

فيزياء حيوية

Tanta University- Faculty of Science-Department of Physics  
Examination for Senior (Fourth level) Students of Biophysics

Course title

Communication and control of biophysics

course code: BP4285

Date: 27/5/2015

term: 2st

Total assessment marks: 100

Time allowed: 2hours

**First question**

Complete the following (25 marks)

- 1- A collection of interconnected components to achieve a desired response in the face of external disturbances (control regulation response) system.
- 2- The Laplace transform of the function  $e^{at}$  is  $(1/(s-a) - (s-a) - (s-a)^2)$
- 3- (Steady state equilibrium constant) condition is a condition that does not change over time.
- 4- (Hemoglobin homeostasis equilibrium) is the maintenance of steady states in the body by coordinated physiological mechanisms
- 5- (optical - nerve audible cutaneous) receptors include Meissner's corpuscles, Merkel's disks, Ruffini cylinders, and free nerve endings
- 6- What of the following is a temperature-increasing mechanism? (Vasodilation of skin blood vessels - Piloerection - heating)
- 7- What of the following is a temperature-decreasing mechanism? (Sweating Increase in thermogenesis - cooling)
- 8- The retina is considered as (audioreceptor nerve receptors photoreceptors)
- 9- (Lesion - histological - anatomical) studies have provided fundamental information about which parts of the brain are involved in various sensory and perceptual functions.
- 10- (Hypothalamus - energy hyperthalamus) is responsible for regulating of body temperature

**Second question (25 marks)**

Describe with drawings how using resistance and capacitor to model biophysical systems and then provide a linear model for description the lung mechanics?

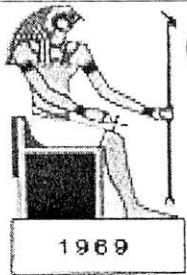
**Third question (25 marks)**

- a) Compare between the servomechanism and the regulator as a control systems? (5 marks)
- b) Compare with drawings between different modes of communication and signaling in living? (20 marks)

**Fourth question (25 marks)**

- a) Prove a mathematical relation using drawings between the closed-loop gain (CLG) of the feedback system and the corresponding open-loop gain? (15 marks)
- b) Draw a schematic diagram of the Smith model of pulsatile luteinizing hormone release and describe the undelined mathematical model? (10 marks)

Good luck.....Dr. Reda Morsy



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Tanta University  
Faculty of Science  
Department of Physics

Biophysics

Examination for Material Science Students (LEVEL 3 Credit hour system)

COURSE TITLE:

Radiobiology II

COURSE CODE:

BP4281

DATE:

June 6<sup>th</sup>, 2015

TERM: Second

TOTAL ASSESSMENT

MARKS: 50

TIME

ALLOWED: 2 HOURS

QUESTION

ANSWER THE FOLLOWING QUESTIONS:

Marks

1.

a- Write detailed notes about the brachytherapy, (source placement, dose rate, and duration of dose delivery).

b- Complete the following sentences:

1- The dose could be fractionated by different ways according to the patient status for optimum treatment from cancer to ....., ....., ....., and ..... (comment on one of these ways)

2- The models that based on microscopic response for normal tissue complication probability (NTCP) are; ....., ....., ..... and that based on macroscopic response are....., .....

3- The therapeutic index improvement could be attained by ....., ....., .....

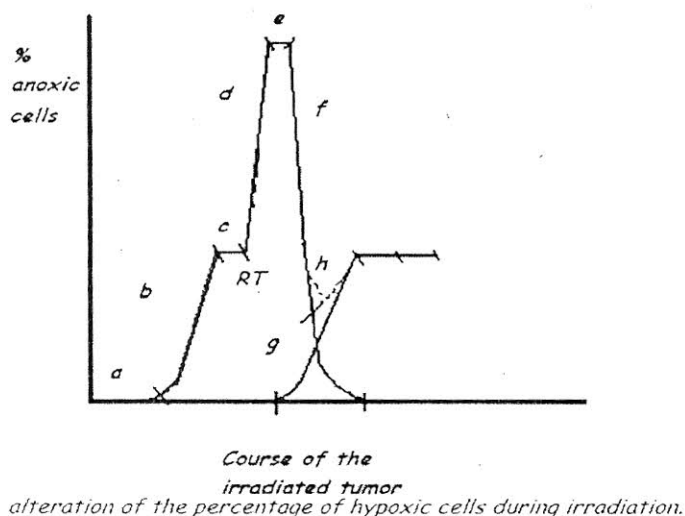
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2.

a- Write in details about the 5 Rs.

b- Using the following graph, explain in details how can you qualitative explain the alteration in tumor population.

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	Tanta University - Faculty of Science - Botany Department			
	Examination for 4 <sup>th</sup> Level Students of Biophysics			
	COURSE TITLE	<b>Bioinformatics BP4284</b>		
June 2015	TERM: second	Total Assessment Marks: 100	TIME ALLOWED: 2 HOURS	

**First question (20 Degtees)**

- 1- Identify the science of bio-informatics?
- 2- Compare between the data and information?
- 3- Write the equation of the total sum of squares?
- 4- What is the difference between the variable and observation?

**Second question (20 Degrees)**

- 1- Make up plans showing a randomized layout for a **completely random design (CRD)** with 6 treatments replicated 3 times, and a **randomized complete block design (RCBD)** with 7 treatments replicated 5 times.
- 2- Key out the degrees of freedom (df) of both designs.
- 3- Explain the meaning and importance of replication and randomization.
- 4- Indicate the advantages and dis-advantages of each of the two designs.

**Third question (20 Degrees)**

Set up a **Latin square design** for the effect of 5 levels of salinity ( $S_1, S_2, S_3, S_4, S_5$ ) on the yield of barley. **Key out** the degrees of freedom (df). **Mention** the advantages and dis-advantages of this experimental design. →



Tanta University  
Faculty of science  
Physics department

امتحان الفرقة الرابعة

فى الفيزياء

PH 4264

رقم المقرر

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تاريخ الامتحان

زمن الامتحان: ساعتان



جامعة طنطا  
كلية العلوم  
قسم الفيزياء

### Answer the following questions:

1- "Nuclear analytical techniques still suitable for study samples in all fields of life", discuss.

2-a Classify the nuclear detectors and mention the properties required for a semiconductor detector material.

2-b What are the applications of Mossbauer spectroscopy?

3-a Write down the method of analysis based on Rutherford backscattering spectroscopy.

3-b **Define:** Neutron activation analysis, Mossbauer spectroscopy, thermal and fast neutrons, NIM - Nuclear Instrumentation Module, Discriminators.

3-a True or false:

- 1- RBS is the most frequently used ion beam analysis method. It relies on the fact that the energy of an elastically backscattered particle depends on the mass of the target atom (kinematic factor) and on the depth at which the scattering took place (energy loss on the way to and from the point of interaction).
- 2- Elastic Recoil Detection Analysis is used for Light elements detectable on heavy substrates

3-b discuss in details neutron activation analysis technique.

4-a Elastic and inelastic scattering of MeV ions with target nuclei can be used to identify the elemental composition of the target. The depth scale of the compositional profile is provided by the energy loss of the ions in the material. Elastic Recoil Detection Analysis is one tool that has been used for this purpose, how?

4-b Atomic absorption/emission spectrometry has a specific role in atomic analytical techniques, discuss in brief this technique.

*WITH MY BEST WISHES*

