ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS)

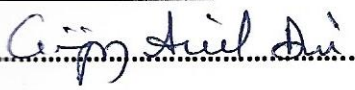## DEPARTMENT OF PHYSICS

2018-2019

BOARD OF STUDIES

Minutes of Meeting

11-04-2018

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 11-04-2018 in the Department of Physics.

Sri Ch. Vijay Anil Dai   Presiding

Members Present:

1) *signature* **Chairman**		Head, Department of Physics
(Ch.Vijay Anil Dai)		A.G. & S.G.S.Degree College of Arts & Science, Vuyyuru - 521165.
2) *signature* **University Nominee**		Professor,
mouli (Asst. Prof. R.V.S.S.N. Ravi Kumar) ↙ Head		Department of Physics,
		Acharya Nagarjuna University, Guntur.
3) *G. Srinivas R* **Academic Council**		Reader in Physics,
(Dr.G. Srinivas Rao) **Nominee**		Andhra Loyola College,
		Vijayawada.
4) *signature* **Academic Council**		Lecturer in Physics,
(Dr. K. Suresh) **Nominee**		VSR & NVR College for Arts & Sciences Tenali.
5) *signature* **Member**		Lecturer in Physics,
(P.V. Ramana)		A.G. & S.G.S.Degree College of Arts & Science, Vuyyuru - 521165.
6) *signature* **Member**		Lecturer in Physics,
(U. Ramprasad)		A.G. & S.G.S.Degree College of Arts & Science, Vuyyuru - 521165.
7) *signature* **Member**		Lecturer in Physics,
(J. Hareeshchandra)		A.G. & S.G.S.Degree College of Arts & Science, Vuyyuru - 521165.
8) *signature* **Member**		Lecturer in Physics,
(M. Sateesh)		A.G. & S.G.S.Degree College of Arts & Science, Vuyyuru - 521165.
9) *signature* **Member**		Lecturer in Physics,
(Ch. Jayasri)		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 I and II semesters of I Degree B.Sc., Physics for the Academic year 2018-2019.

2. To recommend the syllabi and model papers for III and IV semesters of II Degree B.Sc., Physics for the Academic year 2018-2019.

3. To recommend the syllabi and model papers for V and VI semesters of III Degree B.Sc. Physics for the Academic year 2018-19.

4. To recommend the Blue print of question papers for I,II,III,IV,V & VI semesters of B.Sc. Physics for the Academic year 2018-19.

5. To recommend the Guidelines to be followed by the question paper setters in Physics for I, II, III,IV,V & 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 for I & II semesters of I B.Sc.** under Choice Based Credit System (CBCS) for the Academic year 2018-19 also.

2) It is resolved to continue the same **syllabi and model papers** under Choice Based Credit System (CBCS) for **III and IV semesters of II B.Sc.** for the Academic year 2018-19 also.

3) It is resolved to follow the **syllabi and model papers** under Choice Based Credit System (CBCS) prescribed by Krishna University for **V and VI semesters of III B.Sc.**

- It is resolved to follow electives and clusters for VI semester for the academic year 2018-19.

4) It is resolved to change the **Blue prints** of I, II semesters of Degree IB.Sc. for the Academic year 2018-19.

- It is resolved to continue the same **Blue prints** of III, IV, V and VI semesters of Degree B.Sc. for the Academic year 2018-19.

5) It is resolved to change the **Guidelines** of I, II semesters of Degree IB.Sc. for the Academic year 2018-19.

- It is resolved to continue the same **Guidelines** of III, IV, V and VI semesters of Degree B.Sc. for the Academic year 2018-19.

6) It is resolved to continue the following teaching and evolution methods for Academic year 2018-19.

   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 I and II) 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 I B.Sc.**

   - For II&III B.Sc(i.e. III, IV,V,andVI semesters) 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 IB.Sc Semester – End examination shall be 70 marks and duration of the examination shall be 3 hours.

