

DEPARTMENT OF PHYSICS
A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS &
SCIENCE
(AUTONOMOUS) , VUYYURU – 521 165
I B.Sc. 2nd Semester (2020-21)

Paper II: Waves Optics II SEMESTER

Work load: 60 hrs per semester credits - 3

4 hrs/week

UNIT-I Interference of light: (12hrs)

Introduction, Conditions for interference of light, Interference of light by division of wave front and amplitude, Phase change on reflection Stokes' treatment, Lloyd's single mirror, Interference in thin films: Plane parallel and wedge shaped films, colours in thin films, Newton's rings in reflected light-Theory and experiment, Determination of wavelength of monochromatic light, Michelson interferometer and determination of wavelength.

UNIT-II Diffraction of light: (12hrs)

Introduction, Types of diffraction: Fresnel and Fraunhofer diffractions, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, Plane diffraction grating, Determination of wavelength of light using diffraction grating, Resolving power of grating, Fresnel's half period zones, Explanation of rectilinear propagation of light, Zone plate, comparison of zone plate with convex lens.

UNIT-III Polarisation of light: (12hrs)

Polarized light: Methods of production of plane polarized light, Double refraction, Brewster's law, Malus law, Nicol prism, Nicol prism as polarizer and analyzer, Quarter wave plate, Half wave plate, Plane, Circularly and Elliptically polarized light-Production and detection, Optical activity, Laurent's half shade polarimeter: determination of specific rotation, Basic principle of LCDs

UNIT-IV Aberrations and Fibre Optics: (12hrs)

Monochromatic aberrations, Spherical aberration, Methods of minimizing spherical aberration, Coma, Astigmatism and Curvature of field, Distortion;

Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by a distance.

Fibre optics: Introduction to Fibres, different types of fibres, rays and modes in an optical fibre, Principles of fibre communication (qualitative treatment only), Advantages of fibre optic communication.

UNIT-V Laser and Holography :(12hrs)

Lasers: Introduction, Spontaneous emission, stimulated emission, Population Inversion, Laser principle, Einstein coefficients, Types of lasers-He-Ne laser, Ruby laser, Applications of lasers; Holography: Basic principle of holography, Applications of holography

UNIT-VI Competitive Physics (Only for Internal Exams)

Newton's laws of Motion, Work, Energy, and Power, conservative and non-conservative forces, Gravitation, Kepler's laws statements, concept of friction, scalars and vectors with examples, expansion of solids applications.

REFERENCE BOOKS:

- BSc Physics, Vol.2, Telugu Academy, Hyderabad
- A Text Book of Optics-N Subramanyam, L Brijlal, S.Chand& Co.
- Optics-Murugesan, S.Chand& Co.
- Unified Physics Vol.IIOptics, Jai PrakashNath&Co.Ltd., Meerut
- Optics,F.A. Jenkins and H.G.White, McGraw-Hill
- Optics, AjoyGhatak,TataMcGraw-Hill.
- Introduction of Lasers – Avadhanulu, S.Chand& Co.

- Principles of Optics- BK Mathur, Gopala Printing Press, 1995

The Guidelines to be followed by the question paper setters in Physics for the Second semester - end exams (2020-21)

PAPER TITLE: Wave Optics

Paper- II Semester – II Maximum marks: 70marks Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1(28 Marks)	T+P	2
Unit-2(28 Marks)	T+P	2
Unit-3(14Marks)	T	1
Unit-4(18 Marks)	T+T	1
Unit-5(24 Marks)	T	2
Unit-6	0	0

Note: **T** means one theory question, **P** means one problem

- **Section-A** contains **5** short questions and **3** problems out of these **8** questions, the student has to answer any **4**, each question carries **4** marks.
- **Section –B** contains **8** essay questions, the student has to answer any **5** questions, each question carries **10** marks.
- **The Question papers setters are requested to cover all the topics in the syllabus from Units I to V only as per the weightage given. Unit VI syllabus is excluded for the external exams.**

Duration : 3Hours

Maximum marks : 70marks

Pass marks : 28 marks

SECTION-A

Answer any FOUR of the following

4x5=20m

- 1) Explain coma in lenses with a neat diagram
- 2) Explain the formation of colours in thin films
- 3) Explain the difference between interference and diffraction
- 4) State and explain Malus law
- 5) State and explain the principles of holography
- 6) Two thin convex lenses of focal length 0.25 m and 0.20 m are placed coaxially 10 cm apart. Find the focal length of combination.
- 7) In Newton's ring experiment, the diameter of the 10th dark ring is 0.433 cm. Find the wavelength of light, if the radius of curvature of the lens is 70 cm.
- 8) A half wave plate is constructed for a wavelength of 6000 \AA , for what wave length does it work as a quarter wave plate.

