P.R. GOVERNMENT COLLEGE, KAKINADA

AN AUTONOMOUSE COLLEGE WITH POTENTIAL FOR EXCELLENCE

DEPARTMENT OF PHYSICS AND ELECTRONICS

Board of Studies

Physics

2017 - 2018

Index

Board of studies 2017 - 2018

Board of studies meeting in **Physics** was held in the Education Enrichment Hall of the college at 2-00 P.M. on 06-04-2017. The following agenda items were discussed and the resolutions were taken.

1. Agenda item : Departmental activities for 2017 – 18.

Discussion: The members Dr. K. Srinivasa Rao and University nominees of BOS enquired about different schemes introduced by the department such as Upakar, Helping hands . The chair person explained all the schemes and other activities planned by the department.

Resolution: It is resolved to follow the list of activities enclosed in the BOS book.

2. Agenda item : National / State level Seminars/Work shops/Conferences/training programmes with topics and other details.

Discussion: The Chair person expressed the opinion of the department i.e to conduct "Regional level two days work in Physics" in the 4th week of August 2017. All the members unanimously agreed for the same.

Regarding the national level seminar title- the members suggested the following titles

Resolution: It is resolved to conduct the "Regional level two days work shop on in Physics" in the 4th week of August 2017.

Finally the title for national seminar is " Nano Science & Technology".

3. Agenda item : Change of modules in syllabus content

Discussion: The changes made at the course level both in the Core and Electives were placed before the board of members and the members agreed the changes made in the curriculum and those are given in a separate sheet.

a. The general elective paper at the end of 4th semester was removed according to CBCS pattern

Resolution: It is resolved to made and follow the changes and suggestions made by the body in the curriculum from the next academic year i.e 2017-18on wards.

Agenda item : Plan for utilization of funds for autonomous/CPE/other grants available for arranging guest lectures, faculty improvement programs, study tours equipping laboratories, reference books & other necessary teaching- learning material.

Discussion: The following Plan for the utilization of funds is placed before the august body. All the members agreed the plan of expenditure.

Resolution: It is resolved to utilize the funds allotted as shown below and may be changed as per the allocation from the college administration.

S.No.	*Fund*	*Utilization*	*Amount*
1.	*UGC Autonomous*	*BOS*	*10,000*
2.		*Invited Lectures*	*10,000*
3.	*UGC- General development assistance*	*Lab equipment*	*2,50,000*
4.		*Reference books*	*50,000*
5.		*Teaching-learning material*	*20,000*
6.	*Spl. Fee funds*	*Minor repairs, stationery*	*25,000*
7		*Out reach programme*	*10,000*

	Total	***3,75,000***

4. Agenda item : Plan for organizing subject oriented community outreach programmes & allocation of necessary funds.

Discussion: ***The plan of the department "orient our students to give the training to the S.S.C.students of near by rural high school students in their Physical science subject" was placed before members. The members appreciated the initiative taken by our department and encouraged to proceed***

Resolution: It is resolved to orient our students to give the training to the S.S.C students of near by rural high school students in their physical science subject.

5. Agenda item: Institution of new medals/incentives/prizes etc., from alumni, philanthropists, parents, faculty etc.

Discussion: The department recommended Incentive to best project work or paper publication.

The members suggested to approach the philanthropists for financial assistance to institute the new medals/ prizes/ incentives.

Resolution: It is resolved to approach the philanthropists for financial assistance to institute the new medals/ prizes/ incentives.

6. Agenda item: Introduction of new programmes - PG/UG/Diploma and certificates courses.

Discussion: ***The Department wants to commence a new P.G. Program M.Sc (Physics) in our College from this academic year i.e. from 2017 – 18. It is resolved to run the P.G. Course in our college with the help of adhoc or part time lecturers as there is severe shortage of faculty in the department. It is resolved to continue an add – on course " Solar Power design & System Integration". For this , representative from Industry Sri. A.V.V.V. Prasad, Solar systems, Kakinada expressed his willingness to give his support to run the course***

As per the orders of the Commissioner , Collegiate Education, the department wants to commence a new restructured course with Maths , Physics , and Renewable Energy Management as group subjects.

Resolutions: ***It is resolved to commence a new P.G.Course M.Sc(Physics) in the college and is also resolved to continue the add – on course " Solar Power design & System Integration".***

It is resolved to commence a new restructured course as per the directions of commissioner of Collegiate Education in the college from this academic year 2017 – 18 , provided sufficient financial assistance and teaching staff are available.

7. Agenda item: Any other programme that enhances the learning capacity of students and their employable & knowledge skills.

Discussion: ***From this academic year onwards the department wants to introduce a new paper" "Basic measurements in Meteorology "as one of the Skill based Elective in the 6th semester. Dr. K. Nanda Gopal , Scientific assistant , India Meteorology took the initiative of introduction of "Basic measurements in Meteorology ". This elective was very much impressed by the Commissioner of Collegiate Education. On the suggestion of our Commissioner , the department wants to introduce the above mentioned paper as Skill based Elective.***

Resolution: ***It is resolved to introduce "Basic measurements in Meteorology "as one of the Skill based Elective in the 6th semester.***

8. Change in internal assessment exams for conducting II mid semester by way of Group Discussions (or) Quiz / Assignment/Seminar.

From the academic year 2017 – 2018 the department will change the pattern of internal assessment exams by the advice of the college administration. The external and internal marks ratio is 60 : 40.

Two internals are conducted each for 30 marks. The total is reduced to 15 marks.

The remaining 15 marks internal is further divided in to (05+ 05 + 05). 05 marks for the seminar in the concern course, 05 marks for assignments and 05 marks for group discussion/quiz..

From now on wards the Ist year students have Two internal exams each for 40 marks. The total is reduced to 20 marks and the remaining 20 marks to be distributed as 10 marks for Assignments, 5 marks for Student seminar and 5 marks for Quiz (or) Group discussion.

Resolution: It is resolved to conduct internal examination for 40 marks and the model paper is as 6Q x 4 M= 24 M and 2Q x 8M= 16M by giving choice in 8marks question.

9. Agenda item: Suggest panel of examiners/ paper setter & other expert nominees for BOS deliberations.

Discussion: The Prepared list of Panel of examiners/ paper setter is placed before the board of members. Subject experts Dr. K. Srinivasa Rao & Sri S.S.R. Murthy suggested some names to add and some names to delete in the list.

Resolution: It is resolved to submit the revised list of Panel of examiners/ paper setter to the Controller Of Examinations and to Academic Cell.

10. Agenda item: Changes if any, in the eligibility conditions for admitting the students to Degree programmes, so as to increase quality in take during admissions.

Discussion: Most of the members expressed their view that being a Government institution it is not possible to fix our own eligibility conditions for admitting the students in degree programme even though it enhances the quality of intake.

Resolution: It is resolved to follow the government eligibility conditions.

Department of Physics

Changes made in BOS 2017 – 18

S.No	Semester	Additions to modules	Deletions from modules
1	Sem I	5. Geo Stationery Satellite, Motion of a Satellite	2. Concept of Impact Parameter, Scattering Cross Section, Ruther ford scattering angle, 3. Precession of a Top, 4. Simple supported beam carrying concentrated load at mid span, Expression for couple
	Sem II	4. Comparison between longitudinal and transverse vibrations in a bar	1 Compound Pendulum, Measurement of 'g' 2. Energy Considerations, comparison with un damped harmonic oscillator 4. Transverse vibrations in a bar, wave equation and its general solution. Boundary conditions, clamped free bar, free – free bar, bar supported at both ends.
2	Sem III	NIL	1 Position of image planes & magnification of optical system, Unit planes and unit points , nodal planes& nodal points , their location 2. Temporal Coherence and Spatial Coherence, Change of Phase on reflection 3. Interference by a plane parallel film illuminated by a point source, Interference by a film with two non-parallel reflecting surfaces, types of fringes, thickness of a thin transparent plate 4. Circular aperture, Limit of resolution 5. Scattering of light, refraction of plane wave incident on negative and positive crystals, Babinets compensator
	Sem IV	3. Stephen – Boltzmann law-Derivation	1.Experimental verification , toothed wheel experiment 2. Thermodynamic scale of temperature, Change of entropy of a perfect gas, change of entropy when ice changes into steam 3. Joule Kelvin effect, expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas 5. distribution of energy in the spectrum of Black body, Wein's displacement law

3.	Sem V(Core)	2. Difference between LCR Series & Parallel resonance	1.Critical damping 2. AC & DC motors, single phase, three phase 3.Fermi level , continuity equation 6. realization of these gates using discrete components, Parallel adder circuits
	Sem V (adv. Ele 1)	NIL	NIL
	Sem V (adv. Ele 2)		1.Compton effect experimental verification
4.	Sem VI(Core)	1.Fine structure of H_α line, Application of Zeeman effect 2. Quantum theory of Raman effect	1. Paschen back effect, stark effect 2. Classical theory of Raman effect
	Sem VI (skill based Ele 3)	NIL	NIL
	Sem VI (skill based Ele 4)	NIL	NIL

Agenda items of BOS 2017 – 18

11. Departmental activities for 2017 – 18.

    Separate list enclosed

12. National / State level Seminars/Work shops/Conferences/training programs with topics and other details.

    Two days work shop national level on solid state Physics

13. Change of modules in syllabus content

    Changes were made at the course level and are shown

14. Plan for utilization of funds for autonomous/CPE/other grants available for arranging guest lectures, faculty improvement programs, study tours equipping laboratories, reference books & other necessary teaching- learning material.

