

**GOVERNMENT COLLEGE [A]
RAJAMAHENDRAVARAM**





2017-18

**BOARD OF STUDIES MEETING
07 APRIL 2017**

GOVERNMENT COLLEGE (AUTONOMOUS):: RAJAMAHENDRAVARAM
(Re-Accredited by NAAC with grade "A")
DEPARTMENT OF PHYSICS

BOARD OF STUDIES MEETING: 07 APRIL 2017

The Board of studies meeting of **DEPARTMENT OF PHYSICS** was convened at 10.30 A.M on 07-04-2017 under the Chairmanship of Smt. **K. JYOTHI, In-charge** of the department. The members present discussed various aspects such as changes to be made in the Syllabi, Scheme of Evaluation and Blue print both for theory and practical papers for implementing them during the academic year 2017-18 onwards. The following members were present.

S.No	Name	Designation	Signature
1	Dr.K.Jyothi, Lecturer in charge/HOD Department of physics Government College, RAJAMAHENDRAVARAM	Chairman	
2	1 Sri. E. Nageswara Rao 2 Sri. P.V. Satyaji 3 Sri. Esub Basha Shaik 4 Smt. B. Durga Lakshmi 5 Dr. P.V.S.S.S Reddy 6 Sri. N. Venkanna Babu	Member (Faculty members of the Department)	1 2 P.V. Satyaji 3 Sri. Esub Basha Shaik 4 5  6 N. Venkanna Babu

The following documents are submitted to the Academic Coordinator and Controller of Examinations.

1. Resolutions of Board of Studies Meeting
2. Syllabi of I,II,III,IV,V,VI semesters
3. Model question papers of all semesters
4. Examiners list (Revised)
5. Any other new proposals

Date: 07 April 2017

**Chairman
Board of Studies
Department of PHYSICS**

**GOVERNMENT COLLEGE (AUTONOMOUS): RAJAHMUNDRY
(Re-Accredited by NAAC with grade "A")**

DEPARTMENT OF PHYSICS

BOARD OF STUDIES MEETING ON 07 April 2017

RESOLUTIONS:

1. It is resolved to approve the introduction of APSCHE recommended Choice Based Credit System [CBCS] to the II B.Sc., course from the academic year 2017-18. CBC system was

implemented for the I B.Sc., course during the academic year 2016-17.

2. It is resolved to approve the syllabus designed under autonomy setup for III and IV Semesters of II B.Sc, considering the syllabus recommended by APSCHE, ANUR, local needs of Industry and students for the academic year 2017-18.
3. It is resolved to approve the prescribed books for the syllabus designed above.
4. It is resolved to assess the student's performance under Continuous Internal Assessment (CIA) and Semester End Examination (SEE) components at 40:60 ratio for the II B.Sc., course from the academic year 2017 -18 as was done for I BSc course in the academic year 2016-17.
5. It is resolved to approve the Scheme of Examination and Blue print of Semester End Examination (SEE) for III and IV Semesters of II B.Sc, from the academic year 2017-18.

Theory examination:

Scheme for Semester End Examination (SEE)

TYPE OF QUESTION	MARKS	SCHEME
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<p style="text-align: center;">PART-A</p> <p style="text-align: center;">Essay Questions</p>	<p style="text-align: center;">Each question carries 8 Marks</p> <p style="text-align: center;">4x8 = 32 M</p>	<p>Answer all questions</p> <ol style="list-style-type: none"> 1. (A) & (B) - From Unit I 2. (A) & (B) - From Unit II 3. (A) & (B) - From Unit III 4. (A) from Unit IV and (B) from Unit V 						
<p style="text-align: center;">PART-B</p> <p style="text-align: center;">Short Answer Questions</p>	<p style="text-align: center;">Each question carries 4 Marks</p> <p style="text-align: center;">5x4= 20 M</p>	<p>Answer any 5 out of 8 questions</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%; vertical-align: middle;"> 5 6 7 8 9 </td> <td style="width: 10%; vertical-align: middle; text-align: center;">}</td> <td style="vertical-align: middle;">5 Theoretical Questions one question from each unit.</td> </tr> <tr> <td style="vertical-align: middle;">10 11 12</td> <td style="vertical-align: middle; text-align: center;">}</td> <td style="vertical-align: middle;">3 Numerical Questions Not more than one question from each unit.</td> </tr> </table>	5 6 7 8 9	}	5 Theoretical Questions one question from each unit.	10 11 12	}	3 Numerical Questions Not more than one question from each unit.
5 6 7 8 9	}	5 Theoretical Questions one question from each unit.						
10 11 12	}	3 Numerical Questions Not more than one question from each unit.						
<p style="text-align: center;">PART-C</p> <p style="text-align: center;">Very Short Answer Questions</p>	<p style="text-align: center;">Each question carries 2 Marks</p> <p style="text-align: center;">4x2 = 8 M</p>	<p>Answer all questions</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%; vertical-align: middle;">13 14 15 16</td> <td style="width: 10%; vertical-align: middle; text-align: center;">}</td> <td style="vertical-align: middle;">Not more than one question from each unit</td> </tr> </table>	13 14 15 16	}	Not more than one question from each unit			
13 14 15 16	}	Not more than one question from each unit						

Practical examination:

Scheme of valuation for internal & external:

S.No	Description	Marks
1	Formula	05
2	Tabular Form & Readings	10

3	Calculations & Result (Including Graph)	15
4	Precautions & Units	05
5	Viva Voce	05
6	Record**	10
7	TOTAL	50
INTERNAL : 50 M EXTERNAL : 50 M TOTAL: 100 M		

**Award of marks for number of practicals recorded in the Record

- 05 PRACTICALS and above - 10
- 4 PRACTICALS - 08
- 3 PRACTICALS - 06
- 2 PRACTICALS - 05
- LESS THAN 2 - 00

6. It is resolved to continue to offer two advanced elective papers in semester V for III B.Sc., in place of paper IV for the academic year 2017-18 also so as to enable the student to choose one of the two.

The electives papers are

1. Modern Physics and Quantum Mechanics
2. Nanomaterials: Properties and Synthesis.

Justification for inclusion of the paper " Nano materials: Properties and Synthesis"

Objective:

To provide basic concepts of the nano materials, their properties and synthesis techniques

Importance of Nano Materials:**Novel Properties**

Scientists have discovered that materials at small dimensions—small particles, thin films, etc—can have significantly different properties than the same materials at larger scale. There are thus endless possibilities for improved devices, structures, and materials if we can understand these differences, and learn how to control the assembly of small structures.

Career Opportunities:

Nanotechnology is the next technical revolution and products resulting from it will affect all areas of our economy and lifestyle. It is estimated that by 2015 this exciting field will need 7 million workers worldwide.

Electronics/semiconductor industry	Medical fields	Automobile industry
Pharmaceuticals including drug delivery, cosmetics, among others	Materials science including textiles, polymers, packaging, among other	Environmental monitoring and control
Biotechnology	Sports equipment	Optoelectronics
Forensics	Food science: quality / packaging	Aerospace industry
Military	National security	University and federal lab research

Lab Facility:

A well equipped Laboratory established with DST Major Project is already available in the department.

7. It is further resolved to continue to offer two applied (Skill based) elective papers in semester VI for III B.Sc., in place of paper IV for the academic year 2017-18 also so as to enable the student to choose one of the two.

The elective papers are

1. Nuclear Physics & Solid State Physics
2. Analog and Communication Electronics.

Justification for inclusion of the paper "Analog and Communication Electronics"**Objective:**

To provide a complete knowledge on various communication devices, their working, modeling and applications.

Importance of Communication Electronics

Electronics is now a part of our everyday life, from your pocket FM radio to televisions, computers, mobile phones and even the high-end satellites that are helping us in every path and hence is essential to understand today's multidisciplinary applications.

Career Opportunities:

Computers & electronic equipment in the telecommunications, Power Electronics, and other industries like steel, petroleum and chemical industry aeronautical and military fields.

Consumer electronics manufacturing organization

Telecommunication & IT industries

Health care equipment manufacturing

Mobile Communication(2G, 3G,4G)

Internet technologies

Directing control and testing production process.

Lab Facility:

A Well Equipped laboratory in the PG Department is available.

8. It is resolved to continue the examination pattern for the III year students same as that followed during the year 2015-16.
9. It is resolved to continue the scheme of paper setting for theory examinations for V and VI semester for a maximum of 75 marks for external and remaining 25 marks for internal assessment
10. It is resolved to continue the scheme of evaluation for practical examination for V and VI semester for a maximum of 75 marks for external and 25 marks for internal.
11. It is resolved to approve the revised list of examiners and paper setters for the academic year 2017-18. List annexed.
12. It is resolved to offer the certificate course entitled “**Household Electrical Wiring**” for the academic year 2017-18.

Date: 07 April 2017

Chairman

**Board of Studies
Department of PHYSICS**

SYLLABI

GOVERNMENT COLLEGE (A): RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR I B.Sc., PHYSICS
MODULE-I [MECHANICS AND PROPERTIES OF MATTER]
SEMESTER I

(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-18)

UNIT I

1. Vector Analysis: 8 hrs

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

2. Mechanics of particles: 10 hrs

Laws of motion, *velocity and acceleration in Cartesian, polar and cylindrical coordinates*. Motion of variable mass system, motion of a rocket. Conservation of energy and momentum. *Application to rotating frames*. Collisions in two and three dimensions. Concept of impact parameter, scattering cross-section. Rutherford scattering-derivation

UNIT III

3. Mechanics of Rigid bodies:10hrs

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum. Euler equation, precession of a top. Gyroscope, precession of the equinoxes.