SECTION – B

ANSWER ANY FIVE OF THE FOLLOWING

(5 X 10 = 50 M)

- 9) What is chromatic aberration . obtain an expression for the chromatic aberration of a lens .Derive the condition for achromatism when the lens are in contact and seperated by a distance .
- 10) Describe the experimental arrangement to observe Newton's rings, by reflected light. Obtain an expressions for the diameter of nth bright and dark rings.
- 11) Describe with necessary theory Fresnel's biprism experiment to determine the wavelength of light
- 12) What is diffraction. Describe Fraunhofer's diffraction due to single slit .
- 13) Describe the construction and working of a zone plate with necessary theory
- 14) Describe the construction and working of Nicol prism. Explain how it is used as polarizer and analyser.

15) Write a note on spontaneous emission and stimulated emission. Explain the construction and working of ruby laser.

16) Explain Gabor hologram and discuss its limitations.

Practical Paper II: Wave Optics

Exam duration : 3Hours credits - 2 Maximum marks : 50 marks

Work load: 30 hrs

2 Hours per week

Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton's rings.
2. Resolving power of grating.
3. Study of optical rotation –polarimeter.
4. Dispersive power of a prism.
5. Determination of wavelength of light using diffraction grating-minimum deviation method.
6. Determination of wavelength of light using diffraction grating-normal incidence method.
7. Resolving power of a telescope.
8. Refractive index of a liquid-hallow prism
9. Determination of thickness of a thin wire by wedge method
10. Determination of refractive index of liquid-Boy's method.

DEPARTMENT OF PHYSICS
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II B.Sc. 4th Semester (2020-21)

Paper IV: Thermodynamics & Radiation Physics

Work load:60 hrs per semester

credits - 3

4 hrs/week

UNIT- I .. (11 hrs)

1.Kinetic theory of gases

Introduction –Deduction of Maxwell’s law of distribution of molecular speeds, Transport phenomena-Viscosity of gases-thermal conductivity-diffusion of gases.

UNIT- II ..(14 hrs)

2. Thermodynamics

Introduction- Isothermal and adiabatic process- Reversible and irreversible processes- Carnot’s engine and its efficiency-Carnot’s theorem-Second law of thermodynamics. Kelvin’s and Clausius statements-Entropy, physical significance –Change in entropy in reversible and irreversible processes-Entropy and disorder-Entropy of Universe- Temperature-Entropy (T-S) diagram-Change of entropy of a perfect gas- change of entropy when ice changes into steam.

UNIT- III ..(11 hrs)

3. Thermodynamic potentials and Maxwell’s equations

Thermodynamic potentials-Derivation of Maxwell’s thermodynamic relations-Clausius-Clayperon’s equation-Derivation for ratio of specific heats-Derivation for difference of two specific heats for perfect gas. Joule Kelvin effect-expression for Joule Kelvin coefficient for perfect.

UNIT- IV ..(10 hrs)

4. Low temperature Physics

Introduction-Joule Kelvin effect-liquefaction of gas using porous plug experiment Joule expansion-Distinction between adiabatic and Joule Thomson expansion-Expression for Joule Thomson cooling-Liquefaction of helium, Kapitza’s method-Adiabatic demagnetization, Production of low temperatures -applications of substances at low-temperature-effects of chloro and fluoro carbons on ozone layer.

UNIT- V ..(14 hrs)

5. Quantum theory of radiation

Blackbody-Ferry’s black body-distribution of energy in the spectrum of black body-Wein’s displacement law, Wein’s law, Rayleigh-Jean’s law-Quantum theory of radiation-Planck’s law-Measurement of radiation-Types of pyrometers –Angstrom pyroheliometer-determination of solar constant, Temperature of Sun.

