University of Baghdad
College of Science
Department of Biotechnology
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Competition examination for M.Sc. candidates in Biotechnology 2018-2019

Q1: Choose the correct answer : (60 mark)

Basics of Biotechnology

1-Golden rice is a trnsgenic crop of the future with the following imprved triat :

a. Insect resistance b. High protein content
c. High vitamin A content d. High lysine content

2-A. niger is used in the production of :

a. Ethyl alcohol b. Acetic acid c. Citric acid d. SCP

3-Which immobilized enzyme needs to be used to milk lactose free :

a. Lipase b. Protease c. Amylase d. Lactase

4- On the solid substrate , whichof the following microbe can grow most easily?

a. Filamentous fungi b. Algae c. Yeast d. Bacteria

5-Yeast is used in the production of:

a. acetic acid b.Ethyl alcihol c. Cheese d. Curd

Biochemistry

6-Which of the following reagents are used for precipitating DNA :

a. Isopropanol b. Ethanol c. Both (a) and (b) d. Non of these

7-The general formula of polysaccharides is :

a. $[C_6H_{10}O_5]n$ b. $[C_6H_{12}O_5]n$ c. $[C_6H_{10}O_6]n$ d. $[C_6H_{12}O_6]n$

8-A disulphide bond can be formed between :

a. Two methionine residues b. Two Cysteine residues
c. A methionine and cysteine residues d. All of these

9- Each turn of α-helix contains the number of amino acids:

a. 2.8 b. 3.2 c. 3.4 d. 3.6

Gennetic engineering

10-The restriction enzyme breaks in the DNA backbone :

a. Glycosidic bonds b. Hydrogen bonds
c. S-S bonds d. Phosphodiester bonds

11-Ethidium bromide is an intercalating dye that bind to:

a. ccc DNA only b. RNA only c. Nuciec acids only d. DNA only

12-The second step in most genetic engineering experiments is:

a. Screening b. Cleavage of DNA c. Cloning d. Testing

13-In the screening process, clones that metabolize X-gal turn:

a. Yellow b. Orange c. Blue d. Colorless

Molecular biology

14-Individual unit of replication are called:

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

15- Alternative form of DNA structure:

a. B form b. A form c. L form d. Non of the above

16- Pyrmidine is :

a- A nitrogen base containing a double ring
b- A nitrogen base containing a single ring
c- A and B are correct

17-In replication the enzyme that reduces tensional strain that builds up ahead of the replication fork as a result of unwinding is:

a. Gyrase b. S S protein c. Helicase d. None of all above

Mycology

18- Aspergillosis is disease occur by:

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

19- Mycelia in fungi are:

a. Septate b. Aspetate

c. Some fungi have septate mycelia and other have aseptate mycelia.

20- *Histoplasma capsulatum* is an example of :

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

21- Arthrospore is type of:

a. Sexual spore b. Asexual spore c. Neither sexual nor asexual spore

22- All fungi are:

a. Aerobic b. Anaerobic c. Facultative aerobic

Microbial and environmental biotechnology

23- Bacterial insecticides are---------- must be eaten to be effective.

a. Exotoxins b. Neurotoxins c. Enterotoxins

24- In general, height molecular weight Polyaromatic hydrocarbons are slowly degraded by indigenous microorganisms and may persist is soils and sediments due to:

a. High tocxicity b. High molecular weight c. Both of them

25-In *situ* bioremediation techniques such as:

a. Bioreactor b. Compost c. Slurry bioreactor

26- The main causes of eutrophication process are ----------.

a. Nitrogen compounds b. Organic compounds c. Sulphur compounds.

Industrial microbiology and Fermentation

27-Microorganisms have proved to be particularly usefu l to provide a vast range of products and services because of:

a. The ease of their mass cultivation.
b. Use of cheap substrates (which in many cases are wastes)
c. The diversity of potential products.
d. All the above

28-At steady state in the continuous culture:

a. Formation of new biomass by the culture is balanced by the loss of cells from the vessel
b. The rate of change in the residual substrate is equal to zero
c. Both a and b
d. None of the above

29-In small scale fermentor, Glass is useful for vessel construction because it gives:

a. Corrosion proof.
b. Is non-toxic.
c. Smooth surfaces and it is usually easy to examine the interior of the vessel.
d. All the above.

30-The production of substances in industrial microbiology occur in the sequence----------

a. Fermentation, downstream processing, removal of waste, inoculation
b. Inoculation, downstream processing, fermentation, removal of waste
c. Inoculation, fermentation, downstream processing, removal of waste.
d. Removal of waste, inoculation, fermentation, downstream processing

Food Microbiology

31- ---------- is a method to control microorganisms in food by reduced water activity (Aw).

a. Trimming b. Smoking c. Gas flushing d.Freezing.

32- ---------- spoilage of food caused by flavor compound production such as lactic acid as a result of sugar degradation by *Lactobacillus* spp.

a. Rancidity b. Souring c. Bitterness d.Sulfide odor

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33- Food types such as ----------, have been implicated more frequently with foodborne disease outbreaks than other types.

a. Egg product b. Meat products
b. c. Dairy products d. Fruit and vegetable.