4. Mechanics of continuous media :8 hrs

Elastic constants of isotropic solids and their relation, Poisson's ratio and expression for Poisson's ratio in terms of γ , n , k . Classification of beams, types of bending, point load, distributed load, shearing force and bending moment, sign conventions.

UNIT IV

5. Central forces : 12 hrs

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

6. Special theory of relativity : 12 hrs

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. *verification of Einstein's mass energy relation*. Concept of four-vector formalism.

Note: Numerical problems to be solved at the end of the every chapter.

Text/ Reference Books

1. Berkeley Physics Course. Vol 1. Mechanics by Kittle W Knight, M.A.Ruderman- Tata-McGraw Hill Company Edition 2008
2. Fundamentals of Physics Halliday/Resnick/Walker Wiley India Edition 2007
3. Waves and Oscillations by S.Badami, V.Balasubramanian and K.Rama Reddy Orient Longman
4. First Year Physics - Telugu Academy.
5. Mechanics of Particles, Waves and Oscillations. Anwar Kamal, New Age International
6. College Physics-1 by 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.Subramanaian and Brijlal Vikas Publishing House Private Limited

**GOVERNMENT COLLEGE (A): RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

TOPICS INCLUDED UNDER AUTONOMOUS SET UP

CLASS : I B.Sc.,

SEMESTER : I

PAPER : I

TITLE OF THE PAPER : MECHANICS AND PROPERTIES OF MATTER

ADDITIONAL TOPICS	JUSTIFICATION
1. Velocity and acceleration in Cartesian , polar and cylindrical coordinates	1. To familiarize the Cartesian, polar and cylindrical coordinates having significant importance in simplifying problem solving both in mathematics and physics.
2. Application to rotating frames	2. To understand non - inertial frames and concepts like centrifugal force, coriolis force.
	3. To understand relativistic mechanics

3. verification of Einstein's mass energy relation	having great importance in modern physics. Useful for solving problems in nuclear physics and quantum mechanics.
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GOVERNMENT COLLEGE (A):: RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
PHYSICS PAPER -1
(MECHANICS AND PROPERTIES OF MATTER)
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)

EVALUATION SCHEME

Examination	No. of Marks	Remarks
Semester end examination	60	Model of examination pattern furnished below
Internal examination	40	Pedagogy methods like Quiz, classroom seminar, Assignment or Case study, Test , puzzles, viva and few more innovative methods followed by individual lecturer

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]

PART	DESCRIPTION	MARKS
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A	Essay type questions- Four questions to be asked with internal choice in each question (A or B) from each unit. Student has to answer four questions choosing one (A or B) from each question. Each question carries 8 marks.	$4 \times 8 = 32$
B	Short answer type questions - Eight questions are to be asked (5 theory + 3 numerical). Student has to answer any five questions. Each question carries 4 marks	$5 \times 4 = 20$
C	Very short answer type questions - Four questions are to be asked covering the entire syllabus. Student has to answer all four questions. Each question carries 2 Marks	$4 \times 2 = 08$
	TOTAL MARKS	60

**GOVERNMENT COLLEGE (A): RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

BLUE PRINT FOR I - SEMESTER END EXAMINATION

MODULE - I: MECHANICS AND PROPERTIES OF MATTER

Time: 3 Hours

Max. Marks: 60

Marks	Pattern	Type of Question
PART-A (4x8 = 32 M)	Answer all questions 1. (A) & (B) - From Unit I 2. (A) & (B) - From Unit II 3. (A) & (B) - From Unit III 4. (A) from Unit IV and (B) from Unit V	Essay Questions
PART-B (5x4= 20 M)	Answer any 5 out of 8 questions 5 } 6 } 7 } 5 Theoretical Questions 8 } one question from each unit. 9 } 10 } 11 } 3 Numerical Questions 12 } Not more than one question from any unit.	Short Answer Questions
PART-C (4x2 = 8 M)	Answer all questions 13 } 14 } 15 } Not more than one question 16 } from any unit	Very Short Answer Questions

GOVERNMENT COLLEGE (A) : RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR I B.Sc., PHYSICS
MODULE-II [WAVES & OSCILLATIONS]
SEMESTER II
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-18)

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. **Group velocity and phase velocity**

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. **Power consideration, Sharpness of resonance, Quality factor, Band width of 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 and harmonics. 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 midpoint 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.

Note: Numerical problems to be solved at the end of the every chapter.

TEXT BOOKS

1. BSc Physics Vol.1, Telugu Academy, Hyderabad.
2. Waves and Oscillations. N. Subramanyam and Brijlal, Vikas Publishing House Private Limited.
3. Unified Physics Vol., Mechanics, Waves and Oscillations, Jai Prakash Nath&Co.Ltd.Meerut.
4. Mechanics of Particles, Waves and Oscillat ions. Anwar Kamal, New Age International.

REFERENCE BOOKS:

1. Fundamentals of Physics. Halliday/Resnick/Walker , Wiley India Edition 2007.
2. Waves and Oscillations. S. Badami, V. Balasubramanian and K. Rama Reddy, Orient Longman.
3. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
4. Science and Technology of Ultrasonics- Bladevraj, Narosa, New Delhi,2004
5. Introduction to Physics for Scientists and Engineers. F.J. Ruche. McGraw Hill.
6. Mechanics by D S Mathur.

**GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

TOPICS INCLUDED UNDER AUTONOMOUS SET UP

CLASS : I B.Sc.,
SEMESTER : II
PAPER : I
TITLE OF THE PAPER: WAVES & OSCILLATIONS

ADDITIONAL TOPICS	JUSTIFICATION
1. Group velocity and phase velocity 2 Power consideration, Sharpness of resonance, Quality factor , Band width of resonance.	1. To understand the difference between a wave and wave packet and physical significance of wave packet compared to a wave and also to get a clear idea of wave propagation in a given medium. 2. To enrich idea on forced oscillations and to easily compare forced oscillations and damped oscillations.

GOVERNMENT COLLEGE (A): RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
PHYSICS PAPER -1
(WAVES AND OSCILLATIONS)
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)

EVALUATION SCHEME

Examination	No. of Marks	Remarks
Semester end examination	60	Model of examination pattern furnished below
Internal examination	40	Pedagogy methods like Quiz, classroom seminar, Assignment or Case study, Test , puzzles, viva and few more innovative methods followed by individual lecturer

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]

SECTION	DESCRIPTION	MARKS
A	Essay type questions- Four questions to be asked with internal choice in each question (A or B) from each unit. Student has to answer four questions choosing one (A or B) from each question. Each question carries 8 marks.	4x8 =32
B	Short answer type questions - Eight questions are to be asked (5 theory + 3 numerical). Student has to answer any five questions. Each question carries 4 marks	5x4 = 20
C	Very short answer type questions - Four questions are to be asked covering the entire syllabus. Student has to answer all four questions. Each question carries 2 Marks	4x2 =08
	TOTAL MARKS	60

GOVERNMENT COLLEGE (A): RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
BLUE PRINT FOR II - SEMESTER END EXAMINATION

MODULE - II: WAVES & OSCILLATIONS

Time: 3 Hours

Max. Marks: 60

Marks	Pattern	Type of Question
PART-A (4x8 = 32 M)	<p>Answer all questions</p> <ol style="list-style-type: none"> 1. (A) & (B) - From Unit I 2. (A) & (B) - From Unit II 3. (A) & (B) - From Unit III 4. (A) from Unit IV and (B) from Unit V 	Essay Questions
PART-B (5x4= 20 M)	<p>Answer any 5 out of 8 questions</p> <p>5 } 6 } 7 } 5 Theoretical Questions 8 } one question from each unit. 9 }</p> <p>10 } 11 } 3 Numerical Questions 12 } Not more than one question from any unit.</p>	Short Answer Questions
PART-C (4x2 = 8 M)	<p>Answer all questions</p> <p>13 } 14 } 15 } Not more than one question 16 } from any unit</p>	Very Short Answer Questions

GOVERNMENT COLLEGE (A) : RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
PRACTICAL MODULE -1 (I B.Sc.,)
(MECHANICS & OSCILLATIONS LAB)
LIST OF EXPERIMENTS
&
SCHEME OF PRACTICAL EXAMINATION
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-18)

LIST OF EXPERIMENTS

1. Calculation of errors in calculation of acceleration due to gravity by simple Pendulum.
2. Calculation of acceleration due to gravity using compound pendulum.
3. Calculation of Moment of Inertia of Fly Wheel.
4. Calculation of Moment of Inertia of Bifilar pendulum.
5. Verification of laws of transverse vibrations of strings using Sonometer.
6. Calculation of viscosity of liquid using Poiselles method.
7. Verification of the relation between volume of air its resonating frequency resonator.
8. Calculation of Young's Modulus by uniform bending method.
9. Calculation of Rigidity of Modulus of wire using Torsional pendulum.
10. Calculation of Surface Tension of Water.
11. Calculation of Young's Modulus by Non-uniform bending method.
12. Calculation of viscosity of highly viscous liquids by Searl's viscometer.
13. Melde's experiment - Determination of frequency.
14. Sonometer - verification of laws of stretched string.
15. Lissajous figures using CRO (demonstration experiment.)
16. Coupled Oscillators.

Note. Student has to do any six experiments at the end of each I and II semester. In total 12 at the end of the academic year.

