

**A.G& S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS &
SCIENCE**

VUYYURU-521165, KRISHNA Dt., A.P.(Autonomous)

Accredited by NAAC with "A" Grade

2019-2020



DEPARTMENT OF PHYSICS

MINUTES OF BOARD OF STUDIES

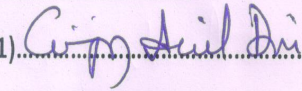
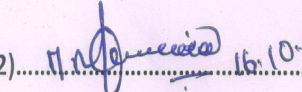
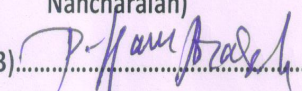
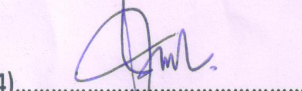
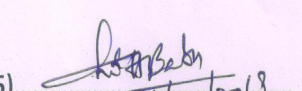
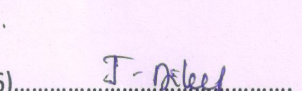
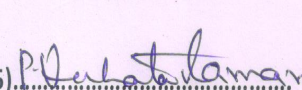

EVEN SEMESTER

16-10-2019

Minutes of the meeting of Board of studies in Physics for the Autonomous course of A.G. & S.G. Siddhartha Degree College of Arts & Science, Vuyyuru held at 10.30 A.M on 16-10-2019 in the Department of Physics.

Sri Ch. Vijay Anil Dai Presiding

Members Present:

- | | | |
|---|---------------------------------|---|
| 1).....  | Chairman | Head, Department of Physics
A.G. & S.G.S. Degree College of Arts &
Science, Vuyyuru - 521165. |
| 2).....  | University Nominee | Lecturer in Physics,
The Hindu College,
Machilipatnam. |
| 3).....  | Academic Council
Nominee | Asst. Professor,
Dept. of Physics, NIT,
Warangal. |
| 4).....  | Academic Council
Nominee | Lecturer in Physics,
VSR & NVR College for Arts &
Sciences
Tenali. |
| 5).....  | Representative from
Industry | Sub Divisional Engineer, BSNL,
Vijayawada. |
| 6).....  | Alumni | Lecturer in Physics,
Srinivasa College, Gannavaram. |
| 5).....  | Member | Lecturer in Physics,
A.G. & S.G.S. Degree College of Arts &
Science, Vuyyuru - 521165. |
| 6).....  | Member | Lecturer in Physics,
A.G. & S.G.S. Degree College of Arts &
Science, Vuyyuru - 521165. |

7) J. Hareeshchandra Member
(J. Hareeshchandra)

Lecturer in Physics,
A.G. & S.G.S. Degree College of Arts &
Science, Vuyyuru - 521165.

8) M. Sateesh Member
(M. Sateesh)

Lecturer in Physics,
A.G. & S.G.S. Degree College of Arts &
Science, Vuyyuru - 521165.

9) M.P.D. Parimala Member
(M.P.D. Parimala)

Lecturer in Physics,
A.G. & S.G.S. Degree College of Arts &
Science, Vuyyuru - 521165.

Agenda for B.O.S Meeting

1. To recommend the syllabi and model papers for II semester of I Degree B.Sc., Physics for the Academic year 2019-2020.
2. To recommend the syllabi and model papers for IV semester of II Degree B.Sc., Physics for the Academic year 2019-2020.
3. To recommend the syllabi and model papers for VI semester of III Degree B.Sc. Physics for the Academic year 2019-2020.
4. To recommend the Blue print of question papers for II, IV & VI semesters of B.Sc. Physics for the Academic year 2019-2020.
5. To recommend the Guidelines to be followed by the question paper setters in Physics for II, IV & VI Semester – end exams.
6. To recommend the teaching and evaluation methods to be followed under Autonomous status.
7. Any suggestions regarding seminars, workshops, Guest lecture to be organized.
8. Recommend the panel of paper setters and Examiners to the controller of Examinations of autonomous Courses of A.G. & S.G.S.Degree colleges of Arts & Science, Vuyyuru.
9. Any other matter.


Chairman.