S. No.	***Fund***	***Utilization***	***Amount***
1.	***UGC Autonomous***	***BOS***	***10,000***
2.		***Invited Lectures***	***10,000***
3.	***UGC – General Development Assistance***	***Lab equipment***	***2,50,000***
4.		***Reference books***	***50,000***
5.		***Teaching - learning material***	***20,000***
6.	***Spl. Fee funds***	***Minor repairs, stationery***	***25,000***
		Out reach programme	***10,000***
	Total		***3,75,000***

15. Plan for organizing subject oriented community outreach programs & allocation of necessary funds.

    Department is planning to orient our students to give the training to the S.S.C. students of near by rural high school students for their Physical science subject.

16. Introduction of new programs-PG/UG/Diploma and certificates courses.

    The department is proposing to start M. Sc. Physics Course from 2017 - 2018.

17. Change in internal assessment exams for conducting II mid semester by way of Group Discussions (or) Quiz / Assignment/Seminar.

From the academic year 2017 – 2018 the department will change the pattern of internal assessment exams by the advice of the college administration. The external and internal marks ratio is 60 : 40.

Two internals are conducted each for 30 marks. The total is reduced to 15 marks.

The remaining 15 marks internal is further divided in to (05+ 05 + 05). 05 marks for the seminar in the concern course, 05 marks for assignments and 05 marks for group discussion/quiz..

From now on wards the Ist year students have Two internal exams each for 40 marks. The total is reduced to 20 marks and the remaining 20 marks to be distributed as 10 marks for Assignments, 5 marks for Student seminar and 5 marks for Quiz (or) Group discussion.

8. Conduct of Practical Examinations Semester wise for First year batch **2017-18**

9. Suggest panel of examiners/ paper setter & other expert nominees for BOS deliberations.
Separate list enclosed

10. Subject Electives for V & VI semesters are continued for this academic year also

From the academic year 2016 – 17 the college introducing subject electives in the final year & also Elective practical's

11. Methodologies of Teaching learning.

The department is following the methods
Lecture method
Problem solving method
Experimental method
Project method
Application method

12. Minimum marks to internal examination

Proposed for open discussion

13. Approval of syllabus, question papers, blue prints for model papers etc.

Approved

14. Any other proposal with the permission of the chair.

Blue print for the model paper – Physics
Semester End External examination
For I year core courses
2017 – 2018

Subject Core

S. No.	Type of question	Given in the Question paper			To be answered		
		No. of Questions	Marks allotted To each question	Total marks	No. of Questions	Marks allotted To each question	Total marks
1	Section – A Essay question	5	10	50	3	10	30
2	Section – B Short answer Question	9	5	45	6	5	30
TOTAL				**95**			**60**

Percentage of Choice given $= \frac{95-60}{95} \; x \; 100$

$= \frac{35}{95} \; x \; 100 \qquad = 36.8\,\%$

Blue print - f**or internal Examinations**

S. No.	Type of question	Given in the Question paper			To be answered		
		No. of Questions	Marks allotted To each question	Total marks	No. of Questions	Marks allotted To each question	Total marks
1	**Section – A** Very short answer questions	6	4	24	6	4	24
2	**Section – B** Short answer questions	3	8	24	2	8	16
TOTAL				**48**			**40**

Percentage of Choice given $= \frac{8}{48} \times 100 = 16.66\%$

The total of two internals is reduced to 20 marks and the other 20 marks are further divided as follows

Seminar	= 5 marks
Assignment	= 10 marks
Group discussion/quiz	= 5 marks
Total	= 20 marks

Blue print for the model paper – Physics
Semester End External examination
For II & III year core courses
2017 – 2018

Subject Core

S. No.	Type of question	Given in the Question paper			To be answered		
		No. of Questions	Marks allotted To each question	Total marks	No. of Questions	Marks allotted To each question	Total marks
1	Section – A Essay question	5	10	50	3	10	30
2	Section – B Short answer question	8	5	60	8	5	40
3	Problems	4					
TOTAL				**110**			**70**

Percentage of Choice given = $\frac{(110-70)x\ 100}{110}$ = 36.36 %

Subject Elective

S. No.	Type of question	Given in the Question paper			To be answered		
		No. of Questions	Marks allotted To each question	Total marks	No. of Questions	Marks allotted To each question	Total marks
1	**Section – A** Long answer questions	6	10	60	4	10	40
2	**Section – B** Short questions	10	5	50	6	5	30
TOTAL				**110**			**70**

Percentage of Choice given = $\frac{(110-70)x\ 100}{110}$ = 36.40 %

Blue print - f**or internal Examinations**

S. No.	Type of question	Given in the Question paper			To be answered		
		No. of Questions	Marks allotted To each question	Total marks	No. of Questions	Marks allotted To each question	Total marks
1	**Section – A** short answer questions	8	3	24	8	3	24
2	**Section – B** Long answer questions	2	6	12	1	6	6
TOTAL				**36**			**30**

Percentage of Choice given = $\frac{(36-30)x\ 100}{36}$ = 16.66 %

The total of two internals is reduced to 15 marks and the other 15 marks are further divided as follows

Seminar	= 5 marks
Assignment	= 5 marks
Group discussion/quiz	= 5 marks
Total	= 15 marks

AIM AND OBJECTIVES OF THE PROGRAMME

Aim

In this programme, we aim to provide a solid foundation in all aspects of physics and to show a broad spectrum of modern trends in physics and to develop experimental, computational and mathematical skills of students. The syllabi are framed in such a way that it bridges the gap between the plus two and post graduate levels of physics by providing a more complete and logical framework in almost all areas of basic physics.

The programme also aims

- To provide education in physics of the highest quality at the undergraduate level and generate graduates of the caliber sought by industries and public service as well as academic teachers and researchers of the future.
- To attract outstanding students from all backgrounds.
- To provide an intellectually stimulating environment in which the students have the opportunity to develop their skills and enthusiasms to the best of their potential.
- To maintain the highest academic standards in undergraduate teaching.
- To impart the skills required to gather information from resources and use them.
- To equip the students in methodology related to physics.

Objectives

By the end of the first year (2nd semester), the students should have,

- Attained a common level in basic mechanics and properties of matter and laid a secure foundation in mathematics for their future courses.
- Developed their experimental and data analysis skills through a wide range of experiments in the practical laboratories.

By the end of the fourth semester, the students should have

- Been introduced to powerful tools for tackling a wide range of topics in Thermodynamics, Statistical Mechanics and Electrodynamics.
- Become familiar with additional relevant mathematical techniques.
- Further developed their experimental skills through a series of experiments which also illustrate major themes of the lecture courses.

By the end of the sixth semester, the students should have

- Covered a range of topics in almost all areas of physics including quantum mechanics, solid state physics, computational physics, electronics etc.
- Had experience of independent work such as projects, seminars etc.
- Developed their understanding of core physics.

P.R. GOVERNMENT COLLEGE (A), KAKINADA.
I B.Sc., Physics-Semester-I Paper – IA

MECHANICS (Core - 1)

Course Code : PH1202 **No. of credits : 03**

2017 - 2018. **4 Hours/Week**

Total hours: 60

30 hrs

L = Lecture T = Tutorial P = Practice S =Seminar

Unit – I **30 hrs**

1. **Module – 1 Vector Analysis (10):**
   Scalar and vector fields, gradient of a scalar field and its physical significance(L). Divergence and curl of a vector field and related problems. Vector integration, line, surface and volume integrals. Stokes, Gauss and Greens theorems(Statements only) (L)- simple applications (L).

2. **Module – 2 Mechanics of Particles(10)**
   Laws of motion, motion of variable mass system(L), motion of a rocket, multi-stage rocket(S), conservation of energy and momentum(L). Collisions in two and three dimensions(L), concept of impact parameter, Rutherford scattering angle - derivation(L)

3. **Module – 3 Mechanics of rigid bodies(10)**
   Definition of Rigid body(L), rotational kinematic relations(L), equation of motion for a rotating body(T), angular momentum and inertial tensor(L). Euler's equation(T), Gyroscope(S), precession of the equinoxes(L)

Unit – II **30 hrs**

4 **Module – 4 Mechanics of continuous media(8)**

Elastic constants of isotropic solids and their relation(L), Poisson's ratio and expression for Poisson's ratio in terms of y, n, k(T). Classification of beams (P), cantilever with an end load(L) – Torsional oscillations – determination of rigidity modulus by torsional pendulum(T) (Disc method)

5 **Module – 5 Central forces(12)**

Central forces – definition and examples(L), conservative nature of central forces(L), conservative force as a negative gradient of potential energy(T), equation of motion under a central force(T), gravitational potential and gravitational field, motion under inverse square law(S), derivation of Kepler's laws(T).Geo stationary satellite , motion of the satellite.

6 Module – 6 Special theory of relativity (10)

Galilean relativity(L), absolute frames, Michelson-Morley experiment(S), Postulates of special theory of relativity(S). Lorentz transformation, time dilation, length contraction, mass-energy relation(T).

Textbooks

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, 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**. 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-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*.

