
	TANTA UNIVERSITY, FACULTY OF SCIENCE, DEPARTMENT OF BOTANY			
	Final Examination for 3 rd Industrial Biotechnology Students			
	COURSE TITLE: Molecular Bases of Plant Stresses		COURSE CODE: BT327	
DATE: 10 January, 2021	TERM: First Semester	TOTAL ASSESSMENT MARKS: 60	TIME ALLOWED: 2 HOURS	

I. Choose the best answer:- (20 marks).

- 1) Gradual adaptation to stress when the plant is located in the stress condition is known as:-
a- Hardening b- acclimation c- a and b d- None of them.
- 2) Reducing the impact of a stress, even though the stress is present in the environment is called: -
b- Avoidance b- Avoidance mechanisms c- Adaptation d- All of them.
- 3) Xanthophyll pigments have a protective role on plants under stress, and some of these pigments are involved in the xanthophyll cycle which has inhibitory role on:-
a- ROS production b- ABA accumulation
c- Osmolytes production d - All of them.
- 4) Alteration in plant cell wall elasticity, ion distribution, cell expansion slows down or ceases, and plant growth is retarded, altered photosynthesis, respiration, ion uptake, nutrient metabolism, and hormones in the cell has been reported as a result of :-
a- Drought stress b- salt stress c- biotic stress d- all of them.
- 5) All the major processes such as photosynthesis, protein synthesis and energy and lipid metabolism are affected during the onset and development of :-
a- Salt stress b- Stress resistance c- Stressful d- None of them.
- 6) The accumulation of ABA can mitigate the inhibitory effect of salinity on:
a- photosynthesis. b- growth. c- translocation of assimilates. d- All of them.
- 7) A stress can lead to a disturbance of the association between membrane lipids and proteins as well as enzymes activity and transport capacity of membranes is the:-
a- water stress. b- Biotic stress. c- Stress avoidance. d- None of them.
- 8) A small volatile gaseous molecule reacts with lipid radicals thus preventing lipid oxidation, exerting a protective effect by scavenging superoxide radical and formation of peroxy nitrite that can be neutralized by other cellular processes is: -
a- ABA b- NO c- SA d- All of them.
- 9) Environments that actually damage the plants and cause a qualitative change such as membrane damage or cell death is considered as:-
a- Stress results b- Stress full c- a and b d- None of them.
- 10) Decrease in photosynthetic activity under water stress is well known, where water stress inhibits;-
a- Photosynthetic apparatus b- Chlorophyll synthesis
c- Photosynthetic metabolism d- All of them.
- 11) Understanding the is key if we are to connect the information on our genome with its functional protein expression under environmental changes.
a- Genome, b- Transcriptome c- Proteome d- all of them
- 12) Steps of a generic protocol will include the following sequence: RNA extraction, cDNA library preparation, cDNA sequencing, and finally DNA alignment and data analysis
a- Microarray b- RNA-sequencing c- Gene cloning d- None of them

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13) Microarray data is only ever displayed as values relative to other signals detected on the array, whilst RNA-seq data is

- a- Qualifiable b- Countable c- Quantifiable d- Determinable

14) interact with the promoter regions (cis-elements) of several stress-inducible genes to mediate the plant response to environmental stresses.

- a- Signaling factors b- Transcription factors c- Receptor factors d- Expression factors

15) Important target genes for improving plant stress tolerance will include genes coding for

- a- Heat shock proteins b- Antioxidant enzymes c- Transcription factors d- All of them

16) Abiotic and biotic stresses can further exaggerate the production and accumulation of reactive oxygen species (ROS), ten sources were reported to produce ROS in plant cells including

- a- Photosynthesis b- Respiration c- Photorespiration d- All of them

17) Major adaptation mechanisms of plants to high temperature include all of the following except

- a- Expression of stress proteins b- Signaling cascades c- Late maturation d- Antioxidant defense

18) High temperature induces the expression of many heat shock proteins to protect intracellular proteins from being denatured and function through protein folding; thus they act as

- a- Capstones b- Chaperones c- Champions d- None of them

19) Plants will use the systemic acquired resistance to restrict the spread of which pathogen of the following.

- a- Necrotroph b- Autotroph c- Biotroph d- All of them

20) signaling enhances the plant resistance to necrotrophic pathogens.

- a- Abscisic acid b- Jasmonic acid c- Salicylic acid d- Ascorbic acid

II. Write on the following:- (6 marks)

- Roles of Polyamines in Salinity Tolerance.
- The role of osmolytes in plant responses to water stress and resistance.

III. Define the following terms:- (10 marks)



Biotic stress, Drought tolerance, Physiological stress, Compatible solutes, Glycine betaine

IV. Answer the following questions: (24 marks)

1. Explain how to use Knowledge about molecular mechanisms of stress tolerance for application of genetic engineering to produce stress tolerant crop plants.
2. Give an account on the components of a generic signaling pathway, support your answer with labeled drawing.
3. ROS are viewed as ideal stress signaling components, discuss this statement with emphasis on their chemistry, production and scavenging in plants.
4. Compare between biotrophic and necrotrophic plant pathogens in terms of their life styles and the plant defense against each of them.