RESOLUTIONS

- 1) It is resolved to continue the same **syllabi and model papers for II semester of I B.Sc.** under Choice Based Credit System (CBCS) for the Academic year 2019-20 also.
- 2) It is resolved to follow the **changed syllabi and model papers for IV semester of II B.Sc.** under Choice Based Credit System (CBCS) for the Academic year 2019-20.
- 3) It is resolved to follow
 - a) The same **syllabi and model papers** for elective paper “Analog and Digital Electronics” (PHY-601GE) under Choice Based Credit System (CBCS) for **VI semester of III B.Sc.**
 - b) The **changed syllabi and model papers** for Cluster paper “Introduction to Microprocessor and Microcontroller” (PHY-602 CE) under Choice Based Credit System (CBCS) for **VI semester of III B.Sc. small change in unit-III**
 - c) The same **syllabi and model papers** for Cluster paper “Computational Methods and Programming” (PHY-603 CE) under Choice Based Credit System (CBCS) for **VI semester of III B.Sc.**
 - d) The **changed syllabi and model papers** for Cluster paper “Electronics Instrumentation” (PHY-604 CE) under Choice Based Credit System (CBCS) for **VI semester of III B.Sc.**
- 4) It is resolved to follow the **changed Blue print of IV semester of Degree II B.Sc.** for the Academic year 2019-20.
 - It is resolved to continue the same **Blue print** of II semester of Degree B.Sc. for the Academic year 2019-20 also.
 - It is resolved to follow the **changed Blue print of VI semester of Degree III B.Sc.** for the Academic year 2019-20.

- 5) It is resolved to follow the changed Guidelines of IV semester of Degree II B.Sc. for the Academic year 2019-20.
 - It is resolved to continue the same **Guidelines** of II semester of I Degree B.Sc. for the Academic year 2019-20.
 - It is resolved to follow the changed Guidelines of VI semester of Degree III B.Sc. for the Academic year 2019-20.
- 6) It is resolved to continue the following teaching and evolution methods for Academic year 2019-20.

Teaching Methods:

Besides the conventional methods of teaching, we use modern technology i.e. using of LCD projector, U boards, virtual lab etc, for better understanding of concepts.

Evaluation of a student is done by the following procedure:

➤ **Internal Assessment Examinations:**

- For I B.Sc.(sem II) and II B.Sc.(sem IV) out of 100 marks in each paper, 30 marks shall be allocated for internal assessment
- Out of these 30 marks, **20 marks are allocated for announced tests (i.e. IA-1 & IA-2)**. Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, **5 marks** are allocated on the basis of candidate's **percentage of attendance**, **5 marks** are allocated for **assignment / class room seminars** for II and IV Semesters.
- For III B.Sc (i.e. VI semester) out of 100 marks in each paper, 25 marks shall be allocated for internal assessment. Out of these 25 marks, **15 marks are allocated for announced tests (i.e. IA-1 & IA-2)**. Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, **5 marks** are allocated on the basis of candidate's **percentage of attendance** and **remaining 5 marks are allocated for the assignment**.

➤ **Semester – End Examination:**

- The maximum marks for I B.Sc and II B.Sc. Semester – End examination shall be 70 marks and duration of the examination shall be 3 hours.
 - The maximum marks for III B.Sc Semester – End examination shall be 75 marks and duration of the examination shall be 3 hours.
 - **Semester – End examinations** in theory papers and **practical Examinations** shall be conducted at the end of every semester **II, IV & VI for I, II & III B.Sc.**
- 7) Discussed and recommended for organizing **seminars, Guest lecturers, workshops** to upgrade the knowledge of students, for the approval of the academic council.
 - 8) Discussed and empowered the Head of the department of Physics to suggest the panel of paper setters and examiners to the controller of examinations.
 - 9) Nil.

Cignu Arul An
Chairman.

DEPARTMENT OF PHYSICS

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS &
SCIENCE**

(AUTONOMOUS) , VUYYURU – 521 165

I B.Sc. 2nd Semester (2019-2020)

Paper II: Waves & Oscillations II SEMESTER

Work load: 60 hrs per semester credits - 3

4 hrs/week

UNIT- I

1. Simple Harmonic oscillations :12 hrs

Simple harmonic oscillator and solution of the differential equation-Physical characteristics of SHM, torsion pendulum-measurements of rigidity modulus, compound pendulum-measurement of 'g', combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies. Lissajous figures.

UNIT- II

2. Damped and forced oscillations :12 hrs

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with un-damped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance and velocity resonance.

UNIT- III

3. Complex vibrations : 10 hrs

Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw tooth wave

UNIT -IV

4. Vibrating strings :8 hrs

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones, energy transport and transverse impedance.

5. Vibrations of bars :9 hrs

Longitudinal vibrations in bars-wave equation and its general solution. Special cases i) bar fixed at both ends ii) bar fixed at the mid point iii) bar free at both ends iv) bar fixed at one end. Tuning fork.

UNIT- V

6. Ultrasonics :9 hrs

Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magnetostriction methods, detection of ultrasonics, determination of wavelength of ultrasonic waves. Applications of ultrasonic waves.