Reference Books

1. Physics — Halliday & Resnick
2. Properties of Matter — D.S.Mathur
3. Lectures on Physics — Richard Feynmann
4. University Physics — Zemansky
5. Mechanics — Berkley Series
6. Mechanics, waves and oscillations — S.L. Gupta and Sanjeev gupta
7. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
8. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
9. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
10. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies*.
11. **Mechanics**. Hans & Puri. *TMH Publications*.
12. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications*.
13. **Mechanics by D**.S Mathur.

P.R. GOVERNMENT COLLEGE (A) KAKINADA
I B.Sc., Semester – I (Model paper)
PHYSICS - Paper 1A
(MECHANICS)

Course Code : PH1202 **No. of credits : 03**

2017 - 2018.

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time : $2\frac{1}{2}$ Hours Max Marks : 60

Section – A

Answer any **3** questions. 3 x 10 = 30M

1. Essay question from Module2
2. Essay question from Module3
3. Essay question from Module4
4. Essay question from Module5
5. Essay question from Module6

Section – B

Answer any **SIX** questions 6x5M = 30M

6. Short answer question from Module 1
7. Short answer question from Module 1
8. Short answer question from Module 2
9. Short answer question from Module 3
10. Short answer question from Module 4
11. Short answer question from Module 5
12. Short answer question from Module 6
13. Problem from Module 1
14. Problem from Module 2
15. Problem from Module 6

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
1. Vector Analysis	-	2	1	15
2. Mechanics of particles	1	1	1	20
3. Mechanics of Rigid bodies	1	1	-	15
4. Mechanics of Continuous Media	1	1	-	15
5. Central forces	1	1	-	15
6. Special theory of relativity	1	1	1	20
Total Marks				100

P.R. GOVERNMENT COLLEGE (A), KAKINADA

I B.Sc., Physics-Practical Semester – I

Course Code : PH1202P(A) **No. of credits : 01**

2017 - 2018. **3 Hours/Week**

Total hours : 45

Any six experiments.

Semester – I

Practical Paper – I (Core Practical – 1A)

1. Study of a compound pendulum determination of 'g' and 'k'…..
2. Study of damping of an oscillating disc in Air and Water logarithmic decrement…..
3. Study of Oscillations under Bifilar suspension…..
4. Study of oscillations of a mass under different combination of springs…..
5. 'Y' by uniform Bending (or) Non-uniform Bending…..
6. 'n' by torsion Pendulum….
7. Verification of Laws of a stretched string (Three Laws)…..
8. Study of Viscosity of a fluid by different methods….

P.R. GOVERNMENT COLLEGE (A) KAKINADA.
I B.Sc., Physics-Semester – II Paper – IB
WAVES AND OSCILLATION (Core - 2)

Course Code : PH2202 **No. of credits : 03**

2017 - 2018. **4 Hours/Week**
Total hours : 60

L = Lecture T = Tutorial P = Practice S =Seminar

Unit – I **30 hrs**

1. Module – 1 Fundamentals of Vibrations(12)

Simple harmonic oscillator and solution of the differential equation(T)– Physical characteristics of SHM(P) - combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies(T), Lissajous figures – applications(L).

2. Module – 2 Damped and Forced Oscillations(12)

Damped harmonic oscillator(L), solution of the differential equation of damped oscillator(T). Logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution(P).

3. Module – 3 Complex vibrations and coupled oscillations (6)

Fourier theorem and evaluation of the Fourier coefficients(T), analysis of periodic wave functions-square wave(T), saw-tooth wave(P)

Unit – II **30 hrs**

4. Module – 4 Vibrations of bars (12)

Longitudinal vibrations in bars- wave equation and its general solution(T). 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(T). Tuning fork(P). Comparison between Longitudinal and Teraservers Vibrations in a bar

5. Module – 5 Vibrating Strings (12)

Transverse wave propagation along a stretched string, general solution of wave equation and its significance (T), modes of vibration of stretched string clamped at both ends(L), overtones.

6. Module – 6 Ultrasonics (6)

Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magnetostriction methods(L), detection of ultrasonics. Applications of ultrasonic waves – ultra sound scan(S).

Textbooks

1. **Berkeley Physics** Course. Vol.1,
2. **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008.*
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. **First Year Physics** - *Telugu Academy*.
6. **Mechanics of Particles, Waves and Oscillations**. Anwar Kamal, *New Age International*.
7. **College Physics-I**. T. Bhimasankaram and G. Prasad. *Himalaya Publishing House*.
8. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill*.
9. **Waves and Oscillations**. N. Subramaniyam and Brijlal *Vikas Publishing House Private Limited*.
10. Mechanics, waves and oscillations S.L. Gupta and Sanjeev Gupta

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1. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
2. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
3. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
4. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies*.
5. **Mechanics**. Hans & Puri. *TMH Publications*.
6. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications*.
7. Waves and oscillations Brijlal and Subrahmanyam.
8. Mechanics and waves Berkley series

P.R. GOVERNMENT COLLEGE (A) KAKINADA
I B.Sc., Semester – II (Model paper)
PHYSICS PAPER – I B
(Waves and oscillations)

Course Code : PH2202 **No. of credits : 03**

2017 - 2018.

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time : 3 Hours Max Marks : 60

Section – A

Answer any **3** questions. 3 x 10 = 30M

1. Essay question from Module 1
2. Essay question from Module 2
3. Essay question from Module 3
4. Essay question from Module 4
5. Essay question from Module 6

Section – B

Answer any **SIX** questions 6x5M = 30M

6. Short answer question from Module 1
7. Short answer question from Module 2
8. Short answer question from Module 2
9. Short answer question from Module 4
10. Short answer question from Module 5
11. Short answer question from Module 5
12. Short answer question from Module 6
13. Problem from Module 1
14. Problem from Module 2
15. Problem from Module 5

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
1. Fundamentals of vibrations	1	1	1	20
2. Damped and forced oscillations	1	2	1	25
3. Complex vibrations & coupled oscillations	1	NIL	NIL	10
4. Vibrations of bars	1	1	-	15
5. Vibrating strings	NIL	2	1	15
6. Ultrasonics	1	1	-	15
Total Marks				100

P.R. GOVERNMENT COLLEGE (A), KAKINADA

I B.Sc., Physics-Practical Semester – II

Course Code : PH1202P(B) **No. of credits : 01**

2017 - 2018. **3 Hours/Week**

Total hours : 45

Any six experiments.

Semester – II

Practical Paper – I (Core Practical – 1B)

1. Study of flow of liquids through capillaries……
2. Determination of Surface Tension of a liquid by different methods…..
3. Volume Resonator –determination of frequency of a tuning fork…..
4. Velocity of Transverse wave along a stretched string…..
5. Determination of frequency of a Bar-Melde's experiment…..
6. Measurement of errors –simple Pendulum……
7. Moment of Inertia of a fly wheel…..
8. Observation of Lissajous figures from CRO…..

P.R. GOVERNMENT COLLEGE (A)
II B.Sc., PHYSICS- SEMESTER-III Paper – II A
OPTICS (Core - 3)

Course Code : PH3202 **No. of credits : 03**

2017 - 2018. **4 Hours/Week**
Total Hours : 60

L = Lecture T = Tutorial P = Practice S =Seminar

Unit I: **30 hrs**

1) Module – 1 The Matrix methods in paraxial optics: (8)

Introduction, the matrix method(L), **optical direction cosine -** effect of translation, effect of refraction(T), System matrix - System matrix and lens formula for thick & thin lenses (L) – System marix for the combination of two thin lenses in contact & seperated by a distance (T).

2) Module – 2 Interference: (10)

Principle of superposition(L) – coherence – Theory of interference fringes(L) - conditions for Interference of light(L)
Interference by division of wave front: Fresnel's biprism – determination of wave length of light(T). Determination of thickness of a transparent material using Biprism (L)– Lloyd's mirror experiment(S).

3) Module – 3 Interference: (12)

Interference by division of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law)(T) – Colours of thin films – Non reflecting films(L) – Determination of diameter of wire-Newton's rings in reflected light with contact between lens and glass plate(T) – Determination of wave length of monochromatic light (S)– Michelson Interferometer (Theory only) – Determination of wavelength of monochromatic light(S).

Unit II: **30 hrs**

4) Module – 4 Diffraction: (12)

Introduction – Distinction between Fresnel and Fraunhoffer diffraction(L) -Fraunhoffer diffraction- Diffraction due to single slit (L) – Fraunhoffer diffraction due to double slit(S) Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating(L).

Fresnel diffraction:-

Fresnel's half period zones(L) – area of the half period zones –zone plate – Comparison of zone plate with convex lens – difference between interference and diffraction(S).

5) Module – 5 Polarization (12)

Polarized light : Methods of Polarization(L), Polarization by reflection(T), refraction, Double refraction, selective absorption,– Brewster's law(L) – Malus law – Nicol prism polarizer and analyzer(L) – Quarter wave plate(L), Half wave plate (L)– Optical activity(L), analysis of light by Laurent's half shade polarimeter(S).

6) Module – 6 Laser (06)

Lasers: Introduction – Spontaneous emission – Stimulated emission – Population inversion(L) . Laser principle – Einstein coefficients(T) – Types of Lasers – He-Ne laser (L)– Ruby laser (L)– Applications of lasers(S).

Textbooks

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

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education.*
2. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand & Co. Publications.*
3. **Feyman's Lectures on Physics** Vol. 1,2,3 & 4. *Narosa Publications.*
4. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc.*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
II B.Sc. - III SEMESTER END EXAMINATION
PHYSICS – PAPER IIA (Model Paper)
OPTICS

Course Code : PH3202 **No. of credits : 03**

2017 - 2018.