**GOVERNMENT COLLEGE (AUTONOMOUS): RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

**BOARD OF STUDIES MEETING ON 07 APRIL 2017
SEMESTER END PRACTICAL EXAMINATIONS
I B.Sc., PHYSICS**

SCHEME OF VALUATION

S.No	Description	Marks
1	FORMULA	05
2	TABULAR FORM & READINGS	10
3	CALCULATIONS & RESULT (Including Graph)	15
4	PRECAUTIONS & UNITS	05
5	VIVA VOCE	05
6	RECORD**	10
7	TOTAL	50
INTERNAL : 50 M		
EXTERNAL : 50 M		
TOTAL: 100 M		

**Award of marks for number of practicals recorded in the Record

- 05 PRACTICALS and above - 10
- 04 PRACTICALS - 08
- 03 PRACTICALS - 06
- 02 PRACTICALS - 05
- LESS THAN 02 - 00

GOVERNMENT COLLEGE (A) : RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR II B.Sc., PHYSICS
MODULE-III [OPTICS]
SEMESTER III

(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-18)

UNIT - I

1. The Matrix methods in paraxial optics: (8)

Introduction- matrix method, effect of translation, effect of refraction, imaging by a spherical refracting surface. Image by co-axial optical system. Unit plane, Nodal planes. A system of two thin lenses.

2. Aberrations: (7)

Introduction - Monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, astigmatism and curvature of field, distortion. Chromatic aberration- the achromatic doublet - Removal of chromatic aberration by a separated doublet.

UNIT - II

3. Interference: (15)

Principle of superposition - coherence - temporal coherence and spatial coherence - conditions for Interference of light

Interference by division of wave front: Introduction and basics of Biprism, Determination of wavelength of light and thickness of transparent thin film. Change of phase on reflection Lloyd's mirror experiment (qualitative treatment only)

Interference by division of amplitude:- 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 with contact between lens and glass plate, Newton's rings in transmitted light (Hydinger Fringes) - Determination of wave length of monochromatic light - Michelson Interferometer - types of fringes - Determination of wavelength of monochromatic light, Difference in wavelength of sodium D₁, D₂ lines and thickness of a thin transparent plate.

UNIT - III

4. Diffraction: (10)

Introduction - Distinction between Fresnel and Fraunhofer's diffraction

Fraunhofer's diffraction:-

Diffraction due to single slit- Diffraction due to circular aperture
Fraunhofer's diffraction due to double slit - Fraunhofer's diffraction pattern with N slits (diffraction grating) Resolving Power of grating - Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel diffraction:-

Fresnel's half period zones - area of the half period zones -zone plate

Comparison of zone plate with convex lens - Phase reversal zone plate -

Diffraction at a straight edge (simple method) - difference between interference and diffraction.

UNIT -IV**5. Polarizations (10)**

Polarized light : Methods of Polarization, Polarization by reflection, refraction, Double refraction, selective absorption , scattering of light – Brewster’s law – Malus law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygens’s explanation) – Quarter wave plate, Half wave plate – **Babinet’s compensator** – Optical activity, analysis of light by Laurent’s half shade polarimeter.

UNIT - V**6. Laser: (6)**

Lasers: Introduction – Spontaneous emission – Stimulated emission – Population inversion. Laser principle – **Einstein coefficients** – **Meta stable state**-Types of Lasers –Components of LASER- He-Ne laser – Ruby laser – Applications of lasers- **Laser welding, Laser cutting, hole drilling, LADAR, Diffraction of laser beam, Determination of wavelength.**

7.Fiber Optics and Holography(6)

Fiber Optics : Introduction – Optical fibers – Types of optical fibers – Step and graded index fibers– Fiber material – Principles of fiber communication (qualitative treatment only) and advantages of fiber communication.

Holography: Basic Principle of Holography – **Gabor hologram and its limitations**, Holography applications.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1. **Optics** by Ajoy Ghatak. *The McGraw-Hill companies.*
2. **Optics** by Subramaniam and Brijlal. *S. Chand & Co.*
3. **Fundamentals of Physics.** Halliday/Resnick/Walker.C. *Wiley India Edition 2007.*
4. **Optics and Spectroscopy.** R. Murugesan and Kiruthiga Siva Prasad. *S. Chand & Co.*
5. **Second Year Physics** – *Telugu Academy.*
6. **Modern Physics** by R. Murugesan and Kiruthiga Siva Prasad (for statistical Mechanics) *S. Chand & Co.*

Reference Books

1. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand & Co. Publications.*
2. **Feynman’s Lectures on Physics** Vol. 1,2,3 & 4. *Narosa Publications.*
3. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc.*
4. **Lasers theory and applications** – K. Thyagarajan and A.K.Ghatak

**GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

TOPICS INCLUDED UNDER AUTONOMOUS SET UP

CLASS :II B.Sc.,
SEMESTER :III
PAPER : II
TITLE OF THE PAPER: OPTICS

S.No	Paper	Unit	Topics included	justification
1	OPTICS (SEMESTER III)	1. Aberrations 2. Interference by division of amplitude 3. Diffraction 5. Polarization 6. Lasers	1. Curvature of field 2. distortion. 1. Newton's rings in transmitted light (Hydinger Fringes) 2. Difference in wavelength of sodium D ₁ ,D ₂ lines. 1. Diffraction due to circular aperture 2. Diffraction at a straight edge (simple method) 1. Babinet's compensator 1. Einstein coefficients 2. Meta stable state 3. Applications of LASERS 4. Laser welding 5. Laser cutting, 6. Hole drilling, 7. LADAR, 8. Diffraction of laser beam, 10. Determination of wavelength. 11. Gabor hologram and its limitations	1. To give a complete knowledge on all types of aberrations. 1. Suggested by the Subject Expert . To understand the theoretical modeling behind the practical component. 1. To obtain theoretical orientation on apertures normally observed in day to day life. 1. To obtain the theoretical knowledge behind the practical component. 1. Suggested by industrial expert and application oriented, job oriented. Useful for higher studies also.

Government College (A) :: RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
MODULE III :: SEMESTER III (PAPER II)
OPTICS.

EVALUATION SCHEME

Examination	No. of Marks	Remarks
Semester end examination	60	Model of examination pattern furnished below
Internal examination	40	Pedagogy methods like Quiz, classroom seminar, Assignment or Case study, Test , puzzles, viva and few more innovative methods followed by individual lecturer

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]

SECTION	DESCRIPTION	MARKS
A	Essay type questions- Four questions to be asked with internal choice in each question (A or B) from each unit. Student has to answer four questions choosing one (A or B) from each question. Each question carries 8 marks.	4x8 =32
B	Short answer type questions - Eight questions are to be asked (5 theory + 3 numerical). Student has to answer any five questions. Each question carries 4 marks	5x4 = 20
C	Very short answer type questions - Four questions are to be asked covering the entire syllabus. Student has to answer all four questions. Each question carries 2 Marks	4x2 =08
	TOTAL MARKS	60

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
BLUE PRINT FOR III - SEMESTER END EXAMINATION

MODULE - III: OPTICS

Time: 3 Hours

Max. Marks: 60

Marks	Pattern	Type of Question
PART-A (4x8 = 32 M)	Answer all questions 1. (A) & (B) - From Unit I 2. (A) & (B) - From Unit II 3. (A) & (B) - From Unit III 4. (A) from Unit IV and (B) from Unit V	Essay Questions
PART-B (5x4= 20 M)	Answer any 5 out of 8 questions 5 } 6 } 7 } 5 Theoretical Questions 8 } one question from each unit. 9 } 10 } 11 } 3 Numerical Questions 12 } Not more than one question } from any unit.	Short Answer Questions
PART-C (4x2 = 8 M)	Answer all questions 13 } 14 } 15 } Not more than one question 16 } from any unit	Very Short Answer Questions

GOVERNMENT COLLEGE (A):: RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR II B.Sc., PHYSICS
MODULE-IV [THERMODYNAMICS]
SEMESTER IV

(As Approved in the BOS meeting held on 26 March 2016 for 2016-17)

UNIT - I

1. Kinetic theory of gases: (8)

Introduction - Deduction of Maxwell's law of distribution of molecular speeds, Experimental verification Toothed Wheel Experiment, Transport Phenomena - Viscosity of gases - thermal conductivity - diffusion of gases.

2. Statistical Mechanics: (10)

Introduction to statistical mechanics, concept of ensembles, Phase space, Maxwell-Boltzmann's distribution law, Molecular energies in an ideal gas, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws.

UNIT-II

3. Quantum theory of radiation: (10)

Black body-Ferry's black body - distribution of energy in the spectrum of Black body - Wien's displacement law, Wien's law, Rayleigh-Jean's law - Quantum theory of radiation - Planck's law - deduction of Wien's law, Rayleigh-Jeans law, Wien's displacement law from Planck's law - Measurement of radiation - Earth as a blackbody - Types of pyrometers - Disappearing filament optical pyrometer - experimental determination - Angstrom pyroheliometer - determination of solar constant, effective temperature of sun.

UNIT -III

4. Thermodynamics: (12)

Introduction - Reversible and irreversible processes - Carnot's engine and its efficiency - Carnot's theorem - Second law of thermodynamics, Kelvin's and Claussius statements - Thermodynamic scale of temperature - 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-.

