



Summer Course In "Physics of Vibrations & Waves" (212 P)

Sep, 2019

Time: 3 hours

## Answer only five questions:

- 1. a) Prove that the frequency of vibrating single mass tied at the middle of string depends on the tensile strength.
  b) Let the displacement of the wave obtained as : y = Acos(at kx), prove that the refractive index of an absorbed medium can represented by a complex quantity,
- 2. a) Discuss the classification of the damped oscillations, find the kinetic energy of the light damped oscillation. b) Prove that the distinctive impedance of a tense string depends on its tensile strength in the form; Z = T/C
- 3. a). Find the phase difference in the LRC- circuit of the electrical forced damped oscillations.
  - b) Apply the eqn. of mechanical oscillation:  $m\frac{d^2x}{dt^2} + kx = 0$  to find the validity of the low energy conservation.
- 4. a) Illustrate with the eqns. the loss energy of the damped oscillations, express the resulting eqn. in terms of the quality factor.
  - b) Find the parameter on which the gained potential energy of an element of a tense string depends.
- 5. a) Use the eqn. of the electrical forced damped oscillation:  $\frac{d^2q}{dt^2} + \frac{R}{L}\frac{dq}{dt} + \frac{1}{LC}q = E_0 \exp(i\omega t)$  to find the amplitude

and current flowing through the LRC-circuit.

- b) Apply the eqn. of the propagation wave in one dimension:  $y = A\cos(\omega t kx)$  to express the wave displacement as a function of the phase constant (k) and frequency ( $\omega$ ).
- 6. a) Compare between the mechanical and electrical parameters of the forced damped oscillations.
  - b) consider a periodic force;  $F_{\theta} exp(i\omega t)$  acts at a certain contact position ( $x = \theta$ ) of a tense string, express the incident, reflected, and transmitted wave eqns. Determine the transmitted and reflected factors and find the condition of totally reflections.

انتهت الأسنلة

تمنياتي بالتوفيق والتفوق ...... ا.د.عبد المنعم سلطان .....

	المستوي :الثاني Level: II	الفصل الدراسي الصيفي	Assiut University
"2 hours" U: (2)       "Modern physics "P 225       Physics Dept.         Question Nº 1 (20 degrees)         Choose the correct answer:         1. Physics is the science which study the properties of (A) materials (B) sound (C) all of the above         2. Nature is         3. Electrodynamics, thermodynamics & electromagnetism are (A) modern phys. (B) classical phys         4. Physics can time & space (A) measure (B) define         5. Relativity deals with: (A) atoms & nucleus (B) stars & planets (C) all of the above         6. In Galileo's transformations one observer will measure a time		العام 2018-2019	Faculty of Science
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Question Nº 3 (10 degrees) Explain shortly the physical meaning of the following equations: (1)  $E = mC^2$ (2) E = h v. $(4)\gamma \Leftrightarrow e^- + e^+$  $(3)h\nu = h\nu_0 + k.E$ Question Nº 4 (10 degrees) Comment shortly on the following images : netual duaxar Lign Image Light image at الأون Farin (ell-Jais) Image of Image (3) Image (2) Image (1) i.c. and eau اننهت الأسيعلة، مع النمنيات بالنوفيق Best Wishes