   - The maximum marks for II & 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 I,II,III,IV,V&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) Proposed to conduct add on Programme /Certificate course.

Chairman.

Physics Paper I: <u>Mechanics & Properties of Matter</u>

Work load: 60hrs per semester   **4 hrs/week**
UNIT I (14 hrs)
1. Vector Analysis :
Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), State and proof of Gauss and Stokes theorem.

UNIT II : (10hrs)
2. Mechanics of particles:
    Laws of motion, motion of variable mass system, motion of a rocket. Conservation of energy and momentum. Collisions in two and three dimensions. Concept of impact parameter, scattering cross-section.

UNIT III (16 hrs)
3. Mechanics of Rigid bodies   : 10 hrs
Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum. Euler equation,applications, precession of a top. Gyroscope, precession of the equinoxes.

4.   Mechanics of continuous media : 6hrs
Elastic constants of isotropic solids and their relation, Poisson's ratio and expression for Poisson's ratio in terms of y, n, k. Classification of beams, types of bending, point load, distributed load, shearing force and bending moment, sign conventions.

UNIT IV (10Hrs)
5.   Central forces :
Central forces, definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force. Derivation of Kepler's laws. Motion of satellites.

UNIT V (10 hrs)
6.   Special theory of relativity :
Galilean relativity, absolute frames. Michelson-Morley experiment, negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.

Reference Books:

1. BSc Physics -Telugu Akademy, Hyderabad
2. Mechanics   - D.S. Mathur, *Sulthan Chand & Co, New Delhi*
3. Mechanics   - J.C. Upadhyaya, *Ramprasad& Co., Agra*
4. Properties of Matter   - D.S. Mathur, *S.Chand& Co, New Delhi ,11ᵗʰEdn.,2000*
5. Physics Vol. I   - Resnick-Halliday-Krane ,*Wiley, 2001*
6. Properties of Matter - Brijlal&Subrmanyam ,*S.Chand&Co. 1982*
7. Dynamics of Particles and Rigid bodies– Anil Rao, *Cambridge Univ Press, 2006*
8. Mechanics-EM Purcell, *McGraw Hill*

The Guidelines to be followed by the question paper setters in Physics for the First semester - end exams (2018-2019)
PAPER TITLE: Mechanics & Properties of Matter
Paper- I   Semester – I   Maximum marks: 70   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 (30 Marks)	T+P	2
Unit-3 (20 Marks)	T+P	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.

A.G. &S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE (AUTONOMOUS),   VUYYURU. Year (2018-2019)

SEMESTER – I	COURSE CODE : PHY- 101C
PAPER TITLE : Mechanics and Properties of Matter	

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

MODEL PAPER

PAPER TITLE :   Mechanics and Properties of Matter
Duration : 3Hours   Maximum marks : 70 marks   Pass marks : 28 marks
         Section – A

Answer any Four of the following questions   4x5=20m
   1. Define and Explain the gradient of a scalar field.
   2. Write a note on impact parameter.
   3. Write a note on Gyroscope.
   4. What is Central Force? Give to Two examples.
   5. Explain length contraction.

6. If the earth be one – half of its present distance From the sun, What will be the number of days in a year.
7. Calculate the poisson's ratio For Silver Given Its Young's modulus = 7.25×10^{10} N/m^2 and bulk modulus = 11×10^{10} N/m^2.
8. A rocket burns 0.05 kg Fuel per Second and ejects the burnt gases with a velocity of 5000m/s
   Find the reaction?

Section – B

Answer any FIVE of the following questions   5X10=50M

9. State and prove gauss's theorem of divergence.

10. What is divergence and curl of a vector field with derivations and their physical Interpretation?

11. Derive an expression for the velocity of a variable mass System.   .
12. Derive an expression for the velocity of rocket at any time.
13. Define Y,n,K and derive the relation among them.
14.   State kepler's laws of planetary motion. Derive kepler's first laws of planetary motion.

15. State the postulates of special theory of relativity. Derive the Lorentz transformation equation
16. Describe the Michelson – Morley Experiment with relevant theory and discuss the importance of its result.