With the best wishes

Prof. Essam El-Deen Abo-Kassem & Prof. Nasser Sewelam

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF BOTANY AND MICROBIOLOGY			
	Final Examination for Third Year students (Industrial Biotechnology)			
1969	COURSE TITLE:	Physiology of Microorganisms		COURSE CODE: BT323
DATE: 17	1: 2021	TOTAL ASSESSMENT MARKS: 60	TERM: First	Time allowed: Two hour

I- Chose the correct answer (MCQ):

15 Marks

- 1- logarithmic phase, marked by cell division as a:
 - A. Maximum rate
 - B. Lower rate
 - C. Minimum rate
- 2- The fungi show broad pH optima on the acid side of neutrality at:
 - A. 2.5-5.5
 - B. 5.5-7.5
 - C. 7.5-11
- 3- Metallic macroelements such as:
 - A. Oxygen
 - B. Potassium
 - C. Carbon
- 4- The mushroom sugar is:
 - A. Fructose
 - B. Trehalose
 - C. Cellulose
- 5- Utilization of sugar alcohol require a number of steps before entering the main respiratory pathways, they are supposed to be:
 - A. Oxidation
 - B. Phosphorylation
 - C. Both the two
- 6- Hydration, of α - and β - unsaturated activated fatty acid produce:
 - A. α - hydroxy activated fatty acid.
 - B. β - hydroxy activated fatty acid.
 - C. γ - hydroxy activated fatty acid.
- 7- The requirement for a certain growth factor is usually influenced by cultural conditions as:
 - A. Complete requirement.
 - B. Partial requirement.
 - C. Medium requirement.
- 8- The thiamine molecule consists of two units linked by:
 - A. Ethylene bridge
 - B. Methylene bridge
 - C. Thymine bridge
- 9- The vesicle contents are not fully characterized but they are known to include
 - A. Wall precursors
 - B. Wall synthases
 - C. Wall lytic enzymes
 - D. All of them

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- 10- The wall of Oomycetes contains:
 - A. Mannans
 - B. Chitin
 - C. Cellulose
 - 11- The second stage of metabolism can operate:
 - A. Aerobically.
 - B. Anaerobically.
 - C. Both.
 - 12- If one molecule of glucose degrades by entener-Doudroff pathway, the yields is:
 - A. 2 ATP + 2 NADPH + 2 NADH
 - B. 1 ATP + 1 NADPH + 1 NADH
 - C. 2 ATP + 1 NADPH + 1 NADH
 - 13- Poly B. hydroxy butyrate, wide spread reserve material has been studied in:
 - A. Azotobacter.
 - B. Bacillus.
 - C. Agrobacter.
 - 14- Bacterial electron transport chains may be:
 - A. Equal p/o to mitochondrial ratios.
 - B. Lower p/o to mitochondrial ratios.
 - C. Larger p/o to mitochondrial ratios.
 - 15- In all kind of fermentation:
 - A. NAD is oxidized to NADH.
 - B. NADH is oxidized to NADH₂.
 - C. NADH is oxidized to NAD⁺.

II- Mark True or False for the following:

15 Marks

- 1- The results obtained for an organism in pure culture may necessarily apply to natural environments, where other organisms are present.
A. True B. False
- 2- Most fungi are strict anaerobic, they need oxygen in at least small amounts in order to grow.
A. True B. False
- 3- Mannans often replace chitin or glucans in the walls of zygomycetes.
A. True B. False
- 4- Oxidation of fatty acids in fungi occurs in the peroxisomes.
A. True B. False
- 5- The production or germination of spores often requires a wider range of conditions than those that will support growth.
A. True B. False
- 6 - The fruiting bodies like cleistothecia are produced at a comparatively lower temperature than the conidia.
A. True B. False
- 7 - Glucose medium results in the formation of yeast phase cells but mycelial growth occurs on starch medium.
A. True B. False
- 8- Plasmodium growth is restricted only on filamentous fungi.
A. True B. False

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- 9- Autotrophic fungi for a certain growth factor have developed from heterotrophic one.
A. True B. False
- 10- Growth factor means an organic substance which in large amounts is necessary or stimulatory for growth.
A. True B. False
- 11- Some chemolithotrophy bacteria can function heterotrophy.
A. True B. False
- 12- Methanogens are oligate aerobes.
A. True B. False
- 13- The enzymes of B. oxidation are present cytoplasm in prokaryotes and eukaryotes.
A. True B. False
- 14- The electron donor in fermentation is inorganic molecules while electron acceptor is organic molecules.
A. True B. False
- 15- In bacteria electron flow causing the protons to move outward across the plasma membrane.
A. True B. False

III- Discuss briefly Two only from the following :-

10 Marks

- 1- Metabolism of nitrate and ammonia by fungi.
- 2- Action of an indispensable and dispensable growth factor on the growth of a fungus.
- 3- Metabolism of protein by fungi.

IV- Write short notes on:

20 Mark

1. Catabolism of disaccharides.
2. The glycolic pathway (drawing only).
3. Function of TCA cycle.
4. Nitrogen oxidizing bacteria.

**With our best wishes
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