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **3** questions. 3 x 10 = 30M

1. Essay question from Module2
2. Essay question from Module3
3. Essay question from Module4
4. Essay question from Module5
5. Essay question from Module6

Section – B

Answer any **EIGHT** questions 8x5M = 40M

6. Short answer question from Module 1
7. Short answer question from Module 1
8. Short answer question from Module 3
9. Short answer question from Module 3
10. Short answer question from Module 4
11. Short answer question from Module 4
12. Short answer question from Module 5
13. Short answer question from Module 6
14. Problem from Module 1
15. Problem from Module 2
16. Problem from Module 4
17. Problem from Module 5

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
1. The matrix methods in paraxial optics	NIL	2	1	15
2. Interference -1	1	NIL	1	15
3. Interference -2	1	2	-	20
4. Diffraction	1	2	1	25
5. Polarization	1	1	1	20
6. Laser	1	1	-	15
Total Marks				110

P.R. GOVERNMENT COLLEGE (A), KAKINADA
II B.Sc., PHYSICS- SEMESTER-IV Paper – IIB
THERMODYNAMICS (Core - 4)

Course Code : PH4202 **No. of credits : 03**

2017 - 2018.

4 Hours/Week **Total hours : 60**

L = Lecture T = Tutorial P = Practice S =Seminar

Unit – I **33 hrs**

1. **Module – 1 Kinetic theory of gases: (12)**

Introduction(L) – Deduction of Maxwell's law of distribution of molecular speeds(T), C, C_p & C_{rms} and the relation among them(T) - Mean free path - Transport Phenomena(L) – Viscosity of gases – thermal conductivity – diffusion of gases(T).

2. **Module – 2 Thermodynamics: (11)**

Introduction – Reversible and irreversible processes(L) – Carnot's engine and its efficiency (T)– Carnot's theorem (L)– Second law of thermodynamics, Kelvin's and Clausius statements(T) –Entropy, physical significance (L)– Change in entropy in reversible and irreversible processes (L)– Entropy and disorder – Entropy of universe(L) – Temperature- Entropy (T-S) diagram(L).

3. **Module – 3 Thermodynamic potentials and Maxwell's equations: (10)**

Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations (T)– Clausius-Clayperon's equation (T)– Derivation for ratio of specific heats(T) – Derivation for difference of two specific heats for perfect gas(T). Stephen – Boltzmann law - derivation

Unit – II **27 hrs**

4. **Module – 4 Low temperature Physics: (12)**

Introduction – Joule Kelvin effect – liquefaction of gas using porous plug experiment(L). Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling(T) – Liquefaction of helium, Kapitza's method (L)– Adiabatic demagnetization – Production of low temperatures(L) – Principle of refrigeration, vapour compression type(S). Working of refrigerator.

5. **Module – 5 Quantum theory of radiation: (15)**

Black body-Ferry's black body(L) – Quantum theory of radiation - Planck's law – deduction of Wein's law, Rayleigh-Jeans law, from Planck's law (T)- Measurement of radiation – Types of pyrometers(S) – Disappearing filament optical pyrometer

experiment (S) – Angstrom pyroheliometer(L) - determination of solar constant, temperature of sun(T).

Textbooks

1. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007.*
2. **Optics and Spectroscopy**. R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co*.
3. **Second Year Physics** – *Telugu Academy.*
4. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co*.

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education.*
2. Berkeley Physics Course. Volume-5. **Statistical Physics** by F. Reif. *The McGraw-Hill Companies.*
3. **An Introduction to Thermal Physics** by Daniel V. Schroeder.*Pearson Education Low Price Edition.*
4. **Thermodynamics** by R.C. Srivastava, Subit K. Saha & Abhay K. *Jain Eastern Economy Edition.*
5. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand & Co. Publications.*
6. **Feyman's Lectures on Physics** Vol. 1,2,3 & 4. *Narosa Publications.*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
II B.Sc., SEMESTER - IV EXAMINATION
PHYSICS – PAPER IIB (Model Paper)
THERMODYNAMICS

Course Code : PH4202 **No. of credits : 03**

2016 - 2017.

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time : 3 Hrs. Max. Marks : 70

Section – A

Answer any **3** questions. 3 x 10 = 30M

1. Essay question from Module 1
2. Essay question from Module 2
3. Essay question from Module 3
4. Essay question from Module 4
5. Essay question from Module 5

Section – B

Answer any **EIGHT** questions 8x5M = 40M

6. Short answer question from Module 1
7. Short answer question from Module 1
8. Short answer question from Module 2
9. Short answer question from Module 2
10. Short answer question from Module 3
11. Short answer question from Module 3
12. Short answer question from Module 4
13. Short answer question from Module 5
14. Problem from Module 1
15. Problem from Module 2
16. Problem from Module 5
17. Problem from Module 5

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
1. Kinetic theory of gases	1	2	1	25
2. Thermodynamics	1	2	1	25
3. Thermodynamic potentials & Maxwell equations	1	2	Nil	20
4. Low temperature physics	1	1	Nil	15
5. Quantum theory of radiation	1	1	2	25
Total Marks				110

P.R. GOVERNMENT COLLEGE (A), KAKINADA

II B.Sc., Physics-Practicals Semesters – III & IV

Course Code : PH4202P **No. of credits : 02**

2017 - 2018

3 Hours/Week
Total hours: 90

Practical Paper – II (Core Practical - 2)

Any twelve experiments.

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Thickness of a wire-wedge method.
6. Determination of wavelength of light –Biprism.
7. Determination of Radius of curvature of a given convex lens- Newton's rings.
8. Resolving power of grating.
9. Study of optical rotation - polarimeter.
10. Dispersive power of a prism
11. Determination of wavelength of light using diffraction grating minimum deviation method.
12. Wavelength of light using diffraction grating – normal incidence method.
13. Resolving power of a telescope.
14. Refractive index of a liquid and glass (Boys Method).
15. Pulfrich refractometer – determination of refractive index of liquid.
16. Wavelength of Laser light using diffraction grating.

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc Physics Paper – IIIA – Semester - V
2017 - 2018.

Course Code : PH5203 **No. of credits : 03**

Alternating Currents, Basic and Digital Electronics (Core - 5)

3 Hour/Week

Total Hours : 45

L = Lecture T = Tutorial P = Practice S =Seminar

1. **Module – 1** **Varying currents** (06 Hours) :

Growth of current in L-R circuit and decay of current in L-R circuit(L) - Growth of current in R - C circuit and decay of current in R - C circuit(S) - Growth of current in L-C-R circuit and decay of current in L-C -R circuit(L).

2. **Module – 2** **Alternating currents** (07 Hours) :

Alternating current relation between current and voltage in pure R, C and L-vector diagrams(P) – Power in ac circuits. LCR series and parallel resonant circuit – Q-factor(L) – sharpness of resonance(T). Difference between LCR series and parallel resonance (P)

3. **Basic Electronics (10 + 10 hours):**

Module – 3 **Semiconductors, rectifiers & filters**

Formation of electron energy bands in solids, classification of solids in terms of forbidden energy gap(L). Intrinsic and extrinsic semiconductors, p-n junction diode, Zener diode characteristics and its application as voltage regulator(S). Half wave and full wave rectifiers and filters, ripple factor (qualitative) (L)

Module – 4 **Transistors & amplifiers**

p n p and n p n transistors, CB,CE and CC configurations(L) – transistor hybrid parameters – determination of hybrid parameters from transistor characteristics(T) – transistor as an amplifier(S) — concept of negative feed back and positive feed back – Barkhausen criterion(T) - RC coupled amplifier (qualitative only).

4. **Digital principles (06 + 06 hours)** :

Module – 5 **Number system**

Binary number system, converting Binary to Decimal and vice versa(P). Binary addition and subtraction (1's and 2's complement methods)(P). Hexadecimal number system(P). Conversion from Binary to Hexadecimal – vice versa and Decimal to Hexadecimal vice versa(P).

Module – 6 **Logic Gates & adders**

Logic gates: OR, AND, NOT gates, truth tables. NAND, NOR as universal gates, Exclusive – OR gate(L), De Morgan's Laws – statement and proof(L), Half and Full adders (L).

Reference books :

1. Physics Vol – II Halliday and Resnik
2. Electricity Berkeley Physics series
3. Electronic devices and circuits Milliman and Halkies
4. Electricity and electonics Tayal
5. Electricity and Magnetism Brij Lal and Subrahmanyam
6. Electricity and Magnetism C. J.Smith
7. Electricity and Magnetism C. J.Smith and Rangawala
8. Digital Electronics Malvino
9. Electricity and Magnetism with electronics K. K. Tewari (R Chand)
10. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath – *S. Chand & Co.* for semi conductor & Digital Principles)
11. Fundamentals of Physics- Halliday/Resnick/Walker - *Wiley India Edition 2007.*
12. Berkeley Physics Course – Vol. II - Electricity and Magnetism – Edward M Purcell – *The McGraw-Hill Companies.*
13. Electricity and Magnetism – D.N. Vasudeva. *S. Chand & Co.*
14. Electronic devices and circuits – Millman and Halkias. *Mc.Graw-Hill Education.*
15. Electricity and Magnetism Brijlal and Subramanyam. *Ratan Prakashan Mandir.*
16. Digital Principles and Applications by A.P. Malvino and D.P. Leach. *McGraw Hill Education.*

Reference Books

1. Electricity and Electronics – D.C. Tayal. *Himalaya Publishing House.*
2. Electricity and Magnetism – C.J.Smith. *Edward Arnold Ltd.*
3. Electricity, Magnetism with Electronics – K .K Tewari. *Richland & Co.*
4. Third year Physics – *Telugu Academy*
5. Principles of Electronics by O.K. Mehta – *S. Chand & Co.*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc Physics Paper – IIIA – Semester – V – Model Paper

2017 - 2018.

