant tissue culture

10- a-What are plant phenolic? Enumerate their physiological function.

b-What are the steps of protoplast isolation from leaves?