Practical paper 1: Mechanics

Exam duration : 3Hours   Maximum marks : 50 marks

Work load: 30 hrs per semester

Minimum of 6 experiments to be done and recorded
1. Volume resonator
2. Viscosity of liquid by the flow method (Poiseuille's method)
3. Young's modulus material a rod by uniform bending
4. Young's modulus material a rod by non- uniform bending
5. Surface tension of a liquid by the method of drops
6. Surface tension of a liquid by capillary rise method
7. Determination of radius of capillary tube by Hg thread method **8.**Viscosity of liquid by logarithmic decrement method
9. Bifilar suspension –moment of inertia.
10. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)
11. Fly-wheel
12. Determination of Y of bar –cantilever.

DEPARTMENT OF PHYSICS
A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU – 521 165
I B.Sc. 2ⁿᵈ Semester (2018-2019)

Paper II: Waves & Oscillations   II SEMESTER

Work load:60 hrs per semester   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 Akademy, 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. Subramaniyam 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 (2018-2019)

PAPER TITLE: <u>**Waves & Oscillations**</u>

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.

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

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

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

<u>MODEL PAPER</u> – Sem II

PAPER TITLE :   Waves and Oscillations
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 $y=7.9 \times 10^{10}$ n/m^2 p=2650kg/m^3

8. The Q-factor of an oscillator is 500. Find its initial energy it its amplitude is 0.01m. Also calculate the energy lost in first cycle. Given S=m^2=100n/m^2

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 if 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   Maximum marks : 50 marks

Work load: 30 hrs per semester

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

DEPARTMENT OF PHYSICS

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE (AUTONOMOUS), VUYYURU – 521 165
II B.Sc. 3rd Semester (2018-2019)
Paper III: Wave Optics

Work load:60 hrs per semester   4 hrs/week
<u>III SEMESTER</u>

<u>UNIT- I</u> .. (7 hrs)
1. Aberrations:
   Introduction – 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.

<u>UNIT –II</u> .. (14 hrs)
 2. Interference :
   Principle of superposition-coherence-conditions for interference of light.

   Fresnel's biprism-determination of wavelength of light.Determination of thickness of a transparent material using biprism –change of phase on reflection-Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (cosine law) –colors of thin films-Non reflecting films-interference by a plane parallel film illuminated by a point source-

Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film). Determination of diameter of wire, Newton's rings in reflected light. Determination of wavelength of monochromatic light, Michelson interferometer. Determination of wavelength of monochromatic light.

UNIT- III .. (12 hrs)
3. Diffraction:

Introduction,distinction between Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction –Diffraction due to single slit and circular aperture-Limit of resolution-Fraunhoffer diffraction due to double slit-Fraunhoffer diffraction pattern with N slits (diffraction grating).Resolving power of grating-Determination of wavelength of light in normal and oblique incidence methods using diffraction grating.

Fresnel's half period zones-area of the half period zones-zone plate-comparison of zone plate with convex lens-difference between interference and diffraction.

UNIT- IV ..(10 hrs)
4.Polarisation: Polarized light: methods of polarization polarization by reflection, refraction, double refraction, scattering of light-Brewster's law-Mauls law-Nicol prism polarizer and analyzer-Quarter wave plate, Half wave plate-optical activity, analysis of light by Laurent's half shade polarimeter-Babinet's compensator.

UNIT- V .. (17 hrs)
5. Lasers and Holography: 10 hrs

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-Gabor hologram and its limitations, Applications of holography.

6.   Fiber Optics: 7 hrs

Introduction- different types of fibers, rays and modes in an optical fiber, fiber material, principles of fiber communication (qualitative treatment only), advantages of fiber optic communication.