TEXT BOOKS:

1. BSc Physics, Vol.2, *Telugu Akademy, Hyderabad*
2. Thermodynamics, R.C. Srivastava, Subit K. Saha&Abhay K. Jain *Eastern Economy Edition.*
3. Unified Physics Vol.2, Optics & Thermodynamics, *Jai Prakash Nath&Co.Ltd., Meerut*
4. Second Year Physics, K. Ramakrishna,D.V.Brahmaji,A.Sreenivasa Rao & S.L.V. Mallikarjun, *VikasPublications,Guntur.*

REFERENCE BOOKS:

1. Fundamentals of Physics. Halliday/Resnick/Walker.C. *Wiley India Edition 2007*
2. Heat, Thermodynamics and Statistical Physics-N Brij Lal, P Subrahmanyam, PS Hemne, *S.Chand& Co.,2012*
3. Heat and Thermodynamics- MS Yadav, *Anmol Publications Pvt. Ltd, 2000*
4. University Physics, HD Young, MW Zemansky,FW Sears, *Narosa Publishers, New Delhi*
5. Text Book of +3 Physics – Samal, Mishra &Mohanty, National Library, Min.of Culture, Govt of India.
6. Modern Engineering Physics, A.S. Vasudeva, S.Chand& Co.,

The Guidelines to be followed by the question paper setters in Physics for the IV Semester - end exams

PAPER TITLE: Thermodynamics & Radiation Physics

Paper- IV Semester – IV Maximum marks: 70 marks Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1(15 Marks)	T	1
Unit-2(30 Marks)	T+P	2
Unit-3(20 Marks)	T+P	2
Unit-4(25 Marks)	T	2
Unit-5(30 Marks)	T+P	1

Note: T means one theory question, P means one problem

- **Section-A** contains **5** short questions and **3** problems out of these **8** questions, the student has to answer any **5**, each question carries **5** marks.
- **Section –B** contains **8** essay questions, the student has to answer any **5** questions, each question carries **10** marks.

- The Question papers setters are requested to cover all the topics in the syllabus as per the weightage given by us.

SEMESTER – IV	COURSE CODE:PHY401C
PAPER TITLE : THERMODYNAMICS AND RADIATION PHYSICS	

Duration : 3Hours

Maximum marks : 70

Pass marks : 28

MODEL PAPER

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
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II B.Sc. (PHYSICS)- IV SEMESTER

THERMODYNAMICS AND RADIATION PHYSICS

TIME: 3 Hrs

PHY – 401 C

MAX MARKS: 70

SECTION – A

ANSWER ANY FIVE OF THE FOLLOWING

(5 X 4 = 20 M)

- 1) Explain about Transport phenomena of gases
- 2) Explain about reversible and irreversible processes
- 3) Deduce Clausius–Clapeyron’s equation using Maxwell’s relations
- 4) Discuss the effects of chloroflouro carbons on ozone layer
- 5) Define black body. Explain about Ferry’s black body
- 6) Calculate the efficiency of a reversible Carnot’s engine that operates between 327 degrees centigrade and 127 degrees centigrade.
- 7) Deduce the change in the boiling point of water when the pressure changes by 1 cm of mercury. Given $L = 22.68 \times 10^5$ J/kg, volume of the 1kg of water = 10^{-3} and volume of 1 kg of steam = 1.674 m³.
- 8) A star emits radiations of maximum energy at a wavelength of 5500 Å. Find the temperature of the star. (Wien's constant = 0.289 cm-K)

SECTION – B

ANSWER ANY FIVE OF THE FOLLOWING QUESTIONS

(5 X 10 = 50 M)

- 9) Derive Maxwell’s law of distribution of molecular speeds
- 10) Derive the construction and working of Carnot’s heat engine. Derive an expression for its efficiency
- 11) Distinguish between isothermal and adiabatic processes. Derive the formula for the work done during adiabatic process.
- 12) Define the four thermodynamic potentials. Obtain Maxwells thermodynamic equations using these equations.
- 13) Define molar specific heats. Derive the specific heat relations from Maxwell’s thermodynamic relations.

- 14) What is Joule-Kelvin effect? Derive an expression for the cooling produced when a real gas suffers Joule-Thomson effect.
- 15) Explain the method of adiabatic demagnetization for producing low temperatures
- 16) What is a pyrometer? Describe the construction and working of Disappearing filament optical pyrometer

Practical Paper IV: Thermodynamics

Exam duration : 3Hours credits - 2 Maximum marks : 50 marks

Work load: 30 hrs

2 Hours per week

Minimum of 6 experiments to be done and recorded

1. Specific heat of a liquid –Joule’s calorimeter –Barton’s radiation correction
2. Thermal conductivity of bad conductor-Lee’s method
3. Thermal conductivity of rubber.
4. Measurement of Stefan’s constant.
5. Specific heat of a liquid by applying Newton’s law of cooling correction.
6. Heating efficiency of electrical kettle with varying voltages.
7. Mechanical equivalent of heat
8. Thermo emf - thermo couple potentiometer
9. Coefficient of thermal conductivity of copper- Searle’s apparatus.
10. Thermal behavior of an electric bulb (filament/torch light bulb)
11. Measurement of Stefan’s constant- emissive method
12. Temperature variation of resistance- thermistor.

