UNIVERSITY OF JAMMU

NOTIFICATION
(12/Apr/Adp/07)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Authority, has been pleased to authorize adoption of the Syllabi and Courses of Study in the subject of Physics for B.Sc. Part II of Three Year Degree (General) Course as given in annexure for the examinations to be held in the years as indicated below against each alongwith %age of change: -

Class	Part	For the Examinations to be held in the year	%age of change	
B.Sc	II	2013, 2014 & 2015	Paper-A	Less than 10%
			Paper-B	Less than 15%

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 be set.

ii). If the change is 25% and above but below 50%, alternative question papers 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

No. F.Acd./XXI/10/12/ 5175—5219
Dated: 18|05|12.

UNIVERSITY OF JAMMU

SYLLABI & COURSES OF STUDY IN PHYSICS FOR THE EXAMINATIONS
TO BE HELD IN THE YEARS MAY 2013, MAY 2014, MAY 2015

Subject   : Physics

Class   : B.Sc. Part-II

Paper   : A
Duration   : 3:00 hours
Maximum Marks: 50
External Examination: 40
Internal Examination: 10

Unit I

Fourier Series

Periodic functions, even and odd functions continuous and discontinuous functions, Dirichlet's conditions, sine and cosine series, properties of Fourier series, complex form of Fourier series, graphical representation of a function, extension of interval, Fourier solution of simple functions. Applications of Fourier theorem to square wave, rectangular wave, half wave rectifier and full wave rectifier.

(18)

Unit II

Differential equations

Legendre differential equation and its series solution. Legendre polynomial, generating function, orthogonality property. recurrence relations.

Hermite differential equation and its series solution. Hermite polynomial, generating function, orthogonality property, recurrence relations.

(18)

Unit III

Thermodynamics I

Second law of thermodynamics, Carnot theorem, thermodynamic scale of temperature and its identity with gas scale. Entropy, statistical definition of entropy, additive nature of entropy, entropy changes in reversible and irreversible processes, law of increase of entropy with examples. T-S diagram, entropy and disorder. Heat death of universe, impossibility of attaining absolute zero. Nernst heat theorem and third law of thermodynamics.

Adiabatic expansion, Joule Thomson expansion, Boyle temperature, temperature of inversion and critical temperature of a gas. Principle of regenerative cooling and of cascade cooling.

(18)

Unit IV

Thermodynamics II

Extensive and intensive thermodynamic variables, Maxwell's general relationships. Application to Joule- Thomson cooling. Clasius Clapeyron latent heat equation. Thermodynamic potentials and equilibrium of thermodynamic system relation with thermodynamic variables. Cooling due to adiabatic demagnetization, production and measurement of very low temperatures.

Spatial distribution of black body radiation, Rayleigh – Jean's law, the ultraviolet catastrophe, Planck's law and deduction of Wien and Rayleigh Jean's law from Planck's law.

(18)

Statistical Mechanics

Probability, macro and micro states, thermodynamic probability, effects of constraints on a system, deviation from the state of maximum probability, equilibrium state of a dynamic system. Distribution of n distinguishable particles in K compartments of unequal sizes. Phase space, types of statistics, Boltzmann's distribution law, Maxwell's distribution of speeds and velocities, mean, r.m.s. and most probable speeds, Bose- Einstein (B-E) statistics and distribution law, derivation of Planck's radiation law. Fermi Dirac (F-D) statistics and its distribution law, application of F-D statistics to electron gas in metals,. Zero point energy.

(18)

Hint for Examiners / Paper setters

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. In question paper, short answer type questions / numerical problems up to a maximum of 15 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. Fourier Series by Shaum's Series
2. Mathematical Physics by Rajput
3. Mathematical Physics by Satya Parkash
4. Statistical Physics and Thermodynamics by V.S. Bhatia
5. Heat, Thermodynamics and Statistical Physics by Singhal, Agarwal and Satya Parkash.
6. Heat and Thermodynamics by M.S. Yadav
7. Statistical & Thermal Physics by S. Lokanatha and R.S. Gamir
8. Thermodynamics and Statistical Physics by J.K. Sharma
9. Heat and Thermodynamics byM.W. Zeemansky and R. Dittman
10. Introduction to Statistical Mechanics by B.B. Laud
11. Statistical Physics by M. Reit
12. Statistical Physics by K. Haung

UNIVERSITY OF JAMMU

SYLLABI & CORUSES OF STUDY IN PHYSICS FOR THE EXAMINATIONS
TO BE HELD IN THE YEARS MAY 2013, MAY 2014, MAY 2015

Subject   :   Physics
Class   :   B.Sc. Part-II

Paper   :   B
Duration   :   3:00 hours
Maximum Marks: 50
External Examination: 40
Internal Examination: 10

Unit I

Waves

Wave equation in simple and differential form, general solution of wave equation, velocity of transverse waves in a string, velocity of longitudinal waves in a fluid, energy density and intensity of a progressive wave, phase and group velocity, characteristic impedance of a string, reflection and transmissions of transverse waves in a string at boundary(discontinuity), reflection and transmission coefficients, impedance matching.

Superposition principle and Linearity, stationary / standing waves on a string of fixed length, eigen functions, energy of a vibrating string, eigen frequencies.