TEXT BOOKS:
1. BSc Physics, Vol.2, *Telugu Akademy, Hyderabad*
2. A Text Book of Optics-N Subramanyam, L Brijlal, *S.Chand& Co.*
3. Unified Physics Vol.II 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. Optics,F..A. Jenkins and H.G. White, *Mc Graw-Hill*
2. Optics, AjoyGhatak,Tata Mc Graw-Hill.
3. Fundamentals of Physics. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*
4. Introduction of Lasers – Avadhanulu, *S.Chand& Co.*
5. Fundamentals of Optics, H.R. Gulati and D.R. Khanna, 1991, R. Chand Publication
6. Principles of Optics- BK Mathur, *Gopala Printing Press, 1995*

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

PAPER TITLE: <u>Wave Optics</u>

Paper- III   Semester – III   Maximum marks: 75 marks   Duration: 3Hours

Weightage for the question paper

Syllabus	Section-A	Section-B

	(Short answer questions)	(essay questions)
Unit-1(20 Marks)	T+P	1
Unit-2(30 Marks)	T+P	2
Unit-3(25 Marks)	T	2
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 **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 – III	COURSE CODE : PHY- 301 C
PAPER TITLE : Wave Optics	

Duration : 3Hours   Maximum marks : 75 marks   Pass marks : 30 marks

MODEL PAPER

II B.Sc (PHYSICS) - III SEMESTER - WAVE OPTICS

TIME: 3 HRS   PHY – 301 C   MAX MARKS: 75

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SECTION – A

ANSWER ANY FIVE OF THE FOLLOWING   (5 X 5 = 25 M)

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 $\mathring{A}$, 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 Fresnels biprism experiment to determine the wavelength of light

12) What is diffraction. Describe Fraunhoffer'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 III: Wave Optics
Exam duration : 3Hours   Maximum marks : 50 marks

Work load:30 hrs

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. 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 fiber by wedge method
10. Spectrometer- i-d curve.
11. Determination of refractive index of liquid-Boy's method.
12. Determination of wavelength-Hartmann formula (prism)

II B.Sc. 4ᵗʰ Semester (2018-2019)
Paper IV: Thermodynamics &Radiation Physics

Work load:60 hrs per semester   4 hrs/week

IV SEMESTER

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-Carnnot's engine and its efficiency-Carnot's theorem-Second law of thermodynamics. Kelvin's and Claussius 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 and Vanderwaal's gas.

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-Disappearing filament optical pyrometer-experimental determination-Angstrompyrheliometer-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: 75 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	1
Unit-4(25 Marks)	T	2
Unit-5(30 Marks)	T+P	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 **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 : PHY- 401 C

PAPER TITLE :	THERMODYNAMICS AND RADIATION PHYSICS

Duration : 3Hours   Maximum marks : 75   Pass marks : 30

<u>MODEL PAPER</u>

TIME: 3 Hrs   PHY – 401 C   MAX MARKS: 75
<u>SECTION – A</u>

ANSWER ANY FIVE OF THE FOLLOWING   **(5 X 5 = 25 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 flouro 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= 22.68X 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)

<u>SECTION – B</u>
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) What is Joule-Kelvin effect? Derive an expression for the cooling produced when a real gas suffers Joule-Thomson effect.
14) Explain the method of adiabatic demagnetization for producing low temperatures
15) State Planck's hypothesis and derive Planck's law.
16) What is a pyrometer? Describe the construction and working of Disappearing filament optical pyrometer

Exam duration : 3Hours   Maximum marks : 50 marks

Work load: 30 hrs

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.

Paper V: Electricity, Magnetism and Electronics

Work load:60 hrs per semester   **4 hrs/week**
<u>V SEMESTER</u>   **Course Code : PHY 501C**

Unit – I(12hrs)
1.Electrostatics
Gauss's law Statement and its proof-Electric field intensity due to (1) Uniformly charged sphere and (2) an infinite conducting sheet of charge. Electric potential- Equipotential surface –potential due to i) a point charge ii)charged spherical shell .
2.Dielectrics
Electric dipolement and molecular polarizability- Electric displacement D, electric polarization P – relation between D, E, and P- Dielectric constant, susceptibility .