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III B.Sc. Physics – VI Semester – Paper –VII (2020-21)

Elective VII (A):(Electronics)

Course Code: PHY – 601GE

SEMISTER-VI

credits - 3

4 hrs/week

ELECTIVE PAPER –VII-A: ANALOG AND DIGITAL ELECTRONICS

UNIT- I (14 hours)

Total Lectures: 60 hours

1. FET Construction ,Working ,Characteristics and uses; MOSEFT-enhancement MOSEFT,Depletion MOSEFT, Construction and Working, drain Characteristics of MOSEFT, applications of MOSEFT.
2. Photo electric devices: structure and operation, Characteristics and applications of LED and LCD.

UNIT- II (10hours)

3. Operational amplifier: Characteristics of ideal and practical OP-amp (IC-741),Basic differential OP-amp supply voltage, IC identification, internal blocks of OP-amp, its parameter off set voltages and currents, CMRR, slew rate, Concept of Virtual ground.

UNIT- III (10hours)

4. Applications of OP-amp: OP-amp as voltage amplifier, inverting amplifier, Non- inverting amplifier, Voltage follower, summing amplifier, difference amplifier, comparator, Integrator, Differentiator.

UNIT- IV (14hours)

5. Data processing circuits: Multiplexers, De –Multiplexers, encoders, decoders, Characteristics

6.For Digital IC's –RTL, DTL,TTL, CMOS (NAND&NOR Gates).

UNIT- V (12hours)

7. Sequential digital circuits: Flip-flops, RS, clocked SR, JK, D, T, Master-Slave Flip-flops .
8. Counters: Asynchronous counters-modulo 4counter-modulo 16 ripple counter, Decade counter, Synchronous counter.

REFERENCE BOOKS :

1. Digital Electronics by G.K.Kharate Oxford University Press.
2. Unified Electronics by Agarwal and Agarwal.
3. OP-Amp and Linear ICs by Ramakanth A Gayekward, 4th edition PHI
4. Digital Principles and Applications by Malvino and Leach, TMH, 1996, 4th edition.
5. Digital Circuit design by Moris Mano, PHI.
6. Switching theory and Logic design by A.Anand kumar, PHI
7. Operations amplifier by S.V.Subramanyam.

The Guidelines to be followed by the question paper setters in Physics for the VI Semester - end exams

PAPER TITLE: (ELECTIVE PAPER –VII-A): ANALOG AND DIGITAL ELECTRONICS

Paper- VII-A Semester – VI Maximum marks: 70 marks Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (24 Marks)	T	2
Unit-2 (18 Marks)	T+P	1
Unit-3 (28Marks)	T+P	2
Unit-4 (18Marks)	T+T	1
Unit-5 (24Marks)	T	2

Note: **T** means one theory question, **P** means one problem

- **Section-A** contains **6** short questions and **2** problems out of these **8** questions, the student has to answer any **5**, each question carries **4** marks.
- **Section – B** contains **8** essay questions, the student has to answer any **5** questions. Each question carries **10** marks.

The Question papers setters are requested to cover all the topics in the syllabus as per the weightage given by us.

SEMESTER – V	COURSE CODE : PHY-601 GE
PAPER TITLE : ELECTIVE PAPER –VII-A: ANALOG AND DIGITAL ELECTRONICS	

Duration : 3Hours Maximum marks : 70 Pass marks : 28 marks

Model paper –VII(A) Elective (Electronics)

Semester -VI

Elective Paper –VII-(A): Analog and Digital Electronics

SECTION-A

Time:3hr

Max.marks:70

Answer any five of the following questions:

5x4=20M

1. Discuss the advantages of FET over BJT.
2. Explain the concept of Virtual Ground.
3. Describe the concept of OP-amp Summing amplifier.
4. The summing amplifier as $R_o=10K$, $R_1=10K$, $R_2=5K$, $R_3=6K$. If $V_1=6V$, $V_2= -3V$, $V_3= -0.8V$. Calculate V_0 ?
5. Explain the Working of Demultiplexer with circuit diagram.
6. Explain the working of TTL logic.
7. Explain the working of RS Flip flop .Write its Truth Table.
8. Find the gain of inverting amplifier with given data. $R_1= 5000\Omega$, $R_f= 60 K\Omega$.