UNIT -IV

5. Thermodynamic potentials and Maxwell's equations: (10)

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 - V**6. Low temperature Physics: (10)**

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 - Principle of refrigeration, vapour compression type. Working of refrigerator and Air conditioning machines. Effects of chloro fluoro carbons on ozone layer

NOTE: Problems should be solved at the end of every chapter of all units

Textbooks

1. **Second Year Physics** - *Telugu Academy*
2. **Fundamentals of Physics.** Halliday/Resnick/Walker.C. *Wiley India Edition 2007*

Reference Books

1. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasad (for statistical Mechanics), *S. Chand & Co.*
2. **Modern Physics** by G. Aruldas and P. Rajagopal, *Eastern Economy Education.* Berkeley Physics Course. Volume-5.
3. **Statistical Physics** by F. Reif. *The McGraw-Hill Companies.*
4. **An Introduction to Thermal Physics** by Daniel V. Schroeder. *Pearson Education Low Price Edition.*
5. **Thermodynamics** by R.C. Srivastava, Subit K. Saha & Abhay K. Jain *Eastern Economy Edition.*

Government College (A) :: RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
MODULE IV :: SEMESTER IV (PAPER II)
THERMODYNAMICS

EVALUATION SCHEME

Examination	No. of Marks	Remarks
Semester end examination	60	Model of examination pattern furnished below
Internal examination	40	Pedagogy methods like Quiz, classroom seminar, Assignment or Case study, Test , puzzles, viva and few more innovative methods followed by individual lecturer

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]

SECTION	DESCRIPTION	MARKS
A	Essay type questions- Four questions to be asked with internal choice in each question (A or B) from each unit. Student has to answer four questions choosing one (A or B) from each question. Each question carries 8 marks.	4x8 =32
B	Short answer type questions - Eight questions are to be asked (5 theory + 3 numerical). Student has to answer any five questions. Each question carries 4 marks	5x4 = 20
C	Very short answer type questions - Four questions are to be asked covering the entire syllabus. Student has to answer all four questions. Each question carries 2 Marks	4x2 =08
	TOTAL MARKS	60

GOVERNMENT COLLEGE (A): RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
BLUE PRINT FOR IV - SEMESTER END EXAMINATION

MODULE - IV: THERMODYNAMICS

Time: 3 Hours

Max. Marks: 60

Marks	Pattern	Type of Question
PART-A (4x8 = 32 M)	Answer all questions 1. (A) & (B) - From Unit I 2. (A) & (B) - From Unit II 3. (A) & (B) - From Unit III 4. (A) from Unit IV and (B) from Unit V	Essay Questions
PART-B (5x4= 20 M)	Answer any 5 out of 8 questions 5 } 6 } 7 } 5 Theoretical Questions 8 } one question from each unit. 9 } 10 } 11 } 3 Numerical Questions 12 } Not more than one question } from any unit.	Short Answer Questions
PART-C (4x2 = 8 M)	Answer all questions 13 } 14 } 15 } Not more than one question 16 } from any unit	Very Short Answer Questions

GOVERNMENT COLLEGE (A):: RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
PRACTICAL MODULE - II (II B.Sc.,)
(OPTICS & THERMODYNAMICS LAB)
LIST OF EXPERIMENTS
&
SCHEME OF PRACTICAL EXAMINATION

1. Co-efficient of thermal conductivity of a bad conductor-Lee's method
2. Heating efficiency of a electrical kettle with varying voltages
3. Thickness of a wire - wedge method
4. Determination of wavelength of light - Fresnel's biprism
5. Determination of radius of curvature of given convex lens - Newton's rings
6. Determination of wavelength of light - diffraction at thin wire
7. Resolving power of grating
8. Determination of mean diameter of Lycopodium powder (Diffraction)
9. Study of optical rotation Polari meter
10. Dispersive power of a prism
11. Determination of wavelength of light using diffraction grating minimum deviation method
12. Pulrich diffraction determination of refractive index of a liquid
13. Wavelength of light using diffraction grating -normal incidence method
14. I-d curve using spectrometer
15. Resolving power of a telescope
16. Refractive index of liquid and glass
17. Wavelength of a laser using diffraction grating
18. Stefan's constant
19. Carey-Foster's bridge - Temperature coefficient of a resistance

* It is mandatory to carry out **at least 10 experiments** of the listed above.

GOVERNMENT COLLEGE (AUTONOMOUS): RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
BOARD OF STUDIES MEETING ON 07 APRIL 2017
SEMESTER END PRACTICAL EXAMINATIONS
B.Sc., PHYSICS

SCHEME OF VALUATION

S.No	Description	Marks
1	FORMULA	05
2	TABULAR FORM & READINGS	10
3	CALCULATIONS & RESULT (Including Graph)	15
4	PRECAUTIONS & UNITS	05
5	VIVA VOCE	05
6	RECORD**	10
7	TOTAL	50
INTERNAL : 50 M EXTERNAL : 50 M TOTAL: 100 M		

****Award of marks for number of practicals recorded in the Record**

- 05 PRACTICALS and above - 10
- 04 PRACTICALS - 08
- 03 PRACTICALS - 06
- 02 PRACTICALS - 05
- LESS THAN 02 - 00

**GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

TOPICS INCLUDED UNDER AUTONOMOUS SET UP

CLASS :II B.Sc.,
SEMESTER :IV
PAPER : II
TITLE OF THE PAPER: THERMODYNAMICS

S.No	Paper	Unit	Topics included	justification
1	HEAT AND THERMODYNAMICS (SEMESTER IV)	1. Kinetic theory of gases. 2. Statistical Mechanics 3. Thermodynamics 4. Quantum theory of radiation.	1. Experimental verification Toothed Wheel Experiment 1. Introduction to statistical mechanics, concept of ensembles, Phase space, Maxwell-Boltzmann's distribution law, Molecular energies in an ideal gas, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws. 1. Change of entropy of a perfect gas 1. Wien's displacement law from Planck's law 2. Earth as a blackbody	1. A complete new chapter included as suggested by the university nominee, useful at post graduation level and is research oriented. 1. Useful in various PG CETS and various competitive examinations. 1. Useful in calculating Solar energy levels and hence industry oriented

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR III B.Sc., PHYSICS (w.e.f. 2017-2018)
SEMESTER V - PAPAER III
CORE III MODULE V- Electricity & Electromagnetism
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)

UNIT-I

Electronic Instruments & Electrostatics (9 Periods): Multimeter, Cathode ray Oscilloscope (CRO){ Circuit diagram and Basic Principles only}. Gauss Law and its applications- Electric field due to an infinite conducting sheet of charge, Uniformly charged sphere and charged cylindrical conductor. Mechanical force on a charged conductor. Electric potential- potential due to charged spherical conductor and Electric dipole- an infinite line of charge. Potential of a uniformly charged circular disc.

UNIT-II

Dielectrics and Capacitance (14 Periods): An atomic view- potential energy of a dipole in an electric field- polarization and charge density- dielectrics and Gauss's Law- Relation between D,E and P. Dielectric constant and susceptibility. Capacity of concentric spheres and cylindrical condenser- capacity of parallel plate condenser with and without dielectric- electrical energy stored by a charged condenser. **Force between plates of condenser. Attracted disc electrometer- Construction and working only.**

UNIT-III

Magnetostatics, Moving Charge in electric and magnetic fields (13 Periods): Magnetic shell- potential due to magnetic shell- field due to magnetic shell-equivalent of electric circuit and magnetic shell- application of field due to magnetic shell- magnetic induction (B) and field (H)-permeability and susceptibility - Hysteresis loop. Hall effect- derivation of hall coefficient - applications - cyclotron, synchrocyclotron and synchrotron-and its applications-force on a current carrying conductor- force and torque on current loop- Biot-Savert's Law and calculation of B due to long straight wire, circular loop and solenoid.

UNIT-IV

Electromagnetic Induction (9 Periods): Faraday's Law - Lenz's law-expression for induced emf-electromotive force-time varying magnetic fields-betaatron-ballistic galvanometer -theory-damping correction-self and mutual inductance-coefficient of coupling -calculation of coupling-calculation of self inductance of a long solenoid-toroid- energy stored in magnetic field. Transformers (Basics only).

Note: Problems should be solved at the end of every chapter of all units.

Reference Books:

1. Basic Electronics and Linear circuits - NN Bharghava, SC Gupta
2. Principles of Electronics - VK Mehta
3. Physics Vol III - Halliday and Resnick
4. Electricity - Berkeley physics series
5. Electricity and Electronics- Tayal
6. Electricity and Magnetism - Brijlal and Subrahmanyam
7. Electricity and Magnetism - C.J. Smith
8. Electricity and Magnetism - C.J Smith and Rangawala
9. Electricity and Magnetism with Electronics - K.K Tewari (R.Chand)
10. Third year Physics - Telugu Academy.

**GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

TOPICS INCLUDED UNDER AUTONOMOUS SET UP

CLASS :III B.Sc.,

SEMESTER :V

PAPER : III

TITLE OF THE PAPER: ELETRICITY AND ELECTROMAGNETISM

ADDITIONAL TOPICS	JUSTIFICATION
1. Electronic instruments-multi meter and cathode ray oscilloscope.	These instruments are practically very important especially in the final year course of practicals. Having a thorough knowledge of these devices make the student feel comfortable in the practical session.