Unit – II(12hrs)
 3. Electric and magnetic field   Biot – Savart's law and calculation of B due to long straight wire, a circular current loop and solenoid.   Hall effect-determination of Hall coefficient and applications.
 4.Electromagnetic induction
Faraday's law – Lenz's law self and mutual inductance, coefficient of coupling, calculation of self inductance of a long solenoid, energy stored in magnetic field. Tansformer- energy losses and efficiency.

Unit-III(12hrs)
5.Alternating current and electro magnetic waves
Alternating current –Relation between current and voltage in LR and CR circuits, vector diagrams, LCR series and parallel resonant circuit , Q- factor, power in AC circuits.
6.Maxwell's equations
 Idea of displacement current- Maxwell's equations (integral and differential forms) (no derivation) Maxwell's wave equation(with derivation), Transverse nature of electromagnetic wave. Pointing theorem (statement and proof) production of electromagnetic wave Hertz experiment.

Unit-IV(12hrs)
7.Basic electronics:
PN junction diode Zener diode ,I-V characteristics, PNP and NPN Transistors, CB,CE and CC configuration Relation between α β and Γ transistors (CE) characteristics,Transistor as an amplifier.

 Unit-V(12hrs)
Digital electronics:
Number systems-conversion of binary to decimal system and vice versa. Binary addition and subtraction (1's and 2's complement methods) laws of Boolean algebra-De Morgan's laws- statement and proof basic logic gates, NAND and NOR as universal gates Half adder and FULL adder.

REFERENCE BOOKS
1) BSC Physics vol.3 Telugu Akademy, Hyderabad.
2) Electricity, Magnetism D,N Vasudeva. S.chand & co.,
3) Electricity, Magnetism and Electronics, K.K.Tewai, R.Chand &co.,

4) Principles of electronics, V.K.Mehta, S.Chand &co.,
5) Digital principles and applications A.P Malvino and D.P.Leach, Mc GrawHILL Edition.

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

PAPER TITLE: **Electricity, Magnetism and Electronics**

Paper- V   Semester – V   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- 501 C

PAPER TITLE :	**Electricity, Magnetism and Electronics**

Duration : 3Hours   Maximum marks : 75   Pass marks : 30 marks

III B.Sc. (PHYSICS)- V SEMESTER
ELECTRICITY,MAGNETISM AND ELECTRONICS

TIME: 3 Hrs   **PHY – 501 C**   **MAX MARKS: 75**

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SECTION – A

ANSWER ANY FIVE OF THE FOLLOWING   **(5 X 5 = 25 M)**

1) Write a short note on equi - potential surfaces
2) obtain an expression for energy stored in a magnetic field
3) Derive expression for power in ac circuit
4) Explain CE configuration of a transisitor
5) Explain briefly how a transisitor works as an amplifier
6) Explain about half adder circuit with truth table.
7) Calculate the intensity of the magnetic field at the center of a circular coil of radius 20 cm and 40 turns having a current of 2A in it.
8) In a series RLC circuit R = 100 ohm, L = 0.5H and C = 0.4 µF. calculate resonant frequency

SECTION – B

ANSWER ANY FIVE OF THE FOLLOWING QUESTIONS   **(5 X 10 = 50 M)**

9) Derive an expression for the electric field due to uniformly charged sphere using Gauss law?

10) Define D, E and P derive the relation between them

11) Calculate the magnetic induction due to a long straight wire using Biot- savart's law

12) State and prove pointing theorem

13) Explain the growth and decay of charge in LR- circuit

14) Describe the construction and working of Zener diode.

15) State and prove De Morgan's theorem with examples.

16) Explain about basic logic gates with truth tables.

