




## المستوى الثالث

### فيزياء حيوى

ليزيه رالدبير

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	TANTA UNIVERSITY FACULTY OF SCIENCES			
	DEPARTMENT OF PHYSICS			
	EXAMINER: <i>PROF. DR. RAYAD A.M. GHASY</i>			
	COURSE TITLE:	<i>laser physics (Physics &amp; Biophysics students)</i>		CODE: <u>3222</u>
DATE:	4 JUN, 2017	TERM: SECOND	TOTAL MARKS: 200	PERIOD: 2 HOURS

Answer the following questions :-


- 1- Derive the expression of the population inversion under steady-state oscillation  $\Delta N_{th}$  as a function of transition probability  $|\mu_{21}|^2$ ?
- 2- The laser beam has some special physical properties, write- down and give a short account about each of them?
- 3- Explain physically the laser action in terms of the rate equations theory?
- 4- Find the relationship between the gain coefficient  $G$  and the loss coefficient  $L_{eff}$  in the laser resonator?

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سید عزیز ہاشمی

PHYSICS

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	<b>TANTA UNIVERSITY</b> <b>FACULTY OF SCIENCE</b> <b>DEPARTMENT OF PHYSICS</b>			
	<b>EXAMINATION OF THERMODYNAMIC (THIRD YEAR) STUDENTS OF BIOPHYSICS</b>			
	<b>COURSE TITLE:</b>	Solid State		<b>COURSE CODE:</b>
<b>DATE:</b>	8-6-2017	<b>TERM:</b> SCOND	<b>TOTAL MARKS:</b> 100	<b>ASSESSMENT</b> TIME ALLOWED:TWO HOURS

**Q1-Choose the correct answer (20)**

- 1-The Miller indices of planes parallel to the x and y axes are  
 (a) (010) (b) (001) (c) (111) (d) (100)
- 2 -If (326) are the Miller indices of a plane ,the intercepts made by the plane on the three crystallographic axes are (a) (2a 3b c) (b) (a b c) (c) (a 2b 3c) (d)None of these
- 3- In a simple cubic lattice  $d_{100} : d_{110} : d_{111}$  (a) 6:3:2 (b)  $6:3:\sqrt{2}$  (c)  $\sqrt{6}:\sqrt{3}:\sqrt{2}$  (d)  $\sqrt{6}:\sqrt{3}:\sqrt{4}$
- 4-Which of the following are correct for tetragonal system (a)  $a=b=c, \alpha = \beta=\gamma \neq 90$  (b)  $a=b \neq c, \alpha = \beta=\gamma=90$  (c)  $a \neq b \neq c, \alpha = \beta=\gamma=90$  (d)  $a \neq b \neq c, \alpha \neq \beta \neq \gamma \neq 90$
- 5-A metallic bond forms by (a) transferring of an electron from one atom to another (b)sharing an electron between two atoms (c) sharing electrons among all atoms (d) None of these
- 6- If the number of atoms per unit in a crystal is 2, the structure of crystal is (a) Octahedral (b) Body centered cubic (c) face centered cubic (d) simple cubic
- 7- A sea of electrons is present in \_\_\_\_\_solids.(a) ionic (b) metallic (c) non-polar molecular (d) polar molecular
- 8-Monoclinic crystal has dimensions \_\_\_\_\_.  
 (a)  $a \neq b \neq c, \alpha = \beta= 90, \gamma \neq 90$  (b)  $a=b =c, \alpha = \beta=\gamma=90$  (c)  $a = b \neq c, \alpha = \beta=\gamma=90$  (d)  $a \neq b \neq c, \alpha \neq \beta \neq \gamma \neq 90$
- 9- X-rays are produced when: a. Metal gets converted to ions b. High speed electrons or ions collide with metal c. The glass tube gets heated d. All of the above
- 10-Single crystal-rotating photograph is used for: (a) high symmetry crystal (b) low symmetry powder crystal (c)low symmetry crystal (d)determination of the orientation

**Q2**

- 1- What do you mean by Primitive cell and non-primitive cell? Derive the expression of Bragg's law for x-ray diffraction. See Back
2. Explain the significance of the following notations: (a) (khl), (b) {hkl}, (c) [hkl], (d) <hkl>, (f) (hkil) .
3. Write all the members of the family of directions <100>, <110>, and <111> in a cubic system.

4. Classify the crystals according to their binding between their constituents. Give the examples of crystals in each class.

Q3

1. In orthorhombic lattice  $a=1 \text{ \AA}$ ,  $b=3\text{ \AA}$ ,  $c=2\text{ \AA}$ . Deduce the lattice spacing between (211) planes.

2. Find the minimum wavelength produced from x-ray tube which has 50kv potential difference.

3. The zones containing  $(20\bar{2}1)$ ,  $(01\bar{1}0)$  and  $(10\bar{1}0)$ ,  $(01\bar{1}1)$ . Find the face common to them both.

4. Drive the relation  $d = a / \sqrt{h^2 + k^2 + l^2}$

Q4 1. Write a note on : various symmetry operations present in a crystal-Single crystal rotation photograph -Laue photograph-Measurement of intensity of x-ray - the two types of crystal lattices

EXAMINERS	Prof. Dr Dalal Hemedda.
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😊 أطيّب التمنيات بالتوفيق 😊