SECTION-B

Answer any five of the following questions:

10x5=50M

9. Explain the construction , Working and V-I Characteristics of JFET.
10. Describe Construction and Working Of LED. Mention its application.
11. What are the Characteristics of an ideal OP-amp .Draw the block diagram of OP-amp. Define the term CMRR and Slew rate.
12. Derive the Expression per Closed loop Gain of an inverting Amplifier. Explain how OP-amp acts as an Integrator.
13. Explain the working of Integrator, Differentiator.
14. What is a Multiplexer? Explain its Working and Analogy.
15. Describe the Working of Master Slave JK Flip flop. Give its Truth Table.
16. Explain Asynchronous counter and Synchronous counter.

ELECTIVE PAPER –VII PRACTICAL: ANALOG AND DIGITAL ELECTRONICS credits – 2 2 Hours per week

Minimum of 6 experiments to be done and recorded

1. Characteristics of FET
2. Characteristics of MOSEFT
3. Characteristics of LDR
4. Characteristics of OP-amp.(IC-741)
5. OP-amp as amplifier/inverting amplifier
6. OP-amp as integrator/differentiator
7. OP-amp as summing amplifier /difference amplifier
8. Master-Slave Flip-flop
9. JK Flip-flop

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III B.Sc. Physics – VI Semester – Paper –VIII (2020-21)

SEMESTER-VI Course Code: PHY -602 CE credits - 3 4
hrs/week

CLUSTER ELECTIVES VIII-A

PAPER-VIII-A-1: INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLER

UNIT- I (10hours)

MICROPROCESSOR:

General architecture of microprocessor, architecture of 8085 microprocessor, 8085 pin diagram, Concept of data bus, address bus, and control bus, 8085 programming instruction classification.

UNIT-II: (10hours)

8085 Interfacing Memory

Introduction-Memory structure and its requirements-basic concepts in memory interfacing. Address Decoding-Interfacing circuit. Port-mapped I/O or Direct I/O interface (8-bit Addressing)-Memory Indirect I/O mapped Interfaces (16-bit Addressing)-Port mapped versus Memory mapped I/O. I/O Device Interfacing.

UNIT-III (15hours)

8085 Microprocessor Applications

Introduction-Programmed data transfer scheme. Direct Memory Access (DMA) – Types. 8255A PPI-Block diagram. 8259A PIC-Pin diagram and functional description. 8257 Programmable DMA controller-Block diagram and Pin description.

UNIT-IV: (13hours)

8051 Architecture-I:

Types of microcontrollers- microcontroller architecture, CISC, RISC, operation of microcontroller, basic building blocks of microcontroller, comparison of microcontroller and microprocessor- block diagram of 8051-I/o pins and ports.

Microcontroller Resources.

UNIT-V: (12hours)**8051 Architecture-II:**

8051 Flag bits and PSW register and DPTR register- Memory Organization- Special function registers- PSW register-Counters and Timers-Serial I/O-8051 Microcontroller Interrupts.

REFERENCE BOOKS:

1. Unified Electronics – VI(A), Micro controllers and applications
2. THE 8051 micro controller and embedded systems using assembly and C, M.A. Mazidi, J.G.Mazidi and R.D.McKinlay second Ed.,2007 Pearson education India.
3. Unified Electronics – V(A),Microprocessor (Intel 8085)
4. Micro controllers in practice, I susena and Mitescu, 2005, Springer.

The Guidelines to be followed by the question paper setters in Physics for the VI Semester - end exams

CLUSTER ELECTIVES VIII-A**PAPER-VIII-A-1: INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLER**

Paper- VIII-A-1 Semester – VI Maximum marks:70 Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (28 Marks)	T+T	2
Unit-2 (14Marks)	T	1
Unit-3 (28Marks)	T+T	2
Unit-4 (24Marks)	T	2
Unit-5 (18 Marks)	T+T	1

Note: T means one theory question.

- **Section-A** contains **8** short questions, out of these **8** questions, the student has to answer any **5**, each question carries

4 marks.

- **Section – B** contains **8** essay questions, the student has to answer any 5 questions. Each question carries **10** marks.

The Question papers setters are requested to cover all the topics in the syllabus as per the weightage given by us.