Practical paper V: Electricity, Magnetism and Electronics
Exam duration : 3Hours   Maximum marks : 50 marks
Work load:30hrs
Minimum of 6 experiments to be done and recorded
1. Figure of merit of a moving coil galvanometer.
2. LCR circuit series/parallel resonance, Q-factor
3. Determination of Ac-frequency-sonometer
4. Verification of Kirchoff's laws
5. Field along the axis of a circular coil carrying current.
6. PN Junction diode Characteristics
7. characteristics of Zener diode
8. Transistor CE Characteristics.
9. Logic Gates –OR ,AND, NOT,and NAND gates verification of truth tables.
10. Verification of De Morgan's theorems.

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU – 521 165
III B.Sc. Physics – V Semester – Paper –VI (2018 – 19)
Modern Physics

Course Code : PHY 502C   **Work Load : 60 hrs**
per semester   **4 hrs/week**

Unit – I (12 hrs)
1.Atomic and molecular physics

Introduction – Drawbacks of Bohr's atomic model – Sommerfeld's elliptical orbits-relativistic correction (no derivation). Vector atom model and Stern & Gerlach experiment - quantum numbers associated with it. L-S and j-j coupling schemes. Zeeman Effect and its experimental study.

Raman effect, stokes and Anti stokes lines . Quamtum theory of Raman effect. Experimental arrangement – Applications of Raman effect.

UNIT – II (12 hrs)
2. Matter waves & Uncertainty Principle

Matter waves, de Broglie's hypothesis – wavelength of matter waves,Properties of matter waves – Davisson and Germer experiment –Heisenberg's uncertainty principle for position and momemtum (x and p) & energy and time (E and t). Experiment verification.

UNIT – III (12 hrs)
3.Quantum (wave) mechanics

Basic postulates of quantum mechanics – Schrodinger time independent and time dependent wave equation – derivations. Physical interpretation of wave function. Applications of Schrodinger wave equation to particle in one dimensional infinite box. Harmonic oscillator.

UNIT – IV (12 hrs)
4.General properties of Nuclei

Basic ideas of nucleus – size,mass,charge density(matter energy), binding energy,angular momemtum, parity, magnetic moment, electric quadrupole moments.Liquid drop model and shell model (qualitative aspects only)- Magic numbers.

5.Radioactivity decay

Alpha decay : basis of α – decay processes. Range of α-particles , Geiger"s Law,Geiger-Nuttal law. β – decay, β ray continuous and discrete spectrum, neutrino hypothesis.

UNIT – V (12 hrs)
6.Crystal structure

Amorphous and crystalline materials, unit cell, Miller indices, reciprocal lattice, types of lattices, diffraction of X- rays by crystals, Bragg's law, experimental techniques, Laue's method and powder diffraction method.

7.Superconductivity :

Introduction – experimental facts, critical temperature – critical field – Meissner effect – isotope effect – Type I and Type II superconductors – BCS theory (elementary ideas only) – applications of superconductors.

REFERENCE BOOKS :

1.B.Sc physics, VOL .4, Telugu academy , Hyderabad.
2.Molecular structure and spectroscopy by G.Aruldas. prentice Hall of india , New Delhi.
3. Modern physics by R.Murugeshan and Kiruthiga siva prasanth. S. Chand & co.
4. Modern physics by G.Aruldhas & p. Rajagopal. Eastren economy edition.

5.Concepts of Modern physics by Arthur Beiser.Tata Mcgrew – Hill Edition.
6.Quantum Mechanics, Mahesh c Jain , Eastern Economy EDITION
7.Nuclear Physics ,Irving Kaplan, Narosa Publishing House.
8.Nuclear physics , D.C Tayal, Himalaya publishing house.
9. Elements of solid state physics, J.P srivastava, Prentice Hall of india pvt. Ltd.
10. Solid state physics, A.J.Dekkar, McMillan India.

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

PAPER TITLE: <u>Modern Physics</u>

Paper- VI   Semester – V   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 (25Marks)	T	2
Unit-4 (20 Marks)	T+T	1
Unit-5 (30 Marks)	T+P	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.