Course Code : PH5203 **No. of credits : 03**

Alternating Currents, Basic and Digital Electronics

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **THREE** questions. 3 x 10 = 30M

1. Essay question from Module 1
2. Essay question from Module 2
3. Essay question from Module 3
4. Essay question from Module 4
5. Essay question from Module 6

Section – B

Answer any **EIGHT** questions 8x5M = 40M

6. Short answer question from Module 1
7. Short answer question from Module 2
8. Short answer question from Module 2
9. Short answer question from Module 3
10. Short answer question from Module 3
11. Short answer question from Module 4
12. Short answer question from Module 5
13. Short answer question from Module 6
14. Problem from Module 1
15. Problem from Module 2
16. Problem from Module 3
17. Problem from Module 5

Blue Print

S.No	Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted

1.	Varying currents	1	1	1	20
2.	Alternating currents	1	2	1	25
3.	Semiconductors, rectifiers & filters	1	2	1	25
4.	Transistors & amplifiers	1	1	--	15
5.	Number system	--	1	1	10
6.	Logic Gates & adders	1	1	--	15
	Total Marks				110

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester - V
2017 - 2018.

Course Code : PH5204A **No. of credits : 02**

Electrostatic & Magnetostatics (Advanced Elective - 1)

2 Hour/Week
Total Hours : 30

L = Lecture T = Tutorial P = Practice S =Seminar

1. **Module – 1** Electrostatics (8 hours):

   Gauss law and its applications-Uniformly charged sphere(L), charged cylinder Deduction of Coulomb's law from Gauss law(S) -Mechanical force on a charged conductor(T).
   Electric potential – Potential due to a charged spherical conductor(L), Potential due to electric dipole(T)

2. **Module – 2** Dielectrics (7 hours):

   An atomic view of dielectrics(L) –behavior of polar and non-polar dielectrics in electric field (P)- potential energy of a dipole in an electric field(T) - Polarization and charge density (L)- Gauss's law in dielectric medium(S)– Relation among D, E and P(T). Boundary conditions at the dielectric surface(L).

3. **Module – 3** Capacitance (6 hours):

Capacitance of concentric spheres and cylindrical condenser(L) - capacitance of parallel plate condenser with and without dielectric(S). Electric energy stored in a charged condenser(T) – force between plates of condenser (P)

4. **Module–4** Magnetostatics (9 hours):

Magnetic shell – potential at a point due to magnetic shell(L) – field due to magnetic shell – equivalence of electric circuit and magnetic shell(T) – Magnetic induction (B) , field (H) and intensity of magnetization (I) – relation among them(P) – permeability and susceptibility –Relation between them(P) - Hysteresis loop(L) – explanation – derivation for hysteresis loss(T) – uses of hysteresis curves.(S)

Reference books :

9. Physics Vol – II Halliday and Resnik
10. Electricity Berkeley Physics series
11. Electronic devices and circuits Milliman and Halkies
12. Electricity and electonics Tayal
13. Electricity and Magnetism Brij Lal and Subrahmanyam
14. Electricity and Magnetism C. J.Smith
15. Electricity and Magnetism C. J.Smith and Rangawala
16. Digital Electronics Malvino
9. Electricity and Magnetism with electronics K. K. Tewari (R Chand)

17. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath – *S. Chand & Co.* for semi conductor & Digital Principles)
18. Fundamentals of Physics- Halliday/Resnick/Walker - *Wiley India Edition 2007.*
19. Berkeley Physics Course – Vol. II - Electricity and Magnetism – Edward M Purcell – *The McGraw-Hill Companies.*
20. Electricity and Magnetism – D.N. Vasudeva. *S. Chand & Co.*
21. Electronic devices and circuits – Millman and Halkias. *Mc.Graw-Hill Education.*
22. Electricity and Magnetism Brijlal and Subramanyam. *Ratan Prakashan Mandir.*
23. Digital Principles and Applications by A.P. Malvino and D.P. Leach. *McGraw Hill Education.*

Reference Books

6. Electricity and Electronics – D.C. Tayal. *Himalaya Publishing House.*
7. Electricity and Magnetism – C.J.Smith. *Edward Arnold Ltd.*
8. Electricity, Magnetism with Electronics – K .K Tewari. *Richland & Co.*
9. Third year Physics – *Telugu Academy*
10. Principles of Electronics by O.K. Mehta – *S. Chand & Co.*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester – V (Model paper)
2017 - 2018.

Course Code : PH5204A **No. of credits : 02**

Electrostatic & Magnetostatics (Advanced Elective - 1)

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **FOUR** questions. 4 x 10 = 40M

1. Essay question from Module 1
2. Essay question from Module 1
3. Essay question from Module 2
4. Essay question from Module 3
5. Essay question from Module 4
6. Essay question from Module 4

Section – B

Answer any **SIX** questions 6x5M = 30M

7. Short answer question from Module 1
8. Short answer question from Module 1
9. Short answer question from Module 2
10. Short answer question from Module 3
11. Short answer question from Module 3
12. Short answer question from Module 4
13. Short answer question from Module 4
14. Problem from Module 1
15. Problem from Module 2
16. Problem from Module 3

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
1. Electrostatics	2	2	1	35
2. Dielectrics	1	1	1	20
3. Capacitance	1	2	1	25
4. Magneto statics	2	2	--	30
Total				110

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester - V
2017 - 2018.

Course Code : PH5204B **No. of credits : 02**

Quantum Mechanics (Advanced Elective - 2)

2 Hour/Week Total Hours : 30

L = Lecture T = Tutorial P = Practice S =Seminar

1. Module – 1 Quantum Mechanics 08Hrs

Inadequacy of classical Physics: (Discussion only) (L)- Photoelectric effect (S)– Fundamental laws of Photo Electric emission(S) Einstien's photoelectric equation(L). Compton's effect (quantitative). Stability of an atom – Bohr's atomic theory(S). Limitations of old quantum theory(L).

2. **Module – 2** **Matter Waves**: **07Hrs**

de Broglie's hypothesis (L)– wavelength of matter waves, properties of matter waves(L). Phase and group velocities(P). Davisson and Germer experiment(L).

3. **Module – 3** **Uncertainty Principle:** **07Hrs**

Heisenberg's uncertainty principle for position and momentum (x and P), Energy and time (E and t)(T). Gamma ray microscope(S). Diffraction by a single slit(S). Complementary principle of Bohr(L).

4. **Module – 4** **Schrodinger Wave Equation** **08Hrs**

Schrodinger time independent and time dependent wave equations(T). Wave function properties (L). Basic postulates of quantum mechanics(S). Operators, Eigen functions and Eigen values, expectation values(L). Application of Schrodinger wave equation to particle in one dimensional box(T)

Textbooks

1. Modern Physics by G. Aruldhas & P. Rajagopal. *Eastern Economy Edition*.
2. Concepts of Modern Physics by Arthur Beiser. *Tata McGraw-Hill Edition*.
3. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co.*
4. Nuclear Physics by D.C. Tayal, *Himalaya Publishing House.*
5. Molecular Structure and Spectroscopy by G. Aruldhas. *Prentice Hall of India, New Delhi.*
6. Spectroscopy –Atomic and Molecular by Gurdeep R Chatwal and Shyam Anand – *Himalaya Publishing House.*
7. Third Year Physics - *Telugu Academy*.
8. Elements of Solid State Physics by J.P. Srivastava. (for chapter on nanomaterials)- *Prentice-hall of India Pvt. Ltd.*

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. Jani. *Eastern Economy Edition.*
4. Nuclear Physics Irving Kaplan – *Narosa Publishing House.*
5. Introduction to Solid State Physics by Charles Kittel. *John Wiley and Sons.*
6. Solid State Physics by A.J. Dekker. *Mac Millan India*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester – V (Model paper)
2017 - 2018.

Course Code : PH5204B **No. of credits : 02**

Quantum Mechanics (Advanced Elective - 2)

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **FOUR** questions. 4 x 10 = 40 M.

1. Essay question from Module 1
2. Essay question from Module 1
3. Essay question from Module 2

4. Essay question from Module 3
5. Essay question from Module 4
6. Essay question from Module 4

Section – B

Answer any **SIX** Questions 6X5 =30M

7. Short answer question from Module 1
8. Short answer question from Module 2
9. Short answer question from Module 2
10. Short answer question from Module 3
11. Short answer question from Module 4
12. Short answer question from Module 4
13. Problem from Module 1
14. Problem from Module 2
15. Problem from Module 3
16. Problem from Module 4

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
5. Quantum Mechanics	2	1	1	30
6. Matter Waves	1	2	1	25
7. Uncertainty Principle	1	1	1	20
8. Schrodinger wave equation	2	2	1	35
Total				110

P.R. GOVERNMENT COLLEGE (A)
III B.Sc., Physics-Practicals Semesters – V
2017 - 2018.