Government College (A) :: RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
MODULE V :: SEMESTER V (PAPER III)
ELECTRICITY AND ELECTROMAGNETISM

SCHEME OF EVALUATION

Examination	Marks	Remarks
Semester end examination	75	
Internal examination	25	Written examination : 10 Viva-voce : 5 Group Seminar : 5 Assignment : 5

PATTERN OF SEMESTER END THEORY EXAMINATION

Section	Description	Marks
A	Essay type questions- Four questions are to be asked with internal choice in each question (A or B). Student has to answer four questions. Each question carries 10 Marks	$4 \times 10 = 40$
B	Short answer type questions - Eight questions are to be asked including four problems. Student has to answer any five questions. Each question carries 3 Marks	$5 \times 3 = 15$
C	Very Short answer type questions - Ten questions are to be asked. Student has to answer all ten questions. Each question carries 2 Marks	$10 \times 2 = 20$
	TOTAL MARKS	75

**GOVERNMENT COLLEGE(A)::RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SEMESTER - V (PAPER - III)**

**ELECTRICITY & MAGNETISM
BLUE PRINT FOR SEMESTER END EXAMINATION**

SECTION - A 4 x 10 = 40 M

1. (a) or (b) Unit - I
2. (a) or (b) Unit - II
3. (a) or (b) Unit - III
4. (a) or (b) Unit - IV

SECTION - B 5 x 3 = 15 M

THEORETICAL QUESTIONS	9. Problem - Unit - I
5. Unit - I	10. Problem - Unit - II
6. Unit - II	11. Problem - Unit - III
7. Unit - III	12. Problem - Unit - IV
8. Unit - IV	

SECTION - C 10 x 2 = 20 M

Ten questions are to be chosen randomly as per the weightage of the chapters.

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR III B.Sc., PHYSICS (w.e.f. 2017-2018)
SEMESTER V - ADVANCED ELECTIVE [1]
MODERN PHYSICS AND QUANTUM MECHANICS

(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)

Unit - I

Atomic Spectra (12 hrs)

Introduction – Drawbacks of Bohr’s atomic model - Sommerfeld’s elliptical orbits – Relativistic correction (no derivation). Stern & Gerlach experiment Vector atom model and quantum numbers associated with it. L-S and j-j coupling schemes. Spectral terms, selection rules, intensity rules. Hydrogen spectrum, Fine structure and hyper fine structure Spectra of alkali atoms, doublet fine structure. Alkaline earth spectra, singlet and triplet fine structure. Zeeman Effect, Paschen-Back Effect and Stark Effect (basic idea). Spin-Orbit interaction-relativistic variation of mass-contribution to fine and hyper fine structure-qualitative treatment only

Unit - II

Molecular Spectroscopy (10 Hrs)

Types of molecular spectra, pure rotational energies and spectrum of diatomic molecule, determination of inter nuclear distance. Vibrational energies and spectrum of diatomic molecule. Raman Effect, Classical theory of Raman Effect. Experimental arrangement for Raman Effect and its applications. Rotational spectra of poly atomic molecules [Theory only].

Unit - III:

Quantum Mechanics (13 Hrs)

Inadequacy of classical Physics: (Discussion only)

Photo Electric effect, Einstein Photo Electric equation, Experimental verification. Compton’s effect (quantitative) experimental verification. Stability of an atom.

Matter Waves:

de Broglie’s hypothesis – wavelength of matter waves, properties of matter waves. Phase and group velocities. Davisson and Germer experiment. Double slit experiment. Standing de Broglie waves of electron in Bohr orbits.

Uncertainty Principle:

Heisenberg’s uncertainty principle for position and momentum (x and p_x), Energy and time (E and t). Gamma ray microscope. Diffraction by a single slit. Position of electron in a Bohr orbit. Particle in a box. Complementary principle of Bohr.

Unit -IV:**Schrodinger Wave Equation: (10 Hrs)**

Schrodinger time independent and time dependent wave equations. Wave function properties - Significance. Basic postulates of quantum mechanics. Operators, Eigen functions and Eigen values, expectation values. Application of Schrodinger wave equation to particle in one and three dimensional boxes, potential step and potential barrier.

Note: Problems should be solved at the end of every chapter of all units.

Reference Books:

1. Modern Physics by G.Aruldas & P.Rajagopal, Eastern Economy Edition
2. Concepts of Modern Physics by Arthur Beiser, Tata McGraw Hill Edition.
3. Modern Physics by R.Murugesan and KiruthigaSiva Prasanth. S.Chand &Co.
4. Molecular Structure & Spectroscopy by G.Aruldas.Prentice Hall of India New Delhi.
5. Spectroscopy- Atomic and Molecular by Gurudeep R Chatwal and Shyam Anand-Himalaya Publishing House.
6. Third Year Physics - Telugu Academy.

Reference Books:

- 1.University Physics with Modern Physics by Young & Freedman A.Lewis Ford.Low Price Edition (Eleventh Edition)
2. Quantum Physics by Eyvind H.Wichman. Volume 4. The McGraw Hill Companies.
3. Quantum Mechanics by Mahesh C Jain Eastern Economy Edition Prentice Hall of India.

**GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

TOPICS INCLUDED UNDER AUTONOMOUS SET UP

CLASS :III B.Sc.,
SEMESTER :V
PAPER : ADVANCED ELECTIVE - 1
TITLE OF THE PAPER : MODERN PHYSICS AND QUANTUM MECHANICS

ADDITIONAL TOPICS INCLUDED UNDER AUTONOMOUS SET UP	JUSTIFICATION
1. Photo Electric Effect 2. Microwave Spectrum of Diatomic molecules. .	1. This experiment has a significant importance in the modern physics. This experiment is the experimental evidence for the particle nature of radiation. 2. The concept has a great importance in determining the bond length of molecules & will be able to calculate the rotational constants.

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
EVALUATION SCHEME &
MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]
ADVANCED ELECTIVE -1
(MODERN PHYSICS AND QUANTUM MECHANICS)
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)

SCHEME OF EVALUATION

Examination	No. of Marks	Remarks
Semester end examination	75	Model of examination pattern furnished below
Internal examination	25	Written examination: 10 Viva-voce : 5 Seminar:5 Assignment:5

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]

SECTION	DESCRIPTION	MARKS
A	Essay type questions- Four questions to be asked with internal choice in each question (A or B) from each unit. Student has to answer four questions choosing one (A or B) from each question. Each question carries 10 marks.	4x10 = 40
B	Short answer type questions - Eight questions are to be asked (4 theory + 4 numerical). Student has to answer any five questions. Each question carries 3 marks	5x3 = 15
C	Very short answer type questions - Ten questions are to be asked covering the entire syllabus. Student has to answer all ten questions. Each question carries 2 Marks	10x2 =20
	TOTAL MARKS	75

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SEMESTER - V ADVANCED ELECTIVE -1
MODERN PHYSICS AND QUANTUM MECHANICS
SEM END EXAM BLUE PRINT

SECTION - A **4 x 10 = 40 M**

1. (a) or (b) Unit - I
2. (a) or (b) Unit - II
3. (a) or (b) Unit - III
4. (a) or (b) Unit - IV

SECTION - B **5 x 3 = 15 M**

THEORETICAL QUESTIONS	
5. Unit - I	9. Problem - Unit - I
6. Unit - II	10. Problem - Unit - II
7. Unit - III	11. Problem - Unit - III
8. Unit - IV	12. Problem - Unit - IV

SECTION - C **10 x 2 = 20 M**

Ten questions are to be chosen randomly as per the weightage of the chapters.

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR III B.Sc., PHYSICS (w.e.f. 2017-2018)
SEMESTER V - ADVANCED ELECTIVE [2]
NANO MATERIALS, PROPERTIES & SYNTHESIS TECHNIQUES
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)

UNIT- I: (13 HRS)

Atoms, clusters and Nano materials Introduction, Melting point of Gold nano crystal, Vapour pressure of Nano crystals.

Synthesis and processing, Methods for creating Nano structures; Processes for producing ultrafine powders- Mechanical grinding; Wet Chemical Synthesis of nano materials - Sol -Gel process, Liquid solid reactions; Gas Phase synthesis of nano materials-Furnace, Flame assisted ultrasonic spray pyrolysis; Gas Condensation processing (GPC), chemical Vapour Condensation (CVC)-Cold Plasma Methods, Laser ablation, vapour-liquid-solid growth, particle precipitation aided CVD, Summary of gas condensation processing (GPC).

UNIT- II: (12 HRS)

Nano composites Synthesis and processing, Introduction, Historical perspective, Different Synthesis methods of nano composites- self Assembly or Bio-Mimetic processes, Film; Processing of nano particles - Binding mechanisms in nano particles, Dispersion of Nano particles, Stabilization of Nano Particles; Special nano structured materials- Fullerenes - Magnetism and tunnelling, Fullerenes films, other applications; Nano tubes - carbon nano tubes, Onions - Carbon onions, Porous silicon -preparation methods.

UNIT- III: (13 HRS)

Synthesis of Zirconium and SiC, Microwave Sintering of nano particles. Preparation of Nano particles, Nano particles of SiC, Optimization of the Attritors Work, Purification of Sintering of SiC-Role of Dopants, Role of carbon, Role of Sintering Atmosphere;Sintering of Nano particles -Preparation of materials, Sintering of Nano particles of SiC.

UNIT- IV: (12 HRS)

Microwave Sintering of Nano particles, Microwave Sintering route, Sample preparation from Nano Particles, Sintering produces of nano particles, Sintering data of nano particles of Alumina, Nano particles of Zirconia -Synthesis of Nano particles - Sol -Emulsion -Gel Technique, The Sol -gel Technique, Sintering of Nano particles of Zirconia.