34- Common food poisoning microbes are ----------.

a. *Clostridium* and *Salmonella* b. *Clostridium* and *Streptococcus*
b. c. *Clostridium* and *E.coli* *d. E.coli* and *Salmonella.*

Pathogenic bacteria

35-Endotoxin belong to a class of biological molecules called:

a. Nucleic acids b. Lipopolysaccharides c. Proteins

36- Which of the following components are found in the cell walls of Gram-positive bacteria but not in Gram- negative bacteria ?

a. Cytoplasmic membrane b. Peptidoglycan c. Teichoic acid

37- *Clostridium difficile* infections are commenly associated with:

a. Antibiotic treatment b. Contamination of wounds
c. Consunption of water contaminated with sewage

38- A normal flora may be found in all the following environments **EXCEPT:**

a. The vagina b. The pharynx c. The blood

Immunology

39- Which of the following dose not protect body surfaces

a. Skin b. Mucus c. Gastric acid
d. Salivary amylase e. Gut microflora

40- Antibody titer refers to the:

a. Absolute amount of specific antibody
b. Affinity of specific antibody
c. Avidity of specific antibody
d. Concentration of specific antibody
e. Highest dilution of antibody still able to give a positive result in a test system

41- The mononuclear phagocyte system does not include:

a. Monocyte b. kupffer cells c. kidney mesangial cells
d. Lymphnode medullary macrophages e. Endothelial cells

42- Epitope binding before Fe receptor engagement is not required for :

a. Carrier molecules. b. Hapten-carrier conjugates.
c. Haptens. d. lgE.

43- Which of the following cells are important effector cells in allergic reactions?

a. Basophils b. Dendritic cells
c. Lymphocytes d. Monocytes

44- A subset of which of the following of these undergoes further differentiation within the thymus?

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

Animal tissue culture

45- Which of the following microorganism are troublesome contaminators of cell cultures and difficult to detect:

a. Bacteria b. Mycoplasma c. Yeast d. Fungi

46- Lymphocytes isolate from blood by using of

a.PBS b. Ficoll c. Acetic acid

47- The resulting of culturing a fragment of tissue in vitro is

a.Explantation b. Primary culture c. Secondary culture

48- The mechanical disaggregation for tissue fragments is preferable for

a. Connective tissue b. Solid tissue c. Soft tissue

Cytogenetics

49-The number of human chromosomes in egg and sperm is ----------

a. 24 b. 46 c. 20 d. 23

50-Each chromosome consist of a construction point that joins the two arms of it called----------

a. Centromere b. Telomere c. Chromatin d. Spindle fiber

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

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

52-Down syndrome is a genetic disorder caused by the presence of all, or part of a third copy of chromosome ----------.

a. 21 b. 18 c. 15 d. 9

Animal physiology

53---------- is responsible for conscious thought and perception, emotions, personality, the mind.

a. Circulatory system b. Nervous system c. Muscular system

54-All exchanges of fluid, nutrients, and wastes between the blood and tissues occur across the walls of

a. lymph ductules b. The heart. c. capillaries

55-Nissl bodies, they manufacture the ----------.

a.Neurolemma b. Neurocytokines c. Neurotransmitters

56-Closing the AV valves produces :

a. The second heart sound (dub) b. The first heart sound (lub) c. Both a and b

Plant physiology and tissue culture

57-Which of the following is not bounded by double membrane ?

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

58-Metabolic energy is required in :

a. Passive absorption of mineral salts b. Active absorption of mineral salts

c. Contact exchange of ions d. Non of the above

59-Callus is :

a. Tissue that forms embryo
b. An insoluble carbohydrate
c. Tissue that grows from embryo
d. Un organized actively dividing mass of cell maintained in culture

60-What is meant by organ culture

a. Maintenance alive of a whole organ after removal from the organism by partial immersion in nutrient fluid
b. Introduction of a new organ in an animal body with a view to create genetic mutation in the progenies of that animal
c. Cultivation of organs in a laboratory through the synthesis of tissues
d. The aspects culture in community which are mainly dedicated by the need of a specified organ of the human body

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Q2/Answer the following questions: (40 mark)

Basics of Biotechnology

1-Compare between batch and continuous cultures ?

Biochemistry

2-What amino acids can be converted into another amino acids with gentle hydrolysis , resulting in release of ammonia?

Gennetic engineering

3- Discuss with illistrations In Situ hybridization of bacterial colonies

Molecular biology

4- An RNA molecule has the following percentages of bases:

23%, U 42%, C 21%, and G 14%.

(a) Is this RNA single stranded or double stranded? How can you tell?

(b)What would be the percentages of bases in the template strand of the DNA that contains the gene for this RNA?

Mycology

5- List only the fungal classes of Division Eumycota

Microbial and environmental biotechnology

6- What is the difference between catabolism and anabolism process?

Pathogenic bacteria

7-Mention the function of (2) of the following, give example on each :

a- Capsule

b- Toxin

d- Spore

Immunology

8- List the stage of phagocytosis.

Cytogenetics

9- Compare between mitosis and meiosis.

Plant physiology

10-Differentiate between the physiological role of auxins and cytokinins.