SEMESTER – VI	COURSE CODE : PHY-602 CE
PAPER TITLE : CLUSTER ELECTIVES VIII-A	
PAPER-VIII-A-1: INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLER	

Duration : 3Hours

Maximum marks : 70

Pass marks : 28 marks

Model Paper- Sem VI

III B.Sc - PHYSICS (cluster) – VI SEMESTER

INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLERS

PHY- 602 CE

Max marks : 70

SECTION-A

Answer any FIVE of the following questions :

(5x4=20M)

- 1) Define data bus and address bus.
- 2) Define Address Decoding.
- 3) Write a short note on asynchronous data transfer scheme.
- 4) What is direct access memory?
- 5) Write about CISC.
- 6) Write about operation of microcontroller.
- 7) Write about program memory.
- 8) Write about memory expansion.

SECTION – B

Answer any FIVE of the following questions :

(5x10 = 50 M)

- 9) Describe the general architecture of Microprocessor.
- 10) Draw the 8085 Microprocessor pin diagram and explain about different pins.
- 11) Discuss about Direct I/O interface of 8-bit?
- 12) Give the functional description of 8259A.
- 13) Describe the Block diagram of 8255A.
- 14) Draw the pin diagram of 8051 and briefly describe the pins.
- 15) Write the basic building blocks of microcontroller.
- 16) Write short notes on
 - a) R-registers
 - b) Program status word register
 - c) Data Pointer register.

PAPER-VIII-A-1: Practical: INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLER

credits – 2 2 Hours per week

Minimum of 6 experiments to be done and recorded

1. To find that the given number is prime or not.
2. To find the factorial of a number.
3. Write a program to make the two numbers equal by increasing the smallest number and decreasing the largest number.
4. Use one of the four parts of 8051 for O/P interfaced to eight LED's simulate binary counter (8 bit) on LED's.
5. Program to glow first four LED then next four using TIMER application.
6. Program to rotate the contents of the accumulator first right and then left.
7. Program to run a count down from 9-0 in the 7 segment LED display.
8. To interface 7 segment LED display with 8051 Microcontroller and display 'HELP' in the 7 segment LED display.

9. To toggle '1234' as '1324' in the 7 segment LED.
10. Interface stepper motor with 8051 and write a Program to move the motor through a given angle in clock wise or counter clock wise direction.
11. Application of Embedded system: Temperature measurement, some information on LCD display, interfacing a key board.

DEPARTMENT OF PHYSICS
A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
III B.Sc. 6th Semester (2020-21)

COURSE CODE : PHY-603 CE credits - 3

Cluster Elective Paper – VIII- A-2 : Computational Methods and Programming

No. of Hours per week : 04

Total Lectures : 60

UNIT – I (12 hrs)

1. Fundamentals of C language: C character set – Identifiers and keywords – structure of c program. Constants- variables- Data types- Declarations of variables – Declaration of storage class – Defining symbolic constants – Assignment statement.
2. Operators : Arithmetic operators- Relational operators – Logic operators – Assignment operators – Increment and decrement operators – Conditional operators.

UNIT –II (12 hrs)

3. Expressions and I/O statements : Arithmetic expressions – precedence of arithmetic operators – Type converters in expressions – Mathematical (Library) functions – Data input and output – The getchar and putchar functions – Scanf – Printf simple programs.
4. Control statements: IF – ELSE statements – Switch statements – The operators – GO TO-while, DO-While, FOR statements – BREAK and CONTINUE statements.

UNIT – III (12 hrs)

5. Arrays: One dimensional and two dimensional arrays – Initialization –Type declaration – Inputting and outputting of data for arrays – Programs of matrices addition, subtraction and multiplication.
6. User defined functions: The form of C functions – Return values and their types – Calling a function – Category of functions. Nesting of functions. Recursion. ANSI C functions – Function declaration. Scope and life of variables in functions.

UNIT – IV (12 hrs)

7. Linear and Non-Linear equations: Solution of Algebra and transcendental equations – Bisection, Falsi position and Newton – Rhapson methods – Basic principles – Formulae – algorithms.
8. Simultaneous equations: Solutions of simultaneous linear equations – Guass elimination and Gauss seidel iterative methods – Basic principles – Formulae- Algorithms.

UNIT – V (12 hrs)

Interpolations : Concept of linear interpolation – Finite differences –
 Newton’s and Lagrange’s interpolation formulae – principles and Algorithms.

9. Numerical differentiation and integration : Numerical differentiation –

algorithm for evaluation of first order derivatives using formulae based on Taylor’s series –
 Numerical integration – Trapezoidal and Simpson’s 1/3 rule – Algorithms.