References:

1. Nanomaterials -AK Bandopadhyay, Newage International (P) limited publishers
2. Nanomaterials -J Dutta and H Hofmann
3. Nano Structured materials processing, properties and applications- Carl C Koch, Jaico publishing
4. Nanotechnology -William Illsey Atkinson, Jaico publishing house

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
EVALUATION SCHEME &
MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]
ADVANCED ELECTIVE -2
(NANO MATERIALS, PROPERTIES & SYNTHESIS TECHNIQUES)
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)
SCHEME OF EVALUATION

Examination	No. of Marks	Remarks
Semester end examination	75	Model of examination pattern furnished below
Internal examination	25	Written examination: 10 Viva-voce : 5 Seminar:5 Assignment:5

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]

SECTION	DESCRIPTION	MARKS
A	Essay type questions- Four questions to be asked with internal choice in each question (A or B) from each unit. Student has to answer four questions choosing one (A or B) from each question. Each question carries 10 marks.	4x10 = 40
B	Short answer type questions - Eight questions are to be asked . Student has to answer any five questions. Each question carries 3 marks	5x3 = 15
C	Very short answer type questions - Ten questions are to be asked covering the entire syllabus. Student has to answer all ten questions. Each question carries 2 Marks	10x2 =20
TOTAL MARKS		75

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SEMESTER - V ADVANCED ELECTIVE -1
MODERN PHYSICS AND QUANTUM MECHANICS
SEM END EXAM BLUE PRINT

SECTION - A **4 x 10 = 40 M**

- 1 (a) or (b) Unit - I
- 2 (a) or (b) Unit - II
3. (a) or (b) Unit - III
4. (a) or (b) Unit - IV

SECTION - B **5 x 3 = 15 M**

THEORETICAL QUESTIONS

- | | |
|---------|------------|
| 5 & 6 | Unit - I |
| 7 & 8 | Unit - II |
| 9 & 10 | Unit - III |
| 11 & 12 | Unit - IV |

SECTION - C **10 x 2 = 20 M**

Ten questions are to be chosen randomly as per the weightage of the chapters.

GOVERNMENT COLLEGE (A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR III B.Sc., PHYSICS (w.e.f.2017-2018)
SEMESTER VI - PAPAER III
COREIII - ELECTROMAGNETIC WAVE THEORY & ELECTRONICS
(As Approved in the BOS meeting held on 07 APRIL for 2017-2018)

1. Varying and alternating currents (11 Periods): CR circuits - LR circuits - Growth and decay of currents. Alternating current, relation between current and voltage in pure R, C and L, Vector diagrams. LCR circuit series and parallel resonant circuit- power factor, Q factor.

2. Maxwell's equations and electromagnetic waves and Network Theorems (18 periods): A review of basic laws of electricity and magnetism- displacement current- Maxwell's equation in differential form. Maxwell's wave equations. Plane electromagnetic waves- Transverse nature of electromagnetic waves, Poynting theorem, production and detection of electromagnetic waves (Hertz experiment). Superposition theorem - Thevenin's theorem - Norton's theorem - Maximum power transfer theorem.

3. Basic Electronics and Special Semi conductor devices (18 Periods): P-N junction diode, Zener diode, Half wave rectifier, Full wave rectifier and filter, ripple factor (quantitative) - PNP and NPN transistors. Current components CB, CE, CC configurations, Transistor hybrid parameters - determination of hybrid parameters from transistor characterization- transistor as an amplifier- concept of feedback. Barkhausen condition, phase shift oscillator (qualitative) - **Photo conductive cells, Solar cells, light emitting diode, laser diode, varactor diode, tunnel diode Basic principles only**

4. Digital Principles (8 Periods): Binary number system, converting Binary to Decimal and vice versa. Binary addition and subtraction (1's and 2's complement methods). Hexadecimal number system. Conversion from Binary to Hexadecimal vice versa and Decimal to Hexadecimal and vice versa. Logic gates: OR, AND, NOT gates, truth tables, realization of these gates using discrete components. NAND, NOR as universal gates, Exclusive -OR gate, DeMorgan's laws - statement and proof, Half and Full adders.

Note: Problems should be solved at the end of every chapter of all units.

Reference Books:

1. Electronic devices and Circuits - GK Mithal
2. Physics Vol III - Halliday and Resnick
3. Electronic devices and Circuits - Milliman and Halkies
4. Electricity and Electronics- Tayal
5. Digital electronics - Malvino
6. Electricity and Magnetism with Electronics - K.K Tewari (R.Chand)
7. Third year Physics - Telugu Academy.

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
TOPICS INCLUDED UNDER AUTONOMOUS SET UP

CLASS : III B.Sc.,
SEMESTER : VI
PAPER : III
TITLE OF THE PAPER : EM THEORY AND ELECTRONICS

ADDITIONAL TOPICS	JUSTIFICATION
1.Special semi conductor devices- Photo conductive cells, Solar cells, Light emitting diode, Laser diode, Varactor diode, Tunnel diode (Basic principles only)	Wide range of applications in industry and job oriented.

Government College (A) :: RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
MODULE V :: SEMESTER VI(PAPER III)
EM THEORY & ELECTRONICS

SCHEME OF EVALUATION

Examination	Marks	Remarks
Semester end examination	75	
Internal examination	25	Written examination : 10 Viva-voce : 5 Group Seminar : 5 Assignment : 5

PATTERN OF SEMESTER END THEORY EXAMINATION

Section	Description	Marks
A	Essay type questions- Four questions are to be asked with internal choice in each question (A or B). Student has to answer four questions. Each question carries 10 Marks	$4 \times 10 = 40$
B	Short answer type questions - Eight questions are to be asked including four problems. Student has to answer any five questions. Each question carries 3 Marks	$5 \times 3 = 15$
C	Very Short answer type questions - Ten questions are to be asked. Student has to answer all ten questions. Each question carries 2 Marks	$10 \times 2 = 20$
	TOTAL MARKS	75

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SEMESTER - VI (PAPER - III)
EM THEORY & ELECTRONICS
BLUE PRINT FOR SEMESTER END EXAMINATION

SECTION - A **4 x 10 = 40 M**

1. (a) or (b) Unit - I
2. (a) or (b) Unit - II
3. (a) or (b) Unit - III
4. (a) or (b) Unit - IV

SECTION - B **5 x 3 = 15 M**

THEORETICAL QUESTIONS	
5. Unit - I	9. Problem - Unit - I
6. Unit - II	10. Problem - Unit - II
7. Unit - III	11. Problem - Unit - III
8. Unit - IV	12. Problem - Unit - IV

SECTION - C **10 x 2 = 20 M**

Ten questions are to be chosen randomly as per the weightage of the chapters.

GOVERNMENT COLLEGE (A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR III B.Sc., PHYSICS (w.e.f.2017-2018)
SEMESTER VI - SKILL BASED ELECTIVE [1]
NUCLEAR PHYSICS, SOLID STATE PHYSICS
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)

Unit - I	15 hrs
Nuclear Structure	
<i>Basic properties of nucleus</i> - Nucleus magnetic dipole moment and electric quadrupole moment. Binding energy of nucleus, deuteron binding energy, p-p and n-p scattering (concepts), nuclear forces. Nuclear models - liquid drop model, shell model.	
Alpha and Beta Decays: Range of alpha particles, Geiger - Nuttall law. Gamow's theory of alpha decay. Geiger - Nuttall law from Gamow's theory. Beta spectrum - neutrino hypothesis, Fermi's theory of β -decay (qualitative).	
Unit - II	10 hrs
Nuclear Reactions: Types of nuclear reactions, channels, nuclear reaction kinematics. Compound nucleus, direct reactions (concepts).	
Nuclear Detectors - GM counter, proportional counter, scintillation counter, Wilson cloud chamber and solid state detector	
Unit - III	15 hrs
Crystal Structure: Crystalline nature of matter. Crystal lattice, Unit Cell, Elements of symmetry. Crystal systems, Bravais lattices. Miller indices. Simple crystal structures (S.C., BCC, CsCl, FCC, NaCl diamond and Zinc Blend) Concept or reciprocal lattice vector and Brillouin Zone (Basic ideas only)	
X-ray Diffraction: Diffraction of X -rays by crystals, Bragg's law, and Experimental techniques - Laue's method and powder method.	
Bonding in Crystals: Types of bonding in crystals - characteristics of crystals with different bindings. Lattice energy of ionic crystals - determination of Madelung constant for NaCl crystal, calculation of Born coefficient and repulsive exponent. Born - Haber cycle.	
Unit - IV	10 hrs
Nanomaterials: Introduction, nanoparticles, metal nanoclusters, semiconductor nanoparticles, carbon clusters, carbon nanotubes, quantum nanostructures - nanodot, nanowire and quantum well. Fabrication of quantum nanostructures.	

Magnetism: Langevin's theory of paramagnetism. Weiss' theory of ferromagnetism – Concepts of magnetic domains, ant ferromagnetism and ferrimagnetism ferrites and their applications.

Superconductivity:

Basic experimental facts – zero resistance, effect of magnetic field, Meissner effect, persistent current, Isotope effect Thermodynamic properties, specific heat, entropy. Type I and Type II superconductors.

Elements of BCS theory-Cooper pairs. Applications. High temperature superconductors (general information)

NOTE: Problems should be solved from every chapter of all units.