PAPER TITLE :   Modern Physics

Duration : 3Hours   Maximum marks : 75   Pass marks : 30 marks

Model Paper

Paper Code : PHY 502C   **Max.Marks:75**

SECTION-A

Answer any **FIVE** questions :   **(5x5=25M)**

1. Write the Draw backs of Bohr's atomic model.
2. Explain deBroglie concept of matter waves.
3. Explain Geiger-Nuttal law.
4. Write a note on liquid drop model.
5. Explain Meissner effect in super conductivity.
6. State postulates of Quantum Mechanics.
7. In a crystal lattice plane cuts intercepts 2a,3b and 6c along the three axes where a,b and c
    are primitive vectors of the unit cell. Determine the miller indices of the given plane.
8. If the uncertainty in position of an electron is 4×10^{-10}m and uncertainty in its momentum is
    1.65×10^{-24}kg m/sec.

SECTION-B

Answer any **FIVE** questions :   **(5x10=50M)**

9. Describe Stern and Gerlach experiment and discuss the importance of the results obtained
10. What is Raman Effect? Write the Experimental setup to study Raman Effect.
11. Describe Davisson and Germer Experiment on electron diffraction. Discuss the results of   the Experiment.
12. Derive Time independent Schrodinger wave equation.
13. Calculate the energy of a particle in one dimensional box using Schrodinger equation.
14. Mention the Basic Properties of Nucleus with reference to Size, Charge, Mass, Nuclear spin and Electric Quadra pole Moment .
15. Desribe X-Ray diffraction by Laue's method.
16. Explain Type-I and Type-II Superconductors.

Practical Paper VI : Modern Physics

Exam duration : 3Hours   Maximum marks : 50 marks

Work load : 30 hrs   **3 hrs.**

Minimum of 6 experiments to be done and recorded

1. e/m of an electron by Thomson method.

2. Determination of Planck's Constant (photocell)

3. Verification of inverse square law of light using photovoltaic cell.

4. Study of absorption of α – rays.

5. Study of absorption of . β – rays.

6. Determination of range of β – particles.

7. Determination of M & H.

8. Analysis of powder X- ray diffraction pattern to determine properties of crystals.

9. Energy gap of semiconductor using junction diode.

10. Energy gap of a semiconductor using Thermistor.

DEPARTMENT OF PHYSICS

Elective VII (A):(Electronics)   **Course Code: PHY - 601c**

SEMISTER-VI   **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, ECL 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: 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 C
PAPER TITLE : ELECTIVE PAPER –VII-A: ANALOG AND DIGITAL ELECTRONICS	

Duration : 3Hours   Maximum marks : 75   Pass marks : 30 marks

<u>Model paper –VII(A) Elective (Electronics)</u>   <u>Semester -VI</u>

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

SECTION-A

Time:3hr   Max.marks:75M

Answer any five of the following questions<u>:</u>   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 Ro=10K, R1=10K, R2=5K

R3=6K.If V1=6V, V2= -3V, V3= -0.8V. Calculate V0?

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   3 hrs.

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

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU – 521 165
III B.Sc. Physics – VI Semester – Paper –VIII (2018 – 19)

SEMISTER-VI   Course Code: PHY -602C(1)   4 hrs/week

CLUSTER ELECTIVES VIII-A

PAPER-VIII-A-1: INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLER
UNIT- I (10hours)
MICROPROCESSOR:
Organization of microprocessor based system, 8085 microprocessor, its pin diagram and Architecture, Concept of data bus, and address bus, 8085 programming instruction classification.

UNIT-II: (10hours)
8051 Architecture:
  Introduction to microcontroller- comparison of microcontroller and microprocessor- block diagram-I/o pins, ports and circuits- external memory-counter and timers- serial I/O interrupts.

UNIT-III (15hours)
8051 Instruction set:
 Classification of instruction set addressing modes-logical operation: byte level-bit level rotate and swap operation.
Arithmetic operation: Instructions affecting flags – incrementing and decrementing -addition –subtraction-multiplication and division- example programs

UNIT-IV: (13hours)
 Jump and call instruction:
Introduction- the jump and call program rang-jump: bit – byte unconditional: calls and subroutine-interrupts and returns- example programs. Time delay generation and calculation, timer/counter programming, generating a rectangular waveform.