REFERENCE BOOKS :

1.Introductory methods of Numerical Analysis : SASTRY

2. Numerical Methods : Balaguruswamy

3. Programming in ANSI C (TMH) : Balaguruswamy

4.Programming with ‘C’ – Byron Gottafried, Tata Mc Graw Hill

The Guidelines to be followed by the question paper setters in Physics for the VI Semester - end exams

Cluster Elective Paper – **VIII- A-2** : Computational Methods and Programming

Paper- VIII-A-2 Semester – VI Maximum marks: 70 marks Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (28Marks)	T+T	2
Unit-2 (28Marks)	T+T	2
Unit-3 (28Marks)	T+T	2
Unit-4 (14Marks)	T	1
Unit-5 (14 Marks)	T	1

Note: T means one theory question.

➤ **Section-A** contains **8** short questions, out of these

8 questions, the student has to answer any 5, each question carries 4 marks.

- **Section – B** contains 8 essay questions, the student has to answer any 5 questions. Each question carries 10 marks.

The Question papers setters are requested to cover all the topics in the syllabus as per the weightage given by us.

SEMESTER – VI	COURSE CODE : PHY-603 CE
PAPER TITLE : Cluster Elective Paper – VIII- A-2 : Computational Methods and Programming	

Duration : 3Hours

Maximum marks : 70

Pass marks : 28 marks

Model Paper :Sem VI
III B.Sc - PHYSICS (cluster) – VI Semester

COMPUTATIONAL METHODS AND PROGRAMMING

Paper Code : PHY 603 CE

Max.Marks : 70

SECTION-A

Answer any FIVE of the following questions :

(5x4=20M)

- 1) Write different data types in C with Examples.
- 2) Structure of C program with Examples.
- 3) Explain about Puchar & getchar.
- 4) Explain about IF-Else Statement.
- 5) Define 2D array in C with example
- 6) Define Function with Examples.
- 7) Write the false position algorithm
- 8) Describe the Trapezoidal rule

SECTION-B

Answer any FIVE of the following questions : (5x10=50M)

- 9) Explain about storage classes in C
- 10) Explain different operators available in C
- 11) Explain about iterative statements in C.
- 12) Explain about Print f() & Scan f() function with examples.
- 13) Write a program for matrix multiplication
- 14) Explain about Recursion with example programme.
- 15) Explain about nesting of functions with example
- 16) Write the algorithm and flowchart of Newton Raphson formula.

Cluster Elective Paper – VIII-A-2 : Practical

Computational Methods and Programming

2 hrs/ week

credits - 2

Minimum of 6 experiments to be done and recorded

1. Write a program that reads an alphabet from keyboard and display in the reverse order.
2. Write a program to read and display multiplication of tablets.
3. Write a program for converting centigrade to Fahrenheit temperature and Fahrenheit temperature centigrade.
4. Write a program to find the largest element in an array.
5. Write a program based on percentage calculation , the grade by entering the subject marks . (If percentage > 60, I class, if percentage between 50 &60 II class, if percentage between 35 & 50 III class, if percentage below 35 fail)
6. Write a program for generation of even and odd numbers up to 100 using while, do – while and for loop.
7. Write a program to solve the quadratic equation using Bisection method.
8. Write a program for integration of function using Trapezoidal rule.
9. Write a program for solving the differential equation using Simpson's 1/3 rule.

DEPARTMENT OF PHYSICS
A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS &
SCIENCE
(AUTONOMOUS) , VUYYURU – 521 165
III B.Sc. 6th Semester (W.E.F 2020-21)

COURSE CODE : PHY-604 CE

Cluster Elective Paper – **VIII-A-3: Electronic Instrumentation**

No.of Hours per week: 04

Total Lectures: 60

UNIT -1 (12 Hours)

1. Basic of measurements: Instruments accuracy, precision, sensitivity- errors in measurements- Basic meter movement-PMMC (Permanent Magnetic Moving Coil).
2. Measurement of dc current: DC ammeter- multi range ammeters-the ARYTON Shunt or universal Shunt.
3. Measurement of dc voltage: DC Voltmeter – Multi Range Voltmeter- Voltmeter sensitivity.

UNIT – II (10 HOURS)

4. **Analog Multimeter:** Multimeter - as dc ammeter-as dc voltmeter-as ac voltmeter- as ohm meter-Multimeter operating instructions.
5. Digital instruments: Principle and working of digital instruments, characteristics of a digital meter, working principle of digital voltmeter.

UNIT –III (14 HOURS)

6. CRO: Block diagram of basic CRO, construction of CRT, electron gun, electrostatic focusing and acceleration (only explanation), time base operation, synchronization, front panel controls, specifications of CRO and their significance.
7. Applications CRO: Measurement of voltage- dc and ac, frequency, time period. Special features of dual trace CRO. Digital storage oscilloscope: block diagram and principle of working.

