UNIVERSITY OF JAMMU

NOTIFICATION
(11/June/ ADP/17)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, has been pleased to authorize the adoption of the revised Syllabi and Courses of Study in the subject of Physics for B.Sc. Part I of Three Year Degree (General) Course for the examination to be held in the years alongwith %age of change as under:-

Class	Part	For the Examinations to be held in the year	%age of change
B.Sc.	Part-I	2012, 2013 and 2014	Paper-A- Less than 5% Paper-B- Less than 5%

The alternative question papers are required to be set as per the regulations given below:-

i). If the change in the Syllabi and Courses of Study is less than 25%, no alternative Question papers to be set.
ii). if the change is 25% and above but below 50% alternative Question Papers to be set for one year.
iii). If the change is 50% and above or whole scheme is changed, alternative Question Papers be set for two years.

Sd/-
REGISTRAR

F.Acd./10/11/ 4146-89
Dated: 21-07-2011

Copy for information and necessary action to:

1. Special Secretary to Vice-Chancellor, University of Jammu;
2. Sr.P.A. to Registrar/Controller of Examinations;
3. Dean, Faculty of Science;
4. Convener, Board of Studies in Physics;
5. Members of the Board of Studies concerned;
6. Principals of the concerned Colleges;
7. C.A. to Controller of Examinations;
8. Deputy/ Asstt. Registrar (Conf./Exams. U/G /Inf./Pub./Admission/DDE);
9. S.O (Confidential); and
10. Content Manager, University Website;

Asstt. Registrar (Academics)
18/7/11

SYLLABI & COURSES OF STUDY IN PHYSICS FOR THE EXAMINATIONS TO BE HELD IN THE YEARS 2012, 2013 & 2014

Subject: Physics
Paper: A
Class: B. Sc Part-I
Duration: 3:00 hours

External Examination : 40 Marks
Internal Assessment : 10 Marks

The question paper shall be of 40 marks. There shall be 10 questions in the paper with two from each unit. Each question shall be of 8 marks. The students have to attempt 5 questions, selecting one question from each unit.

UNIT I: Mechanics – I

Unit vectors, displacement, area element, volume element, velocity and acceleration in Cartesian, spherical polar and cylindrical coordinate system.

Inertial and non inertial frames of reference, uniformly rotating frame; coriolis force and centrifugal force, effect of Centrifugal force due to rotation of earth and coriolis force acting on a freely falling body, geographical effects of coriolis force (qualitative). (18)

UNIT II: Mechanics – II

Two body system; laboratory and centre of mass system, relationship between displacements, velocities, kinetic energies and angles in lab and centre of mass system.

Inverse Square Law of force: Concept of central and non central forces, equivalent one body problem. Angular momentum conservation in a central force field, Energy of reduced mass & its conservation, differential equation of orbit in a central force field, turning points of motion, relation between eccentricity and energy, Kepler's laws & Satellite motion. (18)

UNIT III: Oscillation – I

Differential equation and its solution, energy of simple harmonic oscillator, examples: compound pendulum, torsional pendulum, bifilar oscillations, Helmholtz resonator, LC circuit, oscillation of two masses connected by a spring.

Nature of damping force. Damped simple harmonic oscillator. Differential equation and

its solution, energy power dissipation, logarithmic decrement, relaxation time, quality factor, resistance and electromagnetic damping. Example of damping in physical systems, resistance damping, oscillatory discharge of a capacitor through circuit containing resistance and inductance, electromagnetic damping in a moving coil galvanometer. (18)

UNIT IV: Oscillation – II

Driven harmonic oscillator, transient and steady state behavior, solution of differential equation, velocity of the mechanical forced oscillator in the steady state, behavior of displacement with driving force frequency, behavior of velocity versus driving force frequency, power absorption and power dissipation, Sharpness of resonance, Quality factor, Electrical resonance. (18)

UNIT V: Theory of Relativity

Galilean transformations and conservation laws: conservation of momentum, and energy. Search for ether and Michelson-Morley experiment.

Postulates of special theory of relativity, Lorentz transformations, consequences of Lorentz transformations, length contraction, time dilation, experimental evidence in support of time dilation, twin paradox, simultaneity of events, velocity theorem, variation of mass with velocity, mass energy equivalence, energy-momentum relation., Illustrative examples in support of mass energy equivalence, transformation relations between momentum and energy, Particle with a zero rest mass, Doppler effect. (18)

Hint for examiners/paper setters

There will be two questions from each unit in the question paper. The students should attempt one question from each unit. In question paper, short answer type questions/numerical problems up to a maximum of 12 marks will be included. The weightage to short answer type questions and numerical problems should spread over all the units.

