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॥ अंतरी पेटवू ज्ञानज्योत ॥

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

Syllabus for

F.Y.B.Sc. PHYSICS.

(W.e.f. Acd.Yr. 2002 - 2003)

NORTH MAHARASHTRA UNIVERSITY, JALGAON.
SYLLABUS FOR F.Y.B.Sc. PHYSICS
With effect from A.Y. 2002-2003.

Paper-I

Unit (1) Theoretical Physics
Unit (2) Computer Fundamentals
Unit (3) Electricity
Unit (4) Magnetism

Paper-II

Unit (1) Mechanics & Properties of matter
Unit (2) Thermodynamics
Unit (3) Sound (Proper effect +Ultrasonics)
Unit (4) Optics-I (Geo optics + interference)

Paper - III : Practicals

Physics Paper - I

Unit (1) Theoretical Physics

Vector Algebra and Vector Analysis

(Revision of scalar and vector product of two vector scalar triple product, Geometrical interpretate of scalar tripple product, vector triple product).

Del operator, Gradient of a scalar function divergence and curl of a vector function, verification of following identities with their physical significance (without derivation)

i] $\nabla \times \nabla \psi = 0$

ii] $\nabla . \nabla \times A = 0$

iii] $\nabla .(\phi A) = \phi \nabla . A + A . \nabla \phi$

iv] $\nabla \times (\phi A) = \phi \nabla \times A \quad A \times \nabla \phi$

[9 periods, 10 Marks]

Complex Algebra

Idea of complex number, Algebra of complex number (Addition, substraction, multiplication & division), Argand diagram (Representation of complex number), Rectangular and polar form of complex number, Euler's formula, De Moivere's theorem (statement only) Trignometric functions (Sin θ, Cos θ, Sinh θ, Cosh θ), Application of exponential form for power and roots of complex number, Representation of AC by complex number. [9 periods, 10 Marks]

Partial diffrentiation

Defination of partial differentiation, Total differential, exact differential and chain rule.

[4 periods, 5 Marks]

Total : [22 periods, 25 Marks]

Unit (2) Computer fundamental - I

Introduction to Computer

History, Generations of computers, Block diagram of digital computer and functions of each block, characteristics of computer, Types of computer (Micro, Mini, main frame and super).

Definations of hardware and software, volatile and non volatil memory (RAM , ROM, PROM, EPROM)

[9 periods, 10 Marks]

Input and output devices

Graphic display devices, key board, mouse, hard disk, floppy disk (sector,track,cylinder,seek time, latency time), magnetic tape,compact disk (C.D.) printers (Dot matrix, Inkjet,Line,Laser)

[9 periods, 10 Marks]

Cont..2

Operating System

Operating system defination, need and type ,defination of compiler, interpreter,
[5 periods, 5 Marks]

Total : [23 periods, 25 Marks]

Unit (3) Electricity

Current Electricity

Loop analysis by Kirchhoff's laws. Thevenin's theorem, Norton's theorem with illustrations, Maximum power transfer theorem (for d.c.source), current density vector, power consumption and Joule's law . Idea of watt and kiliowatt-hour. [11 periods, 11 Marks]

Electrical d.c.circuits

Growth and decay of current in circuit containing L and R, charging and discharging of condensor through resistor, concept of time constant. [6 periods, 8 Marks]

Electrical a.c.circuits

L-R and R-C circuit, impedance, reactance, phase diagram, power factor,series LCR circuit Band width and Q-factor [5 periods, 6 Marks]

Total : [22 periods, 25 Marks]

Unit (4) Magnetism

Magnetic Field

Concept of magnetic field. magnetic flux. magnetic intensity and megnetisation, **B, H & M** vector and their relations. [6 periods, 7 Marks]

Electromagnetic induction

Revision of Faradays experiments, self and mutual induction, principle of transformer, Relation of turns ratio with current, voltage and impedance ratios, Efficiency of transformer, losses in transformers [7 periods, 7 Marks]