Reference Books:

1. BSc Physics -Telugu Academy, Hyderabad
2. First Year Physics - *Telugu Academy*.
3. Fundamentals of Physics. Halliday/Resnick/Walker ,*Wiley India Edition 2007*.
4. Waves and Oscillations. S. Badami, V. Balasubramanian and K. Rama Reddy *Orient Longman*.
5. Mechanics of Particles, Waves and Oscillations. Anwar Kamal, *New Age International*.
6. College Physics-I. T. Bhimasankaram and G. Prasad. *Himalaya Publishing House*.
7. Introduction to Physics for Scientists and Engineers. F.J. Ruche. *McGraw Hill*.
8. Waves and Oscillations. N. Subramaniam and Brijlal *Vikas Publishing House Private Limited*.
9. Unified Physics Vol.I Mechanics, Waves and Oscillations – *Jai Prakash Nath &co*.
10. Science and Technology of Ultrasonics- Bladevraj, *Narosa, New Delhi, 2004*

The Guidelines to be followed by the question paper setters in Physics for the Second semester - end exams (2019-20)

PAPER TITLE: Waves & Oscillations

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(30 Marks)	T+P	2
Unit-2(30 Marks)	T+P	2
Unit-3(15 Marks)	T	1
Unit-4(20 Marks)	T+P	1
Unit-5(25 Marks)	T	2

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 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.

II	SEMESTER –	COURSE CODE : PHY-201 C
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PAPER TITLE : Waves and Oscillations

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS),VUYYURU**

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

SECTION-A

Answer any FOUR of the following

4x5=20m

1. write any five application of ultrasonic.
2. Explain fundamental frequency, overtone and harmonics
3. Write the physical characteristics of simple harmonic oscillator
4. Explain amplitude resonance
5. State and prove fourier theorem.
6. A steel wire of length 150cm has 5gm mass it is stretched with a tension of 200n the velocity of transverse wave travelling in the wire
7. Calculate the fundamental frequency of a quartz crystal of thickness 0.001m.
Given $y=7.9 \times 10^{10} \text{ n/m}^2$ $p=2650 \text{ kg/m}^3$
8. The Q-factor of an oscillator is 500. Find its initial energy, if its amplitude is 0.01m. Also calculate the energy lost in first cycle. Given $S=m\omega^2= 100 \text{ n/m}$

SECTION-B

Answer any FIVE of the following

5x10=50m

9. What is the simple harmonic oscillator? Derive equation of motion of the simple harmonic oscillator and its solution.
10. Derive the equation for the combination of two mutually perpendicular simple harmonic vibration of equal frequency.
11. What is damped oscillator? Derive the expression for energy of a damped oscillator.
12. What is forced oscillation? Derive the differential equation of forced oscillation. Obtain its solution
13. Deduce the frequencies longitudinal vibration of a bar clamped at both ends.
14. State Fourier's theorem and use it to analysis of a square wave.
15. Explain the production of ultrasonic by magnetostriction method
16. Describe the how ultrasonic waves are produced by piezo electric effect.

Practical Paper 2: Waves & Oscillations

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

Work load: 30 hrs per semester

2 Hours per week

Minimum of 6 experiments to be done and recorded.

1. Determination of 'g' by compound/bar pendulum
2. Simple pendulum normal distribution of errors-estimation of time period and the error of the mean by statistical analysis
3. Determination of the force constant by static and dynamic method and evaluation of 'g'.
4. Determination of the elastic constants of the material of a flat spiral spring.
5. Determination of moment of inertia of a cylindrical rod -bifilar suspension
6. Coupled oscillators
7. Verification of laws of vibrations of stretched string –sonometer
8. Determination of velocity of transverse wave along a stretched string-sonometer
9. Determination of frequency of a bar –Melde's experiment.
10. Study of a damped oscillation using the torsional pendulum immersed in liquid-decay constant and damping correction of the amplitude.
11. Searls viscometer
12. Lissajous figures-CRO

(AUTONOMOUS) , VUYYURU – 521 165
II B.Sc. 4th Semester (2019-2020)

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.
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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
(AUTONOMOUS), VUYYURU – 521 165**

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 chloro fluoro carbons on ozone layer
- 5) Define black body. Explain about ferrys black body
- 6) Calculate the efficiency of a reversible carnots 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.

DEPARTMENT OF PHYSICS
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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: 75 marks
Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (25 Marks)	T	2
Unit-2 (20 Marks)	T+P	1
Unit-3 (30Marks)	T+P	2
Unit-4 (20 Marks)	T+T	1
Unit-5 (25 Marks)	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 **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 – V	COURSE CODE : PHY-601 GE
PAPER TITLE : ELECTIVE PAPER –VII-A: ANALOG AND DIGITAL ELECTRONICS	

Duration : 3Hours

Maximum marks : 75

Pass marks : 30 marks

Model paper –VII(A) Elective (Electronics)

Semester -VI

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

SECTION-A

Time:3hr

Max.marks:75M

Answer any five of the following questions:

5x5=25M

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

DEPARTMENT OF PHYSICS
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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 Assembly Programming

Assembler-types, assembler directives, structure of assembly program, assembly language development tools.