Text and Reference Books:

1. Mechanics by Hans & Puri
2. Mechanics by Sikri
3. Mechanics by D.S. Mathur
4. Classical Mechanics by Takwale & Purnick
5. Classical Mechanics by Symon
6. Classical Mechanics by Kumar & Gupta
7. Classical Mechanics by Goldstein
8. Waves and vibrations by S.P.Puri
9. Waves & Oscillation, by Brij Lal & Subarmayam
10. Waves & Oscillation, by S.P. Pabhi
11. Waves & Oscillation, by Main
12. Waves & Oscillation, Pain
13. Waves & Oscillation, by A.P. French
14. Waves & Oscillation, by S.L. Kakeni
15. Theory of Relativity by R. Resnick
16. Theory of Relativity by French
17. Theory of Relativity by Patharia.

S K Khosa

REVISED SYLLABUS FOR THE EXAMINATIONS TO BE HELD IN THE YEARS 2012, 2013 & 2014.

Subject: Physics
Paper: B
Class: B. Sc Part-I
Duration: 3:00 hours

External Examination: 40 Marks
Internal Assessment: 10 Marks

The question paper shall be of 40 marks. There shall be 10 questions in the paper with two from each unit. Each question shall be of 8 marks. The students have to attempt 5 questions, selecting one question from each unit.

UNIT I: Vectors

Basic ideas of vector algebra, Scalar and vector fields, Gradient of a scalar field and its physical interpretation, Line, surface and volume integrals, Divergence of a vector field and its physical significance, Solenoidal field, Gauss's divergence theorem.

Curl of a vector field and its physical significance, Stokes' theorem, Irrotational vector field, Vector identities. (18)

UNIT II: Electrostatics

Gauss's law in integral and differential forms, Line integral of electrostatic field, Conservative nature of electrostatic field, Electric field as the negative gradient of potential, Poisson's and Laplace's equations.

Electric quadrupole, Electric field and potential due to a quadrupole, Energy of electrostatic field.

Dielectrics, Polar and non-polar molecules, Polarisation of dielectric, Polarisation vector $\vec{P}$, Displacement vector $\vec{D}$, Relation $\vec{D} = \varepsilon_0 \vec{E} + \vec{P}$, Atomic polarizability, Electric susceptibility, Relation $K = 1 + \chi_e$, Gauss's law in a dielectric medium (differential and integral forms), Energy in the dielectric system, Boundary conditions satisfied by $\vec{E}$ and $\vec{D}$ at the interface between two homogeneous dielectrics. (18)

UNIT III: Electric current and Magnetostatics

Current and current density, Equation of continuity, Electrical conductivity, Microscopic

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form of Ohm's law, Failure of Ohm's law.

Review of Biot-Savart's law, Ampere's circuit law (integral and differential forms) and its limitations, Modified form of Ampere's circuit law, Displacement current, Divergence of magnetic field, Magnetic scalar and vector potentials, Divergence of vector potential, Derivation of Biot-Savart's law from vector potential.

Current loop as a magnetic dipole, Relation between magnetic dipole moment and angular momentum, Magnetisation vector $\vec{M}$, Magnetisation current, Free and bound currents, Relation between $\vec{B}, \vec{H}$ and $\vec{M}$, Magnetic susceptibility and permeability, Boundary conditions satisfied by $\vec{B}$ and $\vec{H}$ at the interface between two media. (18)

UNIT IV: Time Varying Fields

Integral and differential forms of Faraday's law of electromagnetic induction, Self inductance of a solenoid, Mutual inductance of two solenoids, Self inductance and mutual inductance of current loops, Reciprocity theorem of mutual inductance, Relation between self and mutual inductances, Coefficient of coupling.

Energy stored in a magnetic field, Maxwell's equations (differential and integral forms) and their interpretation, Poynting vector, Poynting theorem and its differential form. (18)

UNIT V: Electromagnetic Waves

Electromagnetic waves in vacuum: The wave equations for $\vec{E}$ and $\vec{B}$, Monochromatic plane electromagnetic waves and their transverse nature, Characteristic impedance.

Electromagnetic waves in dielectric medium: Propagation in linear media, Reflection and transmission at normal and oblique incidence, Derivation of laws of reflection and refraction.

Electromagnetic waves in conductors: Modified wave equations, Skin depth, and Characteristic impedance. (18)

Note for Paper Setters:

There will be two questions from each unit in the question paper. The students should attempt one question from each unit. In question paper, numerical problems/short answer questions upto a maximum of 12 marks will be included.

Text and Reference Books

1. Vectors by Speigal.
2. Electromagnetics by B.B. Laud
3. Electricity and Magnetism by K.K Tiwari.
4. Electricity, Magnetism and E.M. Waves by K.K. Sharina.
5. Introduction to Electrodynamics by David J. Griffiths
6. Electricity and Magnetism by A.E. Kip.
7. Electromagnetic fields and waves by Corson and Lorraine
8. Electricity and Magnetism by D.C. Tayal.
9. Electricity and Magnetism by Reitz and Millford.
10. Electricity and Magnetism by AX. Sikri.