3 HOUR/WEEK **TOTAL HOURS : 45** **No. of credits : 01**

Core Practical – 3 Course Code : PH5203P

Electrostatics & Electromagnetism Expts.

1. Determination of AC frequency – sonometer.
2. Verification of Kirchhoff's laws.
3. LCR circuit series resonance, Q – factor.
4. LCR circuit parallel resonance, Q – factor
5. Power factor of an A.C. circuit.
6. Carey Foster's bridge – comparison of resistance.

Elective Practical – 1 Course Code : PH5204AP

3 HOUR/WEEK **TOTAL HOURS : 45** **No. of credits : 01**

Electronics Expts.

1. Design and construction of multi meter.
2. Construction of a model D.C. power supply.
3. Characteristics of transistor.
4. Impedance of an A.C. circuit.
5. Potentiometer – internal resistance of a cell.
6. Figure of merit of a moving coil galvanometer.

Elective Practical – 2 Course Code : PH5204BP

3 HOUR/WEEK **TOTAL HOURS : 45** **No. of credits : 01**

Electrical Expts

1. RC circuit – frequency response (Low pass).
2. RC circuit – frequency response (High pass).
3. RL circuit – frequency response (Low pass).
4. RL circuit – frequency response (High pass).
5. Characteristics of a junction diode.
6. Characteristics of Zener diode.

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc Physics Paper – IIIB – Semester - VI
2017 - 2018.

Course Code : PH6203 **No. of credits : 03**

Atomic, Molecular spectra & Nuclear Physics (Core - 6)

3 Hour/Week

Total Hours : 45

L = Lecture T = Tutorial P = Practice S =Seminar

5. Module – 1 Atomic Spectra 12 hrs

Introduction – Drawbacks of Bohr's atomic model(L) - Stern & Gerlach experiment Vector atom model and quantum numbers associated with it. L-S and j-j coupling schemes(L). Spectral terms, selection rules, intensity rules(L). Fine structure of Hα line - Zeeman Effect. Applications of Zeeman effect.

6. Module – 2 Molecular Spectroscopy 12 hrs

Types of molecular spectra - pure rotational energies and spectrum of diatomic molecule(T), determination of internuclear distance(P). Vibrational energies and spectrum of diatomic molecule(T). Raman effect(L), Quantum theory of Raman effect(L). Experimental arrangement for Raman effect and its applications(S).

Nuclear Physics

7. Module – 3 Nuclear Structure 12 hrs

Basic properties of nucleus – size, charge, mass, spin, magnetic dipole moment and electric quadrupole moment(L). Binding energy of nucleus, deuteron binding energy(L), nuclear forces(S). Nuclear models – liquid drop model, shell model(L).

Alpha and Beta Decays:

Range of alpha particles, Geiger – Nuttal law(T). Gammow's theory of alpha decay(T). Geiger – Nuttal law from Gammow's theory(L). Neutrino hypothesis(L), Fermi's theory of β-decay(L) (qualitative).

8. Module – 4 Nuclear Reactions 09 hrs

Types of nuclear reactions(L), channels - Compound nucleus(S), direct reactions (S)(concepts).

Nuclear Detectors:

GM counter, proportional counter, scintillation counter(L), Wilson cloud chamber(S)

Textbooks

9. Modern Physics by G. Aruldhas & P. Rajagopal. *Eastern Economy Edition*.
10. Concepts of Modern Physics by Arthur Beiser. *Tata McGraw-Hill Edition*.
11. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co.*
12. Nuclear Physics by D.C. Tayal, *Himalaya Publishing House.*
13. Molecular Structure and Spectroscopy by G. Aruldhas. *Prentice Hall of India, New Delhi.*
14. Spectroscopy –Atomic and Molecular by Gurdeep R Chatwal and Shyam Anand – *Himalaya Publishing House.*
15. Third Year Physics - *Telugu Academy*.
16. Elements of Solid State Physics by J.P. Srivastava. (for chapter on nanomaterials)- *Prentice-hall of India Pvt. Ltd.*

Reference Books

7. University Physics with Modern Physics by Young & Freedman. *A. Lewis Ford. Low Price Edition (Eleventh Edition).*
8. Quantum Physics by Eyvind H. Wichman. Volume.4. *The McGraw-Hill Companies.*
9. Quantum Mechanics by Mahesh C. Jani. *Eastern Economy Edition.*
10. Nuclear Physics Irving Kaplan – *Narosa Publishing House.*
11. Introduction to Solid State Physics by Charles Kittel. *John Wiley and Sons.*
12. Solid State Physics by A.J. Dekker. *Mac Millan India*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc Physics Paper – IIIB – Semester – VI (Model Paper)
2017 - 2018.

Course Code : PH6203 **No. of credits : 03**

Atomic, Molecular spectra & Nuclear Physics (Core - 6)

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **THREE** questions. 3 x 10 = 30M

1. Essay question from Module 1
2. Essay question from Module 2
3. Essay question from Module 3
4. Essay question from Module 3
5. Essay question from Module 4

Section – B

Answer any **EIGHT** questions 8x5M = 40M

6. Short answer question from Module 1
7. Short answer question from Module 1
8. Short answer question from Module 2
9. Short answer question from Module 3
10. Short answer question from Module 3
11. Short answer question from Module 3
12. Short answer question from Module 4
13. Short answer question from Module 4
14. Problem from Module 1
15. Problem from Module 2
16. Problem from Module 3
17. Problem from Module 4

Blue Print

S.No	Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
1.	Atomic Spectra	1	2	1	25
2.	Molecular spectroscopy	1	1	1	20
3.	Nuclear structure	1	2	1	25
	Alpha and beta Decays	1	1	Nil	15
4.	Nuclear Reactions	Nil	2	Nil	10
	Nuclear Detectors	1	-	1	15
Total Marks					110

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester - VI
2017 - 2018.

Course Code : PH6204A **No. of credits : 02**

Electromagnetic induction & Electromagnetism (Skill Based Elective - 3)

2 Hour/Week
Total Hours : 30

L = Lecture T = Tutorial P = Practice S =Seminar

5. Moving charge in electric and magnetic fields (8 hours) :

Module – 1

Hall effect – derivation of Hall coefficient(L) – applications(P) - cyclotron (L)- synchrocyclotron - Biot –Savart's law – applications(S) - Calculation of B due to a) long straight wire(L) b) a circular current loop and (P) c) solenoid.(P)

6. Electromagnetic induction (7 + 7 hours) :

Module - 2

Faraday's laws and demonstration experiments(S) –Lenz's law(L) – expression for induced emf – time varying magnetic fields(L) – Betatron(S) –Ballistic galvanometer – theory(L).

Module – 3

7. Self inductance - calculation of self inductance of a long solenoid(T)– toroid - energy stored in magnetic field (L)- mutual inductance - mutual inductance of two given coils(T)

8. Maxwell's equations and electromagnetic waves (08 hours) :

Module – 4

A review of basic laws of electricity and magnetism(P) – displacement current – Maxwell's equations in differential form(L) – Maxwell's wave equation, Poynting theorem(L), production and detection of electromagnetic waves (Hertz experiment)(S)

Reference books :

1. Physics Vol – II — Halliday and Resnik
2. Electricity — Berkeley Physics series
3. Electricity and electonics — Tayal
4. Electricity and Magnetism — Brij Lal and Subrahmanyam
5. Electricity and Magnetism — C. J.Smith
6. Electricity and Magnetism — C. J.Smith and Rangawala
7. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath – *S. Chand & Co.* for semi conductor & Digital Principles)
8. Fundamentals of Physics- Halliday/Resnick/Walker - *Wiley India Edition 2007.*
9. Berkeley Physics Course – Vol. II - Electricity and Magnetism – Edward M Purcell – *The McGraw-Hill Companies.*
10. Electricity and Magnetism – D.N. Vasudeva. *S. Chand & Co.*
11. Electricity and Magnetism Brijlal and Subramanyam. *Ratan Prakashan Mandir.*

Reference Books

1. Electricity and Electronics – D.C. Tayal. *Himalaya Publishing House.*
2. Electricity and Magnetism – C.J.Smith. *Edward Arnold Ltd.*
3. Electricity, Magnetism with Electronics – K .K Tewari. *R.Chand & Co.*
4. Third year Physics – *Telugu Akademy*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester - VI
2017 - 2018.

Course Code : PH6204A **No. of credits : 02**

Electromagnetic induction & Electromagnetism (Skill Based Elective - 3)

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **FOUR** questions. 4 x 10 = 40 M.

1. Essay question from Module 1
2. Essay question from Module 1
3. Essay question from Module 2
4. Essay question from Module 3
5. Essay question from Module 4
6. Essay question from Module 4

Section – B

Answer any **SIX** Questions 6X5 =30M

7. Short answer question from Module 1
8. Short answer question from Module 2
9. Short answer question from Module 2
10. Short answer question from Module 3
11. Short answer question from Module 4
12. Short answer question from Module 4
13. Problem from Module 1
14. Problem from Module 2
15. Problem from Module 3
16. Problem from Module 3

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
Moving charge in electric and magnetic fields	2	1	1	30
Electromagnetic induction -1	1	2	1	25
Electromagnetic induction - 2	1	1	2	25
Maxwell's equations and electromagnetic waves	2	2	--	30
Total				110

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester - VI
2017 - 2018.