Programs - addition, subtraction, multiplication and division.

UNIT-III (15hours)

8051 Architecture:

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.

UNIT-IV: (13hours)

Application of Microcontroller:

Square wave generation, rectangular wave generator, sine wave generator, frequency counter, temperature control, stepper motor control.

UNIT-V: (12hours)

Interfacing:

Interfacing of keyboard, 7-Segment display, stepper motor and ADC (0844) Interfacing & DAC(0808/MC 1408) Interfacing.

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: 75 marks Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (30 Marks)	T+T	2
Unit-2 (20 Marks)	T+T	1
Unit-3 (30Marks)	T+T	2
Unit-4 (15 Marks)	T	1
Unit-5 (25 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 **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 – VI	COURSE CODE : PHY-602 CE
PAPER TITLE : CLUSTER ELECTIVES VIII-A	

Duration : 3Hours

Maximum marks : 75

Pass marks : 30 marks

Model Paper- Sem VI

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

INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLERS

PHY- 602 CE

Max marks : 75

SECTION-A

Answer any FIVE of the following questions :

(5x5=25M)

- 1) Define data bus and address bus.
- 2) Write various types of assemblers.
- 3) Write about any five assembler directives.
- 4) Write about CISC.
- 5) Write about operation of microcontroller
- 6) Write about temperature controller
- 7) Write about frequency counter.
- 8) Explain the concept control of stepper motor.

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) What are the assembly language tools?
- 12) Write ALP for subtraction of two 8-bit number.
- 13) Draw the pin diagram of 8051.
- 14) Write the basic building blocks of microcontroller.
- 15) Write ALP to generate rectangular wave form.
- 16) Discuss DAC interfacing with 8051.

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 (2019-20)
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 – Inputing 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 functios. Recursion. ANSI C functions – Function declaration . scope and life of variables in functions.

UNIT – IV (12 hrs) (Algorithms and flow charts only)

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) (Algorithms and flow charts only)

9. Interpolations : Concept pf linear interpolation – Finite differences – Newton's and Lagrange's interpolation formulae – principles and Algorithms.
10. Numerical differentiation and integration : Numerical differentiation –

algorithm for evaluation of first order derivatives using formulae based on Taylor's series – Numerical integration – Trapezodal 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: 75 marks Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (30 Marks)	T+T	2
Unit-2 (30 Marks)	T+T	2
Unit-3 (30Marks)	T+T	2
Unit-4 (15 Marks)	T	1
Unit-5 (15 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 **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 – VI	COURSE CODE : PHY-603 CE
PAPER TITLE : Cluster Elective Paper – VIII- A-2 : Computational Methods and Programming	

Duration : 3Hours

Maximum marks : 75

Pass marks : 30 marks

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

COMPUTATIONAL METHODS AND PROGRAMMING

Paper Code : PHY 603 CE

Max.Marks : 75

SECTION-A

Answer any FIVE of the following questions : (5x5=25M)

- 1) Write different data types in C with Examples.
- 2) Structure of C programme with Examples.
- 3) Explain about Putchar & 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
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(AUTONOMOUS) , VUYYURU – 521 165
III B.Sc. 6th Semester (W.E.F 2019-20)
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, ripple factor, Filter circuits.
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 – wave analysis: Definition of wave analyzer- Types of Wave Analyzers- Basic Wave analyzer.
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: 75 marks Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (30 Marks)	T+T	2
Unit-2 (20 Marks)	T+T	1
Unit-3 (30Marks)	T+T	2
Unit-4 (15 Marks)	T	1
Unit-5 (25 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 **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 – VI	COURSE CODE : PHY-604 CE
PAPER TITLE : Cluster Elective Paper – <u>VIII-A-3: Electronic Instrumentation</u>	

Duration : 3Hours

Maximum marks : 75

Pass marks : 30 marks

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

Paper Code : PHY 604 CE

Max.Marks:75

SECTION-A

Answer any FIVE of the following questions : (5x5=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.

Minimum of 6 experiments to be done and recorded.

1. Construction of Half wave rectifier and calculation of ripple factor with C filter.

2. Construction of Full wave rectifier and calculation of ripple factor with C and pi filters.
3. Study the limitations of a multimeter for measuring high frequency voltage and currents.
4. Measurement of voltage , frequency, time period and phase angle using CRO.
5. Calculate Power factor of an inductive circuit.
6. Measurement of rise, fall and delay times using a CRO.
7. Measurement of distortion of a RF signal generator using distortion factor meter.
8. Measurement of R with Wheat stone bridge.