Magnetic properties of materials

Origin of magnetism, types - Para, ferro and diamagnetism, Hysterisis , Energy loss due to hysterisis, soft and hard magnetic materials, Choice of magnetic materials, materials for electro-magnets and transformers, ferrites. [10 periods, 11 Marks]

Total . [23 periods, 25 Marks]

Grand Total : [90 periods, 100 Marks]

Reference Books

1) Mathematical Physics - B.S. Rajput (Pragati Prakashan)
2) Vector Analysis - Spiegel (Schaum Series)
3) A course in mathematical Physics - R.G. Takwale
4) Mathematical Physics - B.D. Gupta
5) Computer Fundamentals - R.K. Sinha
6) Fundamentals of Computers - Rajaraman (Third Edition)
7) Electricity and Magnetism - A. Kip
8) Basic Electronics - B.L. Theraja
9) Electrostatics - B.B. Laud
10) An Introduction to Electricity and Magnetism - P.N. Das
11) Electricity and Magnetism - D.C. Tayal

Cont..3

Physics Paper - II

Unit (1) Mechanics and properties of matter.

I) Mechanics - Rotational motion

Physical significance of M.I., M.I. of solid and hollow cyclinders about different axes, M.I. of flywheel (Derivation and experiment) , kinetic energy of body rolling down an inclined plane.

[6 periods, 7 Marks]

II) Properties of Matter

Elasticity - Defination of y ,k, η and σ , relation between y,k and η, expression for η by torsional oscillations.

Surface Tension -Revision of S.T. and angle of contact, relation between S.T., pressure and curvature , Experimental determination of S.T. by Jaeger's method, factor affecting S.T.

Viscosity : Streamline and turbulant flow, coefficient of viscosity,Poiseuille's equation for determination of η (derivation and experimental verification),Bernoulli's equation.

[16 periods, 18 Marks] .

Total : [22 periods, 25 Marks]

Unit (2) Thermodynamics

Isothermal, adiabatic, isochoric and isobaric changes(definations only), work done on and by the gas, indicator diagram, equation of adiabatic change, work done during isothermal and adiabatic changes.

[5 periods, 6 Marks]

Reversible and irreversible processes, cyclic process, statement of first, second and third law of thermodynamics, entropy, entropy-temperature diagram, change of phase, first and second latent heat equation.

[7 periods, 7 Marks]

Carnot cycle, otto cycle, diesel cycle- their operations and efficiencies.

[6 periods, 7 Marks]

Elements of Refrigeration - Meaning of refrigeration, refrigeration system (types only), simple refrigeration system with refrigerator, refrigerant, components and their functions , refregerator cycle on p-v diagram, uses of refrigerator.

[5 periods, 5 Marks]

Total : [23 periods, 25 marks]

Unit (3) Sound

i) Ultrasonics - Production of ultrasonic waves, Piezo-electric effect, Piezo-electric oscillator, magnetostriction effect and magnetostriction oscillator, detection of ultrasonic waves and application. [7 periods, 8 Marks]

ii) Doppler effect - Listener at rest and source in motion, source at rest and listener in motion, source and listener both in motion, effect of wind velocity , Application of Doppler effect (Radar, supersonic air craft, red shift) , Asymmetric nature of Doppler effect in sound.

[9 periods, 10 Marks]

Cont.4

iii) Accoustics of buildings - Measurement of intensity of sound (weber, fechner law only) Bel, decibel and phone,reverberation, sabine's formula (No derivation), determination of absorption coefficient (No derivation), echos, focussing and resonance, interference (only explanation)

[6 periods, 7 Marks]

Total : [22 periods, 25 Marks]

Unit (4) Optics

(i) Geometrical optics : Combination of two thin lenses separated by finite distance and in contact, introduction to spherical and chromatic aberration, conditions for minimum spherical aberration, a matiem of two lenses (i) separated from each other , (ii) in contact, cardinal points, Ramsden's eye-piece.