Course Code : PH6204B **No. of credits : 02**

Solid State Physics (Skill based Elective - 4)

2 Hour/Week
Total Hours : 30

L = Lecture T = Tutorial P = Practice S =Seminar

1. **Module – 1** **Crystal Structure:** 07 Hrs

Crystalline nature of matter(L). Crystal lattice, Unit Cell, Elements of symmetry(L). Crystal systems, Bravais lattices(L). Miller indices(T). Simple crystal structures (S.C., BCC, CsCl, FCC, NaCl (L)

X-ray Diffraction: Diffraction of X –rays by crystals(L), Bragg's law(S), Experimental techniques - Laue's method(L) and powder method(S).

2. **Module – 2** **Nanomaterials:** 10 Hrs

Introduction, nano particles, metal nanoclusters, semiconductor, nanoparticles, carbon clusters, carbon nanotubes. Applications of Nano technology.

Bonding in Crystals:

Types of bonding in crystals – characteristics of crystals with different bindings(L). Lattice energy of ionic crystals – determination of Madelung constant for NaCl crystal(T) - Born – Haber cycle(S).

3. **Module – 3** **Magnetism:** 06 Hrs

Magnetic properties of dia, para and ferromagnetic materials(L). Langevin's theory of paramagnetism(T). Weiss' theory of ferromagnetism(L) – antiferromagnetism and ferrimagnetism ferrites and their applications(S).

4. **Module – 4** **Superconductivity:** **07 Hrs**

Basic experimental facts – zero resistance(S), effect of magnetic field, Meissner effect(L), persistent current, Isotope effect - Type I and Type II superconductors(T). Elements of BCS theory-Cooper pairs(L). Applications(S).

Textbooks

1. Modern Physics by G. Aruldhas & P. Rajagopal. *Eastern Economy Edition*.
2. Concepts of Modern Physics by Arthur Beiser. *Tata McGraw-Hill Edition*.
3. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co.*
4. Nuclear Physics by D.C. Tayal, *Himalaya Publishing House.*
5. Molecular Structure and Spectroscopy by G. Aruldhas. *Prentice Hall of India, New Delhi.*
6. Spectroscopy –Atomic and Molecular by Gurdeep R Chatwal and Shyam Anand – *Himalaya Publishing House.*
7. Third Year Physics - *Telugu Academy*.
8. Elements of Solid State Physics by J.P. Srivastava. (for chapter on nanomaterials)- *Prentice-hall of India Pvt. Ltd.*

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. Jani. *Eastern Economy Edition.*
4. Nuclear Physics Irving Kaplan – *Narosa Publishing House.*
5. Introduction to Solid State Physics by Charles Kittel. *John Wiley and Sons.*
6. Solid State Physics by A.J. Dekker. *Mac Millan India*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester – VI (Model paper)
2017 - 2018.

Course Code : PH6204B **No. of credits : 02**

Solid State Physics (Skill based Elective - 4)

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **FOUR** questions. 4 x 10 = 40 M.

1. Essay question from Module 1
2. Essay question from Module 1
3. Essay question from Module 2
4. Essay question from Module 2
5. Essay question from Module 3
6. Essay question from Module 4

Section – B

Answer any **SIX** Questions 6X5 =30M

7. Short answer question from Module 1
8. Short answer question from Module 1
9. Short answer question from Module 2
10. Short answer question from Module 2
11. Short answer question from Module 3
12. Short answer question from Module 3
13. Short answer question from Module 4
14. Problem from Module 1
15. Problem from Module 2
16. Problem from Module 4

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Problems 5 marks	Marks allotted
Crystalline nature of matter	1	1	1	20
X-ray Diffraction	1	1	Nil	15
Nano Materials	1	2	Nil	20
Bonding in crystals	1	1	1	20
Magnetism	1	Nil	1	15
Superconductivity	1	2	Nil	20
Total				110

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester - VI
2017 - 2018.

Course Code : PH6204C **No. of credits : 02**

Basic measurements in meteorology (Skill based Elective - 5)

2 Hour/Week
Total Hours : 30

Module1: The nature of meteorological observations – Surface instrumental Observations

Classification of Stations – Types of Observations – Times of Observations – Measurement of vertical distances- Desirable characteristics of meteorological instruments – The basic forms of the instruments – Recording instruments – Recording drums & clocks – Charts for recording instruments – The vernier – Recording meteorological instruments

Module 2 : Cloud Classification - Measurement of Atmospheric Humidity, Surface wind

Classification of Clouds – summary of Cloud classification – Cloud varieties - Definitions & Units of Humidity – Instruments for measuring Surface Atmospheric humidity – Simple Psychrometer without Artificial ventilation - Wind direction measurement – Wind vanes – Wind direction indicators & recorders – Wind speed measurements – Wind speed indicators and recorders – Surface wind observations

Module 3 : Measurement of Temperature, Pressure, Precipitation

Temperature Scales – Surface Air temperature – Maximum Thermometer – Minimum Thermometer – Bi metallic thermograph – Soil Thermometer - Definitions & units of Atmospheric Pressure - Mercury Barometers – Aneroid Barometers – Units of measurement of rainfall – Rain measures - Rain fall observations & Recorders – Types of Rain gauges

Module 4 : Surface weather Observations

Climatological stations – Synoptic Stations – Terms used in the present weather code – Weather phenomena included in present weather code.

References : Compendium of Lecture notes for meteorological personnel – Vol – II Meteorology – By B.J. RETALLACK(World Meteorological Organization, Geneva , Switzerland

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc., Physics – Semester – VI (Model paper)
2017 - 2018.

Course Code : PH6204C **No. of credits : 02**

Basic measurements in meteorology (Skill based Elective - 5)

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **FOUR** questions. 4 x 10 = 40 M.

1. Essay question from Module 1
2. Essay question from Module 2
3. Essay question from Module 2
4. Essay question from Module 3
5. Essay question from Module 3
6. Essay question from Module 4

Section – B

Answer any **SIX** Questions 6X5 =30M

7. Short answer question from Module 1
8. Short answer question from Module 1
9. Short answer question from Module 2
10. Short answer question from Module 2
11. Short answer question from Module 2
12. Short answer question from Module 3
13. Short answer question from Module 3
14. Short answer question from Module 3
15. Short answer question from Module 4
16. Short answer question from Module 4

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Marks allotted
The nature of meteorological observations – Surface instrumental Observations	**1**	**2**	**20**
Cloud Classification - Measurement of Atmospheric Humidity, Surface wind	**2**	**3**	**35**
Measurement of Temperature, Pressure, Precipitation	**2**	**3**	**35**
Surface weather Observations	**1**	**2**	**20**
Total			**110**

P.R. GOVERNMENT COLLEGE (A)
III B.Sc., Physics-Practicals Semesters – VI
2017 - 18
3 HOUR/WEEK TOTAL HOURS : 45 NO. OF CREDITS : 01

Core Practical – 4 **Course Code : PH6203P**

Magnetism Experiments.

1. e/m of an electron by Thomson method.
2. Temperature characteristics of thermistor.
3. Hysteresis curve of transformer core.
4. Determination of Planks constant (photo cell).
5. Energy gap of semiconductor using junction diode.
6. Determination of rms voltage and frequency of AC using C.R.O.

Elective Practical – 3 Course Code : PH6204AP

3 HOUR/WEEK TOTAL HOURS : 45 NO. OF CREDITS : 01

Digital Electronics Expts.

1. R – C coupled amplifier.
2. Logic gates AND , OR, NOT, X – OR gates.
3. Verification of De Morgan theorems.
4. Verification of truth tables for half and full adders.
5. Conversion of galvanometer in to voltmeter.
6. Conversion of galvanometer in to ammeter.

Elective Practical – 4 Course Code : PH6204BP

3 HOUR/WEEK TOTAL HOURS : 45 NO. OF CREDITS : 01

Modern Physics Expts.

1. Study of alkaline earth spectra using a concave grating.
2. Hall-probe method for measurement of magnetic field.
3. Absorption spectrum of iodine vapour.
4. Study of spectra of hydrogen spectrum (Rydberg's constant).
5. Study of absorption of α and β rays.

Elective Practical – 5 Course Code : PH6204CP

3 HOUR/WEEK TOTAL HOURS : 45 NO. OF CREDITS : 01

1 . Draw Correction graph for Thermograph

2. Draw Correction graph for Barograph

3. Draw Correction graph for Hygrograph

4. Draw Isobars using given data.

5. Annual measurement of mean maxima and minima temperature by using meteorological data

6. Annual measurement of mean maxima and minima rainfall by using meteorological data.

Books for Practicals

1. A textbook of Practical Physics by M.N. Srinivasan. *S. Chand & Co.*
2. Practical Physics by M. Arul Thakpathi by *Comptek Publishers.*
3. A. Laboratory manual for Physics Course by B.P. Khandelwal.
4. B.Sc. Practical Physics – C.L. Arora – *S. Chand & Co*.
5. Viva-voce in Advanced Physics – R.C. Gupta and Saxena P.N. – *Pragathi Prakashan, Meerut.*
6. Viva-Voce in Physics – R.C. Gupta, *Pragathi Prakashan, Meerut.*

P.R. GOVERNMENT COLLEGE (A), KAKINADA
II B.Sc., Physics – Semester - IV
2017 - 2018.

