بسم الله الرحمن الرحيم

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سورة التين الاية (4)

Dedication

To my family members
Mother,
Father,
and brothers
I present this work

ACKNOWLEDGEMENT

First I would like to thank my supervisor Dr.Jumma yousef tamboul, , for getting me into this field of research, the world of medical physics, and for great guidance throughout the course of this work.

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ABSTRACT

Students of medicine, biomedical engineering and Para-medicals need ideas of physics in studding living system; there are no professional books in such topics.

Physics of the human body looks at the several of physiological systems in the human body from physical point such as mechanics, pressure, fluid flow, light and sound.

The thesis presents brief reviews of the importance of physical principles in the operation of the human body. The combination of the knowledge from biology and engineering can be used to understand the principles of biomechanics.

The biological principles underlying different systems are introduced such as the respiratory system, cardiovascular system, auditory system and the vision system (the eye). These are followed by core description related to the fluid principles such as Newtonian fluid flow, sound physics, and physics of light.

The review study includes the effect of gravity on fluids pressure, and fluid flow that represent how the body maintains body temperature through the mechanism of vasodilatation and vasoconstriction of blood vessels which in turn affect the flow rate of the blood. The relation between work and energy are reviewed in this thesis.

Also on the other hand the physiological mechanism of hearing and balance, transmission of sound in the ear are described briefly on the basis of physical quantities.

The thesis represent the brief review of basic concept of contemporary physics those are relevant to the life science. These brief reviews of concepts are recommended to be expanded in the near future for a full review book in the subject.

الملخص

إن دراسي العلوم الطبية ، الطب ، الهندسة الطبيةو مجالات الكوادر الطبية المساعدة في حاجة ماسة إلى معرفة دور الفيزياء في العلوم الطبية لفهم الأنظمة الحية في طريقة عملهاو ظائفياً .و بما أنه لا توجد كتب متخصصة في هذا المجال (الفيزياء في الأنظمة الحية) يعتبر هذا البحث مقدمة هامة لهذا المجال الفيزياء في جسم الإنسان تتعلق بدراسة فيزيولوجيا الجسم البشري من النواحي الفيزيائيةو تطبيقات قوانين الفيزياء العامة مثل الميكانيكا ، الضغط ، سريان الموائع ، الضوءو الصوت .

إن هذا البحث يوضح أهمية إلاسس الفيزيائية في توضيح طريقة عمل الجسم البشرى.

تشتمل الرسالة على مقدمة للاسس البيولوجية لأجزاء مختلفة من الجسم مثل الجهاز التنفسي ، جهاز الدورة الدموية ،والجهاز السمعيو النظام البصري (العين). هذه المقدمة تبعتها توضيح عن كيفية ارتباطها في نسق ترتيبي ، بأسس فيزياء الموائع مثل قوانين نيوتن لسريان الموائع ، فيزياء الصوتو فيزياء الضوء.

أشتملت الدراسة أيضاً على تأثير قوى الجاذبية الأرضية على ضغطو حركة الموائع التي يستفيد منها الجسم في فهم ظاهرة الحفاظ على استقرار درجة حرارة الجسم فيو ضعها الطبيعيو ذلك عن طريق توسيع أو تضييق الأوعية الدموية الذي بدوره يغير معدل السريان للدم ، (معادلة ويزيلي) .

كذلك تم شرح العلاقة بين الشغلو الطاقة في هذا البحث.و لفهم فسيولوجيا آلية السمع والإتزان ، انتقال الأصوات عبر الأذن الذي تم شرحه بصورة مختصرة على أساس الكميات الفيزيائية .بصورة عامة يقدم البحث القواعد الأساسية للفيزياءو التي ترتبط بالعلوم الحيوية .

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Appendix

List of Abbreviations

Symbol	Quantity
A	Area
v	Velocity, speed
a	Acceleration
t	Time
ρ	Density
m	Mass
p	Pressure
h	Height, depth
g	Acceleration of gravity
F	Force
t	Torque
σ	Stress
ε	Strain
Y	Young's Modulus
σ_S	Shear stress
S	Shear Modulus
w	Work
l	Distance, length
P	Power
P_E	Potential energy
K_E	Kinetic energy
W	Weight
T	Tension
λ	Wavelength
κ	Wave number
Φ_i	Angle of incidence
Φ_r	Angle of reflection
n	Index of refraction
c	Speed of light
D	Refractive power (diopters)
f	Focal length
s_o	Distance of object from lens
s	Distance of image from lens

h_i	Height of image
h_o	Height of object
M	Magnification
T	Temperature
η	Viscosity
dB	Decibel relative
V	Volume
r	Radius
k	Spring constant