Reference books :-

- 1.Quantum mechanics-mathews and venkatesan
- 2.Introduction to quantum mechanics –Pauling and Wilson.
- 3.Nuclear physics –Tayal
- 4.Elements of modern physics –Patil.
- 5.Atomic and nuclear physics –T.A Little field as N.thorley
- 6.Quantum chemistry by Ira N.Levine (P.H.I)
7. Nuclear physics by somayajulu, varma, choudary
8. Organic spectroscopy - Kalsi, Pawe

**GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS**

TOPICS INCLUDED UNDER AUTONOMOUS SET UP

CLASS : III B.Sc.,
SEMESTER : VI
PAPER : SKILL BASED ELECTIVE -1
TITLE OF THE PAPER : NUCLEAR PHYSICS, SOLID STATE PHYSICS

ADDITIONAL TOPICS	JUSTIFICATION
1. Reciprocal lattice vector and Brillouin Zone (Basic Ideas only)	<p>To represents the Fourier transform of another lattice (usually a Bravais lattice)</p> <p>plays a fundamental role in most analytic studies of periodic structures, particularly in the theory of diffraction.</p> <p>To infer the atomic arrangement of a crystal.</p>

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
EVALUATION SCHEME &
MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]
SKILL BASED ELECTIVE -1
(NUCLEAR PHYSICS , SOLID STATE PHYSICS)
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)
SCHEME OF EVALUATION

Examination	No. of Marks	Remarks
Semester end examination	75	Model of examination pattern furnished below
Internal examination	25	Written examination: 10 Viva-voce : 5 Seminar:5 Assignment:5

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]

SECTION	DESCRIPTION	MARKS
A	Essay type questions- Four questions to be asked with internal choice in each question (A or B) from each unit. Student has to answer four questions choosing one (A or B) from each question. Each question carries 10 marks.	4x10 = 40
B	Short answer type questions - Eight questions are to be asked (4 theory + 4 numerical). Student has to answer any five questions. Each question carries 3 marks	5x3 = 15
C	Very short answer type questions - Ten questions are to be asked covering the entire syllabus. Student has to answer all ten questions. Each question carries 2 Marks	10x2 =20
	TOTAL MARKS	75

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM**DEPARTMENT OF PHYSICS
SEMESTER - VI SKILL BASED ELECTIVE - 1
NUCLEAR PHYSICS, SOLID STATE PHYSICS
SEM END EXAM BLUE PRINT****SECTION - A 4 x 10 = 40 M**

- 1 (a) or (b) Unit - I
- 2 (a) or (b) Unit - II
3. (a) or (b) Unit - III
4. (a) or (b) Unit - IV

SECTION - B 5 x 3 = 15 M

THEORETICAL QUESTIONS	9. Problem - Unit - I
5. Unit - I	10. Problem - Unit - II
6. Unit - II	11. Problem - Unit - III
7. Unit - III	12. Problem - Unit - IV
8. Unit - IV	

SECTION - C 10 x 2 = 20 M

Ten questions are to be chosen randomly as per the weightage of the chapters.

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SYLLABUS FOR III B.Sc., PHYSICS (w.e.f. 2017-2018)
SEMESTER VI - SKILL BASED ELECTIVE [2]
ANALOG AND COMMUNICATION SYSTEMS
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)

UNIT-I (15 Hrs)

Operational Amplifiers: Differential amplifier-double ended input and single ended output- Block diagram of Op-Amp- Ideal characteristics of Op-Amp- Op-Amp parameters- Input resistance- Output resistance- Common mode rejection ratio (CMMR)- Slew rate- Offset voltages - Input bias current- Basic Op-Amp circuits- Inverting Op-Amp- Virtual ground- Non-inverting Op-Amp- Frequency response of Op-Amp.

UNIT-II (10 Hrs)

Applications of Op-Amps: Summing amplifier- subtractor- Voltage follower- Integrator-Differentiator - Comparator- Logarithmic amplifier- Sine wave [Wein Bridge] and square wave [Astable] generators- Triangular wave generator- Monostable multivibrator- Solving simple second order differential equation. Basic Op-Amp series regulator and shunt regulator. Ramp generator - Timer IC 555 and its applications to astable and monostable multivibrators

UNIT-III (15 Hrs)

Communications: Need for modulation-Types of modulation- Amplitude, Frequency and Phase modulation.

Amplitude modulation-side bands- modulation index- square law diode modulator- Demodulation- diode detector.

Frequency modulation working of simple frequency modulator- Ratio detection of FM waves- Advantages of frequency modulation.

AM and FM radio receivers [block diagram approach].

UNIT - IV (10 Hrs)

Satellite communication: introduction to satellite communication - types of orbits - orbital perturbation - co-ordinates, launch and launch vehicles - launching geostationary satellite - applications

References:

1. Operational Amplifiers and Linear Integrated Circuits- K. Lalkishore - Pearson Education
2. Operational Amplifiers and Linear Integrated Circuits- Ramakant A. Gayakwad
3. Electronic Communication Systems - George Kennedy & Bernard Davis - TMH.
4. Electronic Communication -D. Roddy & J. Coolen- PHI
5. Electronic Devices and Circuits-Millman and Halkias- Tata Mc Graw Hill (TMH)
6. Microelectronics- J. Millman and A. Grabel - TMH
7. Principles of Electronic Communication Systems -Louis E. Frenzel -TMH
8. Satellite communications - pratt
9. Operational amplifiers and linear integrated circuits - D. Mahesh kumar

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
EVALUATION SCHEME &
MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]
SKILL BASED ELECTIVE -2
(ANALOG AND COMMUNICATION SYSTEMS)
(As Approved in the BOS meeting held on 07 APRIL 2017 for 2017-2018)
SCHEME OF EVALUATION

Examination	No. of Marks	Remarks
Semester end examination	75	Model of examination pattern furnished below
Internal examination	25	Written examination: 10 Viva-voce : 5 Seminar:5 Assignment:5

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER [THEORY]

SECTION	DESCRIPTION	MARKS
A	Essay type questions- Four questions to be asked with internal choice in each question (A or B) from each unit. Student has to answer four questions choosing one (A or B) from each question. Each question carries 10 marks.	4x10 = 40
B	Short answer type questions - Eight questions are to be asked . Student has to answer any five questions. Each question carries 3 marks	5x3 = 15
C	Very short answer type questions - Ten questions are to be asked covering the entire syllabus. Student has to answer all ten questions. Each question carries 2 Marks	10x2 =20
	TOTAL MARKS	75

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
SEMESTER - V ADVANCED ELECTIVE -1
MODERN PHYSICS AND QUANTUM MECHANICS
SEM END EXAM BLUE PRINT

SECTION - A **4 x 10 = 40 M**

- 1 (a) or (b) Unit - I
- 2 (a) or (b) Unit - II
3. (a) or (b) Unit - III
4. (a) or (b) Unit - IV

SECTION - B **5 x 3 = 15 M**

THEORETICAL QUESTIONS

- 5 & 6 Unit - I
7 & 8 Unit - II
9 & 10 Unit - III
11 & 12 Unit - IV

SECTION - C **10 x 2 = 20 M**

Ten questions are to be chosen randomly as per the weightage of the chapters.

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
(SEMI CONDUCTORS LAB)
PHYSICS PRACTICALS - PAPER III

1. Figure of merit of a moving coil galvanometer
- 2) Voltage sensitivity of a moving coil galvanometer
- 3) RC circuit (frequency response)
- 4) LR circuit (frequency response)
- 5) LCR series circuit resonance, Q -factor
- 6) Power factor of an AC circuit
- 7) Determination of AC - frequency by Sonometer
- 8) Design and Construction of multimeter
- 9) Characteristics of a Junction Diode
- 10) Characteristics of Zener Diode
- 11) Characteristics of Transistor
- 12) Verification of Kirchoff's laws
- 13) Construction of a model DC power supply.
- 14) Thevenin's theorem
- 15) Norton's theorem
- 16) Maximum Power transfer theorem

Note: One has to complete a minimum of 10 experiments.

GOVERNMENT COLLEGE(A):RAJAMAHENDRAVARAM
DEPARTMENT OF PHYSICS
(DIGITAL ELECTRONICS LAB)
PHYSICS PRACTICALS - PAPER IV

1. Energy gap of semiconductor using a junction diode
2. Temperature characteristics of a thermistor
3. R.C coupled amplifier
4. Verification of Logic gates OR, AND, NOT, X-OR , NOR, NAND gates
5. Realization of basic logic gates by NAND and NOR gates
6. Verification of De-Morgan's theorems
7. Verification of truth tables for half adder and full adders
8. Determination of Planck's constant (photo cell)
9. FET characteristics
10. Full wave rectifier with L- type and π – type filters
11. Draw the characteristic curve of Wien's Bridge
12. Phase shift oscillators
13. e/m of an electron by Thomson's method
14. Hysteresis curve of transformer core
15. Study of spectra of hydrogen spectrum (Determination of Rydberg constant)
16. Hall - Probe method for measurement of magnetic field

Note: One has to complete a minimum of 10 experiments.