[11 periods, 12 Marks]

ii) Interference : Idea of coherience, intensity distribution in interference pattern, phase change on reflection (stoke's treatment), interference in uniform thin film - reflected and transmitted system and interference in wedge shaped film (normal incidence), Newton's rings (Reflected system only) theory and its application (determination of wavelength and refractive index)

[12 periods, 13 Marks]

Total : [23 periods, 25 Marks]

Grand Total : [90 periods, 100 Marks]

Reference Books

1)	Properties of Matter	:-	N. Subrahmanyam & Brij Lal
2)	Elements of Properties of Matter	:-	D.S. Mathur
3)	Treatise of Heat	:-	Shah & Shriwastav
4)	Text book of Heat	:-	J.B. Rajam
5)	Refrigeration & Air conditioning	:-	Jordan & Prinstley
6)	Principals of Refrigeration	:-	Roy J.Dossat
7)	A Course in Refrigeration & Air conditioning	:-	S.Demkundwar
8)	Waves & Oscillations	:-	N. Subrahmanyam & Brij Lal
9)	Text Book of optics	:-	N. Subrahmanyam & Brij Lal
10)	Principles of optics	:-	B.K. Mathur
11)	Fundamentals of optics	:-	Jenkins & White
12)	Optics	:-	Ajay Ghatak

Cont.5

Physics Paper III - Practicals

Section - I Any eight of the following .

A: Computer Fundamentals - I (Any Two)

1. Demonstration of booting.
2. DOS commands - Internal commands (date,time,MD ,CD,RD, type, del, rename etc.)
3. Study of windows - 98.
4. Use of Excel to manuculate the data and to plot the graphs.

B: Electricity & Magnetism (Any Six)

1. Verification of Kirchhoff's laws.
2. Verification of Thevenin's theorem & Norton's theorem.
3. Maximum power transfer therorem.
4. Determination of inductance of a given AC Circuit (LR)
5. Charging and Discharging of the condenser through resister.
6. To determine the resonant frequency and to find bandwidth of series LCR ckt.
7. Electric billing with energy meter
8. Calibration of energy meter
9. To determine the efficiency and turns ratio of transformer.
10. Hysterisis by solenoid.
11. Angle of dip by earth inductor.
12. Use of Multimeter (Analog)

Section - II Any eight of the following .

A: Mechanics of properties of matter (Any Four)

1. n by torsional oscillation.
2. M.I.of disc using Ring.
3. M.I. of Flywheel.
4. S.T by Jaeger's method.
5. Viscosity by Poissulle's method.
6. Verification of Bernaulli's theorem.
7. Possion's ratio of rubber cord/rubber tube.
8. Y by bending.
9. η by flat spirel spring.

B : Thermodynamics,Sound,Optics. (Any four)

1. Study of components of two stroke/four stroke engine.
2. Thermal conductivity (k) by Lee's method.
3. Frequency of A.C. using sonometer.
4. Study of sound polution using dB meter.
5. Magnifying power of microscope.
6. Callibration of spectrometer.
7. R.I. of Prism.
8. R I. of various liquids by Abbe's refractometer.
9. Dispersive power of prism using spectrometer.

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CORRIGENDUM

The following corrections may be carried out to the Syllabus for **B.Sc. Part-I (Physics)** Circulated vide Circular No. 27/2002, No.NMU/12/Sci. Faculty /490/ 2002, Dated 01\07\2002.

Sr. No.	Page No.	Particulars of Corrections.
1.	1	The word " Proper " be read as "Doppler" appears in Unit (3) of Paper-II
2.	1	Under Heading of Physics Paper-I, Unit (1) Theoretical Physics, Sub Head, Bracket Vector Algebra and Vector Analysis :- (.....) be inserted as shown now & read as under - "(Revision of Scalar and vector product of two vector) scalar triple product, Geometrical interpretate of scalar tripple product, vector triple product ".
3.	1	Correct sentence be read as shown now - "Del operator, Gradient of a scalar function divergence and curl of a vector function, <u>with their physical significance (without derivation)</u> : <u>Verification of following identities</u> : "

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