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),Microprocesser (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 (25 Marks)	T	2
Unit-2 (15 Marks)	T	1
Unit-3 (30Marks)	T+T	2
Unit-4 (20 Marks)	T+T	1
Unit-5 (30 Marks)	T+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 C(1)
PAPER TITLE : CLUSTER ELECTIVES VIII-A PAPER-VIII-A-1: INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLER	

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) Draw the pin diagram of 8085 MP.
2) Write the short notes on timer TO.
3) Write the short notes on timer 0 in mode 1(16 – bit timer).
4) Discuss # data 16.
5) Define the term Flag.
6) What do you mean by instructions affecting flags?
7) Write a short note on machine cycle and delay calculation.

8) Explain the concept control of stepper motor.

<u>Answer any **FIVE** of the following questions :</u>   **(5x10 = 50 M)**

9) Draw the block diagram of 8051 MC and explain each block.

10)   Draw the 8051 MC pin diagram and explain about different pins.

11)   Describe how you interface the keyboard to 8051 microcontroller   along with suitable assembly language programs.

12)   What are the different types of instruction sets of 8085 MP?

13)   Draw the pin diagram of 8051.

14)   Discuss input/output ports (I/O ports) of 8051.

15)   Discuss the types of instructions.

16)   Write ALP to generate rectangular wave form.

PAPER-VIII-A-1: Practical: INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLER   3Hrs.

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 (AUTONOMOUS) , VUYYURU – 521 165

III B.Sc. 6ᵗʰ Semester (2018-2019)

Semester – VI   COURSE CODE : PHY-602 C(2)

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) **(Algarithms 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) **(Algarithms 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-602 C(2)
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 algoritm and flowchart of Newton Raphson formula.

Cluster Elective Paper – VIII-A-2 : Practical : Computational Methods and Programming
2 hrs/ week

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 Fahrenhit 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

Semester- VI   **COURSE CODE : PHY-602 C(3)**

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. Measurement of dc voltage: DC Voltmeter – Multi Range Voltmeter- Voltmeter sensitivity- Loading Effect- A.c voltmeter using rectifiers.

UNIT – II (10 HOURS)

3. **Analog Multimeter:** Multimeter as micro ammeter- as dc ammeter-as dc voltmeter-as ac voltmeter- as ohm meter-Multimeter operating instructions- General Specifications of a multimeter.

4. Electronic voltmeter : Advantage over conventional multimeter for voltage measurement with Electronic voltmeter. A.c, dc voltage measurements with TVM (FET) (block diagram only).

UNIT –III (14 HOURS)

5. 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.
    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)

    Digital Multimeter : Block diagram and working of DMM, Digital frequency meter principle of Operation. Block diagram of digital frequency meter, working-Universal counter. Advantages of DMM over Analog Multimeter.

6. Digital instruments : Principle and working of digital instruments, characteristics of a digital meter, working principle of digital voltmeter.

UNIT – V (12 HOURS).

7. Signal Generators : Block diagram, working and specifications of low frequency signal generators, pulse generator, function generator –   wave analysis: Definition of wave analyser- Types of Wave Analyser- Basic Wave analyser- Harmonic distortion analyser(Distortion factor meter).

8. 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 .

<u>REFERENCE BOOKS :</u>

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

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) precesion (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 diagrm 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. Study the loading effect of a multimeter by measuring voltage across a low and high resistance.
2. Study the limitations of a multimeter for measuring high frequency voltage and currents.
3. Measurement of voltage , frequency, time period and phase angle using CRO.
4. Measurement of time period and frequency using universal counter/ frequency counter.
5. Measurement of rise, fall and delay times using a CRO.
6. Measurement of distortion of a RF signal generator using distortion factor meter.
7. Measurement of R with Wheat stone bridge.
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