(18)

Unit II

Optics-I

Interference

Condition for interference, Young's double slit experiment, theory of interference fringes, Fresnel's Biprism and its application to the determination of wave length of sodium light, phase change on reflection, thin films (reflected and transmitted cases), Newton's rings, determination of refractive index of liquid and wavelength of monochromatic light. Michelson's interferometer and its application to determination of (i) wave length of monochromatic light (ii) thickness of thin transparent plate (iii) resolution of spectral lines (iv) Determination of refractive index of glass.

(18)

Unit III

Optics-II

Diffraction

Fresnel's diffraction, Fresnel's half-period zones, rectilinear propagation of light, zone plate, action of zone plate, diffraction at a straight edge, rectangular slit and thin wire, Fraunhofer diffraction, one slit diffraction, two slit diffraction, plane transmission grating, determination of wavelength of monochromatic light using grating, width of principal maximum, absent spectra, dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of grating,

(18)

Unit IV

Optics-III

Polarization

Polarization by reflection, Brewster's law, Malus Law, phenomenon of double refraction, Huygen Theory of double refraction, Nicol prism, quarter wave plate and half wave plate; theory, production and detection of plane, circularly and elliptically polarized light, optical activity, specific rotation, Laurent's half shade polarimeter.

(18)

Unit V

Electronics

Zener diode and its characteristics. Zener diode as voltage regulator, construction and characteristics of unijunction diode, tunnel diode and light emitting diode. Construction, working and characteristics of UJT, SCR and JFET.

P-N junction diode as half wave and Full wave rectifier. Ripple factor and efficiency of HWR and FWR. Characteristics of a transistor in common-base and common emitter modes, Operational amplifier and its applications as adder and inverter. Logic gates: OR, AND, NOT, NOR and NAND, XOR.

Hint for Examiners / Paper setters

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. In question paper, short answer type questions / numerical problems up to a maximum of 15 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. Optics by Brijlal, Subrahmanyam and M.N.Avadhanulu (S.Chand & Co.)
2. Optics by Jenkins & White (McGraw Hill)
3. Waves and Oscillations, Berkeley Physics course Vol. III
4. The Physics of Vibrations and Waves, By. H.J. Pain (Mac, Millan)
5. Waves, Optics and Electronics by K.K. Sharma (Sharma Publications)
6. Vibrations and Waves by French
7. Principles of Electronics by V.K. Mehta (S.Chand & Co.)
8. Basic Electronics by B.L. Theraja (S.Chand & Co.)
9. Basic Electronics and Linear Circuits by Bhargava and Gupta (Tata McGraw)
10. Integrated Electronics by Millman and Holkian (McGraw Hill)
11. Solid State Physics and electronics by Babbar and Puri

Class   B.sc part II Physics   practical's

Objective:

The objective of the course is to train students in the principles of experimental verification of physical laws .T he course also aims to train students in handling various instruments and to know their working .

Scheme of Examination and hints to Examiners.

i)   Practical examination will be of 25 marks to be conducted by one external and one internal examiner.

ii)   Total duration of the examination will be six hours divided into two days with a duration of three hours on each day.

iii)   Distribution of marks for practical examination will be as under:-

    a)   One experiment allotted on Ist day   -7marks

    b)   One experiment allotted on 2nd day   -7 marks

    c)   Written answer submitted to examiners   -3marks

         before the start of each allotted experiment

         as per directions of the examiners

         (1.5marks for each)

    d)   Oral examination(viva-voce)   -8marks

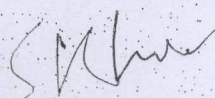   Total- 25 marks

iv)   Experiments will be alloted out of the ones done by the candidate during the session.

v)   Internal assessment (25 marks) will be evaluated as per rules of the University on the subject and will not be part of annual practical examination.

Note: The students are required to present their physics practical note books (containing minimums number of experiment required for their eligibility to the external examiner duly signed by the teacher-incharged and Countersigned by the Head of the Physics Department of the College, failing which the candidate shall not be allowed to appear in the examination.

DETAILED SYLLABUS

NOTE: Students are required to do minimum 12 experiments at least 4 experiments of dark rooms.

1. Determination of refractive index of a Liquids using spectrometer.
2. Determination of u and u using calcite or quartz prism.
3. Newton Rings
4. Diffractions grating.
5. Resolving power transmission grating
6. Measurement of width of narrow slit by producing diffraction bands with high light of known wave length
7. Resolving power of a telescope by its variation with diameter of lens.
8. Polarimeter
9. Cauchy's constants using known wavelength
10. Characteristics of transistor common base.
11. Characteristics of transistor common emitter.
12. Semiconductor diode characteristics, load line and dynamic characteristics
13. Load line(static and synamic) for transistor.
14. Determination of Planck's constant by Photocell
15. Kholrauch conductivity bridge.
16. Excitation and Ionisation Potential.
17. Valocity of voltage or current along the transmission line.
18. Self inductance by Andersons method.
19. Determination of E.C.E of Copper by employing a potentiometer.

20. Comparison of capacities using B.G. or sport reflection Galvanometer by refraction method.
21. Stefan"s constant.

Books Recommended for Practicals:

1. Advanced practical Physics   :   Workshop and Flint
2. Advanced practical physics   :   Chauhan and Singh
3. Basic Electronic and liner   :   N.N Bhargave,S.C Kulshreshta and
   Circuits.   Gupta
4. Principles of electronics   :   Ryder