SCHEME OF EVALUATION FOR PRACTICAL EXAMINATION

Internal Examination	External Examination		Remarks	
25 Marks	75 Marks	Formula	10	
		Tabular form & Readings	20	
		Calculation & Result (Including Graphs)	20	
		Units & Precautions	05	
		Viva-voce	10	
		Record	10	<ul style="list-style-type: none"> • 10 Marks for 10 practicals and above • 08 marks upto 9 practicals • 06 marks upto 7 practicals • 05 marks upto 5 practical • NIL marks for less than 5 practicals

LIST OF EXAMINER

S.NO	CODE	EXAMINER NAME	PAPERS	SERVICE	COLLEGE	CITY
1	202081	Board of Studies DR.K.BALAKAJU	3,4	27	Govt City COLLEGE	Government College L.A. Rajamahendravaram HYDERABAD
		P.VENKATESWARAREDDY			2	
2	202084	P.VENKATESWARAREDDY	2	21	GOVT.CITY COLLEGE	HYDERABAD
3	202041	N.RANGAJI	2	20	AMAL COLLEGE	ANAKAPALLI
4	202069	U.DHANAPATHI VARMA	1,3	20	D.N.R.COLLEGE	BHIMAVARAM
5	202040	M.R.L.GOPAL	1,2	19	AMAL COLLEGE	ANAKAPALLI
6	202013	A.S.N.MURTHY	2,4	19	GBR COLLEGE	ANAPARTHI
7	202073	K.S.R.P.KUMAR JOHN	3,2	16	SVKP COLLEGE	PENUGONDA
8	202091	S.VENKATARAJU	1,3	15	D.N.R.COLLEGE	BHIMAVARAM
9	202111	P.V.SRINIVASARAO	1,2,3	14	S.S.N.COLLEGE	NARSARAOPETA
10	202112	B.VENKATESWARARAO	ALL	14	S.S.N.COLLEGE	NARSARAOPETA
11	202074	S.SRINIVASARAO	2,4	13	SVKP COLLEGE	PENUGONDA
12	202087	DR.A.NIRMALA JYOSTHANA	1	13	ST.THERESSA'S	ELURU
13	302056	G.VENU GOPAL	ALL	13	MRS.A.V.N.COLLEGE	VISAKHAPATNAM
14	302055	DR.S.SRINIVASARAO	ALL	11	MRS.A.V.N.COLLEGE	VISAKHAPATNAM
15	202096	C.J.SOMARAJU	2	10	D.N.R.COLLEGE	BHIMAVARAM
16	202022	N.VEERA KUMAR	2	9	SRVBSJV MAHARANI	PEDDAPURAM
17	202107	P.SUBRAHMANYAM NAIDU	ALL	8	JBD COLLEGE	KAVALI
18	202047	DR.SANTHA DEVI	ALL	8	GOVT.DEGREE COLLEGE	ANANTHAPUR
19	202057	DR.B.V.H.N.SAINATH	1,2,3	8	MRS.A.V.N.COLLEGE	VISAKHAPATNAM
20	202108	D.RAMAKRISHNA REDDY	3	7	GOVT DEGREE COLLEGE	KARNOOL
21	202023	S.RAMARAO	4	7	SRVBSJV MAHARANI	PEDDAPURAM
22	202097	K.RAMAKRISHNA	ALL	6	M.G.COLLEGE	ATREYAPURAM
23	202105	P.S.S.SRINIVAS	ALL	6	GBR COLLEGE	ANAPARTHI
24	302046	M.RAVIKUMAR	ALL	6	GOVT DEGREE COLLEGE	ANANTHAPUR
25	202092	M.SATYAVANI	1,2	6	D.N.R.COLLEGE	BHIMAVARAM
26	302058	P.PRAMEELA	ALL	5	MRS.A.V.N.COLLEGE	VISAKHAPATNAM
27	202101	B.V.R.K.MURTHY	ALL	5	MAHARAJA'S	VIZIANAGARAM
28	202082	DR.I.H.PRASAD	3	4	GOVT.CITY COLLEGE	HYDERABAD
29	202083	DR.B.KRISHNA SENKAR	1,2	4	GOVT.CITY COLLEGE	HYDERABAD
30	302041	R.CHANDRA SEKHAR	ALL	4	SRVBSJV MAHARANI	PEDDAPURAM
31	202080	P.B.V.A.G.RAVI KIRAN		3	SKSD MAHILA COLLEGE	TANUKU
32	202109	M.VENKATESWARARAO	4	3	GOVT DEGREE COLLEGE	KARNOOL
33	202113	CH.VIJAYA KUMARI	1,2,4	3	SSN COLLEGE	NARSARAOPETA
34	202106	SURIBABU	ALL	3	GBR COLLEGE	ANAPARTHI
35	202114	A.SUBBARAO	1,2,3	3	SSN COLLEGE	NARSARAOPETA
36	202093	M.V.S.PRASAD	1,2	2	D.N.R.COLLEGE	BHIMAVARAM
37	202094	N.UDAYASRI	1,2	2	D.N.R.COLLEGE	BHIMAVARAM
38	202102	G.V.S.JAYAPALRAO	ALL	2	MAHARAJA'S	VIZIANAGARAM
39	202095	A.VEERAYYA	3	2	D.N.R.COLLEGE	BHIMAVARAM
40	202003	P.SREEDEVI	ELE	2	ST.THERESSA'S	ELURU
41	202004	K.SUNICYROSE	1,2,ELE	1	ST.THERESSA'S	ELURU
42	202005	K.LALITHADEVI	1,2	1	ST.THERESSA'S	ELURU

43	202006	K.SREELATHA	1,2	1	ST.THERESSA'S	ELURU
44		G.NARAYANARAO	ALL		ASDW COLLEGE	KAKINADA
45		N.R.LEELAKRISHNA PRASAD	ALL		P.R.G.COLLEGE	KAKINADA
46		K.SREENIVASARAO	ALL		V.S.M.COLLEGE	RAMACHANDRAPURAM
47		KRISHNA	ALL		SCIM GOVT COLLEGE	TANUKU
48		P.S.N.RAJU	ALL		P.R.G.COLLEGE	KAKINADA
49		P.S.BRAHMACHARI	ALL		P.R.G.COLLEGE	KAKINADA
50		D.VIJAYASREE	ALL		GOVT.DEGREE COLLEGE	MACHERLA
51		SYAMALA	ALL		ASDW COLLEGE	KAKINADA
52		P.V.RAMANA	ALL		P.R.G.COLLEGE	KAKINADA
53		MEHAR	ALL		P.R.G.COLLEGE	KAKINADA
54		D.GANGADHARUDU	ALL		SRVBSJV MAHARANI	PEDDAPURAM
55		DR.GS.NARAYANARAO	ALL		VS KRISHNA COLLEGE	VISAKHAPATNAM
56		BHASKARAPRASAD	ALL		SRR COLLEGE	VIJAYAWADA
57		A.V.RAMANAMURTHY	ALL		GOVT DEGREE COLLEGE	TANUKU
58		A.K.SURYANARAYANA	ALL		IDEAL COLLEGE	KAKINADA
59		SUBBARAJU	ALL		KGRL COLLEGE	BHIMAVARAM
60		SATYANARAYANA RAJU	ALL		KGRL COLLEGE	BHIMAVARAM
61		VENKATESWARA RAO	ALL		CRR COLLEGE	ELURU
62		DR A.R.S.KUMAR	ALL		Y.N.COLLEGE	NARASAPUR
63		K.LAKSHMINARAYANA	ALL		Y.N.COLLEGE	NARASAPUR

**** THE END ****

Modules, Marks and Credits under CBC System

I YEAR B.Sc., SEMESTER - I FROM 2016 -17

Paper	Course	Total Marks	CIA Marks	SEE Marks	Teaching Hours	Credits
I YEAR B.Sc., SEMESTER - I FROM 2016 -17						
PI DSC A	MODULE - I MECHANICS & PROPERTIES OF MATTER	100	40	60	4	3
PI DSC A Practical	I B.Sc., P1 Lab (MECHANICS &	50	50	-	2	2

	OSCILLATIONS)					
I YEAR B.Sc., SEMESTER - II FROM 2016 -17						
PI DSC B	MODULE - II WAVES& OSCILLATIONS	100	40	60	4	3
PI DSC B Practical	I B.Sc., P1 Lab (MECHANICS & OSCILLATIONS)	50	-	50	2	2
II YEAR B.Sc., SEMESTER- III FROM 2017 -18						
PII DSC C	MODULE - III OPTICS	100	40	60	4	3
PII DSC C Practical	II B.Sc., P2 Lab (OPTICS & THERMODYNAMICS)	50	50		2	2
II YEAR B.Sc., SEMESTER- IV FROM 2017 -18						
PII DSC D	MODULE - IV THERMODYNAMICS	100	40	60	4	3
P II DSC D Practical	II B.Sc., P2 Lab (OPTICS & THERMODYNAMICS)	50	-	50	2	2
III YEAR B.Sc., SEMESTER- V FROM 2016 -17						
P III DSC E	MODULE -V ELECTRICITY & ELECTROMAGNETISM	100	40	60	4	3
P III DSC E Practical	III B.Sc., P3 Lab (SEMICONDUCTORS)	50	50		2	2
P IV DSE E Elective- 1	Elective -1 MODERN PHYSICS & QUANTUM MECHANICS	100	40	60	4	3
P IV DSC E E1 Practical	III B.Sc., P4 Lab (DIGITAL ELECTRONICS)	50	50		2	2
P IV DSC E Elective - 2	Elective -2 NANO MATERIALS, PROPERTIES & SYNTHESIS TECHNIQUES	100	40	60	4	3
P IV DSC E E2 Practical	III B.Sc., P4 Lab (DIGITAL ELECTRONICS)	50	50		2	2
III YEAR B.Sc., SEMESTER- VI FROM 2018 -19						
P III DSC F	MODULE -VI ELECTROMAGNETIC WAVE THEORY &	100	40	60	4	3

ELECTRONICS						
P III DSC F Practical	III B.Sc., P3 Lab (SEMI CONDUCTORS)	50		50	2	2
P IV DSE F Elective-1	Elective -1 NUCLEAR PHYSICS & SOLID STATE PHYSICS	100	40	60	4	3
P IV DSC F E1 Practical	III B.Sc., P4 Lab (DIGITAL ELECTRONICS)	50		50	2	2
P IV DSC F Elective -2	Elective -2 ANALOG & COMMUNICATION SYSTEMS	100	40	60	4	3
P IV DSC F E2 Practical	III B.Sc., P4 Lab (DIGITAL ELECTRONICS)	50		50	2	2
DSC - Domine Specific Core		Total Credits				40