UNIT – IV (12 HOURS)

8. Diode as Rectifier – Half wave rectifier, Full wave rectifier – construction, working and efficiency. (no derivation)
9. Feedback in Electronic circuits – Positive and Negative feedback, expressions for gains, advantages of negative feedback, Oscillators, Barkhausen criteria, RC phase shift oscillator (no derivation)

UNIT – V (12 HOURS).

10. Signal Generators: Block diagram, working and specifications of low frequency signal generators, pulse generator, function generator .
11. Bridges: Measurement of resistance by Wheat stone’s Bridge- Sensitivity of Wheat stone’s Bridge- Applications of Wheat stone’s Bridge-Limitations of Wheat stone’s Bridge.

REFERENCE BOOKS :

1. A text book in electrical technology by B.L. Thereja (S.Chand & CO)
2. Digital circuits and systems by venugopal 2011 (Tata Mcgraw Hill)
3. Digital Electronics by SubrathaGoshal 2012 (Cengage Learning)
4. Electronic Instrumentation by HS Kalsi (Tata Mcgraw Hill)

The Guidelines to be followed by the question paper setters in Physics for the VI Semester - end exams

Cluster Elective Paper – VIII-A-3: Electronic Instrumentation

Paper- VIII-A-3 Semester – VI Maximum marks: 70 marks Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (28Marks)	T+T	2
Unit-2 (18 Marks)	T+T	1
Unit-3 (28Marks)	T+T	2
Unit-4 (14 Marks)	T	1
Unit-5 (24 Marks)	T	2

Note: T means one theory question

- **Section-A** contains **8** short questions out of these **8** questions, the student has to answer any **5**, each question carries 4 marks.
- **Section – B** contains **8** essay questions, the student has to answer any **5** questions. Each question carries **10** marks.

The Question papers setters are requested to cover all the topics in the syllabus as per the weightage given by us.

SEMESTER – VI	COURSE CODE : PHY-604 CE
PAPER TITLE : Cluster Elective Paper – <u>VIII-A-3: Electronic Instrumentation</u>	

Duration : 3Hours

Maximum marks : 70

Pass marks : 28 marks

Model Paper :Sem VI
III B.Sc - PHYSICS (CLUSTER) – VI Semester
ELECTRONIC INSTRUMENTATION

Paper Code : PHY 604 CE

Max.Marks:70

SECTION-A

Answer any FIVE of the following questions : (5x4=25M)

- 1) Explain the following terms (a) precession (b) sensitivity.
- 2) Explain Multirange d.c voltmeter with a circuit diagram.
- 3) Write briefly the specifications of an electronic voltmeter.
- 4) Explain the function of various parts of an electronic gun.
- 5) Explain the time base operation of CRO.
- 6) Write the characteristics of a digital meter.
- 7) Explain the working of function generator.
- 8) What are the Limitations of Wheat stone's Bridge

SECTION-B

Answer any FIVE of the following questions : (5x10=50M)

- 9) Explain different types of errors that occur in measurements.
- 10) Explain the principles of voltage measurement with a block diagram.
- 11) Draw the basic block diagram of cathode ray oscilloscope and explain the functions of each block.
- 12) Explain with a block diagram the principle and working of digital storage oscilloscope .
- 13) Explain the working of a Multimeter as micro ammeter- as dc ammeter-as dc voltmeter-as ac voltmeter- as ohm meter
- 14) Explain the principle and working of digital instruments .
- 15) Explain the operation of a signal generator with the help of a suitable block diagram .

16) Explain the principle and working of Wheat stone's bridge .

***Cluster Elective Paper – VIII-A-3-Practical: Electronic Instrumentation
2hrs/Week.***

Paper Title: Project Work

Paper code: PHY-604 CE

The students have chosen Physics as cluster elective and “Arduino microcontroller based projects” for this Academic year.

Scheme of valuation

1. External : 25 marks given by the examiner (viva)
2. Internal : 25 marks
 - a) Written viva :10 marks
 - b) Submission of the Project book : 15 marksTotal = 50 marks

Certificate course

Electrical Motor Winding

Unit-I

DC motors-Toy motors, fan motor, other types of motors

AC motors

Single Phase motor- design and working

Three phase motor- design and working

Unit-II

DC -Dynamo- different types

AC Dynamo-

Single Phase - design and working

Three Phases - design and working

Unit-III

Delta connections

Star connections

Different circuits of House hold applications.