Course Code : PH4202AOC **No. of credits : 02** Solar

power design & system integration

(Add-on course)

2 Hour/Week
Total Hours : 50

Module – 1(10 hrs)

Basic electronics:-Atomic Structure - Semi Conductor Materials - Doping -Silicon N Channel-Silicon P Channel - PN Junction - Biasing-PN Junction as closed Switch-PN Junction as open Switch-Voltage-Current-Power-Solar Cells-Solar Modules

Module – 2(10 hrs)

Solar modules: Standard Voltage Ratings of a Solar Module - Power Rating Of A Solar Module - Designing Of a Solar Module - Calculations of Power Generation through Solar Modules - Calculations on Energy Requirements.

Module – 3 (10 hrs)

Assembling of solar cell: Designing of Solar Power Packs - Solar Street Lights - Circuit Ideas on Control Systems - Designing of Battery Bank - Primary & Secondary Cells - Construction Of La Battery – Banking - Maintenance & Repairs

Module – 4 (10 hrs)

Solar cell maintenance: Solar Power Conditioning unit - MPPT Charge Controller - Dusk To Dawn Operation Sensors - Max. Load Design on PCU - Calculation of Savings from Solar Power Plant - Maintenance & operational Guidelines to user - Service & Repairs of Solar Plant.

Module – 5 (10 hrs)

Solar panel standards: Micro-Controller – Introduction - Control Logics on Power Systems - Fail Safe Techniques - Standards of Materials - IEC Standards - Standard Levels of Installation & Erection

Text books & Reference books

1. Grob's Basic Electronics - Mitchel E.Schultz 10th Edn. Tata McGraw Hill (TMH)
2. A First course in Electronics- AA Khan & KK Day- PHI
3. Basic Electronics D.C. Tayal
4. Basic Electronics Grobb
5. Solar Photovoltaics: Fundamentals, Technologies and Applications
   By Solanki Chetan Singh

6. Solar Panel Efficiency Enhancement [Import]
   By Riasad Amin (Author), MD Ali Imam Hossain (Author), Mowdudur Rahman Dewan (Author)
7. Solar Cell Technology and Applications
   By A. R. Jha
8. Solar Photovoltaics: Fundamentals Technologies And Applications
   By Solank
9. Optoelectronics of Solar Cells
   By Greg P. Smesta
10. Thin Film Solar Cells: Fabrication, Characterization and Applications
    By Jef Poortmans, Vladimir Arkhipov
11. Practical photovoltaics: electricity from solar cells
    By Richard J. Komp
    Aatec Publications
12. Dye-sensitized Solar Cells
    By K. Kalyanasundaram
13. Physics and Technology of Amorphous-Crystalline Heterostructure Silicon ...
    By Wilfried G. J. H. M. van Sark, Lars Korte, Francesco Roca

P.R. GOVERNMENT COLLEGE (A), KAKINADA
II B.Sc., Physics – Semester – IV (Model Paper)
2017 - 2018.

Course Code : PH4202AOC **No. of credits : 02**

Solar power design & system integration

(Add-on course)

Note:- Set the question paper as per the blue print given at the end of this model paper.

Time: 3 Hrs. Max. Marks: 70

Section – A

Answer any **THREE** questions. 3 x 15 = 45 m.

1. What is doping? How to form P channel and N channel.
2. Briefly explain about design of battery. How to Maintenance & Repairs the battery.
3. What is a microcontroller? Write about controller logic in power system.
4. Explain about solar power conditioning unit. Write about MPPT charger controller.
5. What is difference between solar and conventional street light.

Section – B

Answer any **Five** Questions 5X5 =25M

6. How solar cell works
7. What is MNRE subsidy?
8. How the P-N junction diode works?
9. How many type of solar module.
10. What are the standards of solar material.
11. How to calculate the annual solar energy out put of a photovoltaic system.
12. Write standard levels of installation and erection.
13. What are important features and protection of solar inverter

Blue Print

Module	**Essay Questions 15 marks**	**Short Questions 5 marks**	**Problems 5 marks**	**Marks allotted**
Basic electronics	1	02	Nil	15
Solar modules	Nil	01	01	5
Assembling of solar cell	1	1	Nil	20
Solar cell maintenance	1	1	Nil	25
Solar panel standards	1	02	Nil	25
Total Marks				115

LIST OF EXAMINERS/ PAPER SETTERS IN PHYSICS

2017-18

S.No.	Name of the examiner	Subject	Name of the College
1	L.Malleswara Rao 9985137973	Physics	Y.N.College, Narsapur
2.	Dr.A.Nirmala Jyotsna 9490171202	Physics	St.Theresa College for Women, Gavaravaram, Eluru
3	R.Venkateswararao 9440119231	Physics	M.S.N.Charties, Kakinada
4	Dr.G.Sankaranarayana Rao 9441207220	Physics	V.S.Krishna College, Visakhapatnam
5	Dr.R.Kanna Rao 9397347713	Physics	Principal, Mrs.A.V.N.College, Visakhapatnam
6	Dr.S.Srinivasarao 9849057189	Physics	Mrs.A.V.N.College, Visakhapatnam
7	K.Ananda Rao	Physics	C.R.R. College (M), Eluru
8	K.Ramesh	Physics	C.R.R. College (M) Eluru
9	K.B.S.Gopal	Physics	C.R.R. College (M) Eluru
10	P.P.Divakar	Physics	C.R.R. College (M) Eluru
11	A.Veerabhadra Rao	Physics	C.R.R. College (M) Eluru
12	L.S.R.Ch.V.K.Nageswararao	Physics	C.R.R. College (M) Eluru
13	R.Suryanarayana Raju	Physics	K.G.R.L.College , Bhimavaram
14	Smt.V.Vidyamallika	Physics	K.G.R.L.College , Bhimavaram
15	P.Rajyalakshmi	Physics	C.R.R. College (W), Eluru
16	K.Sireesha	Physics	C.R.R. College (W), Eluru
17	M.Jayalakshmi Devi	Physics	C.R.R. College (W), Eluru
18	P.Himakar	Physics	S.K.B.R.College, Amalapuram
19	N.S.Satyanarayana Murthy	Physics	S.K.B.R.College, Amalapuram
20	K.Nagavarma	Physics	S.K.B.R.College, Amalapuram
21	V.V.Subba Rao	Physics	S.K.B.R.College, Amalapuram

S.No.	Name of the examiner	Subject	Name of the College
22	J.Prabhakara Rao	Physics	S.K.B.R.College, Amalapuram
23	S.V.Kumara Sastry	Physics	S.K.B.R.College, Amalapuram
24	V.Radha Krishna	Physics	S.K.B.R.College, Amalapuram
25	K.Srinivasa Rao	Physics	Govt. College , Kotha peta
26	Valluri Srinivasa Rao	Physics	Govt. College (women) Nidhavolu
27	Dr.K.Ramachandra Rao	Physics	Govt. College (A), Rajahmundry
28	E.Nageswara Rao	Physics	Govt. College (A), Rajahmundry
29	Dr.K.Jyothi	Physics	Govt. College (A), Rajahmundry
30	B.V.Thirupanyam	Physics	Govt. College , Narayanapuram
31	Vobulaneni Srinivasa Rao	Physics	Govt. College , Ramachandrapuram
32	T.Y.H.A.G.Gandhi	Physics	Govt. College , Ravulupalem
33	T.K.Visweswara Rao	Physics	Govt. College(women), Nidhavolu
34	Dr. A.R.S. Kumar, Reader	Physics	Y.N. College (A), Narasapur
35	A.P.V. Appa Rao	Physics	Y.N. College (A), Narasapur
36	J. Rammohan	Physics	Y.N. College (A), Narasapur
37	P. Rama Krishna Rao	Physics	Y.N. College (A), Narasapur

S.No.	Name of the examiner	Subject	Name of the College
38	D. Gangadharudu	Physics	M.R. College, Peddapuram
39	A.Satyanarayana Murthy	Physics	M.R. College, Peddapuram
40	N. Veer Kumar	Physics	M.R. College, Peddapuram
41	N. Sridhar	Physics	M.R. College, Peddapuram
42	S. Rama Rao	Physics	M.R. College, Peddapuram
43	K.G. Krishnam Raju	Physics	D.N.R. College (A), Bhimavaram
44	S. Venkata Raju	Physics	D.N.R. College (A), Bhimavaram
45	Smt. M. Satya vani	Physics	D.N.R. College (A), Bhimavaram
46	M.V.S. Prasad	Physics	D.N.R. College (A), Bhimavaram
47	Smt. N. Udaya Sri	Physics	D.N.R. College (A), Bhimavaram
48	A. Veeraiah	Physics	D.N.R. College (A), Bhimavaram
49	S.S.R. Murthy	Physics	Ideal College (A), Kakinada

P. R . GOVERNMENT COLLEGE (A), KAKINADA
Department of Physics & Electronics
Departmental Activities Planned for 2017-2018

The department of Physics and Electronics is planning the following programmes to conduct for the academic year 2017 – 18.

S. No.	Activity	Probable date	Remarks
1	Counseling session for all classes of I year. a) About curriculum b) About semester system c) CBCS system d) About examination system e) About co curricular activities f) About extra curricular activities g) About extension activities h) About carrier guidance	June 4th week	
2	Post admission test	July 1st week	
3	Inaugural function of Physics association a) To explain aims and objectives of dept., b) To start UPKAR SCHEME c) Helping hands	July 1st week	
4	Guest Lecture	July 3rd week	
5	Local Field trip surrounding industries, Awareness programme on IMD and importance	August 2nd week	
	Two days work shop National level On Solid state physics	August 4th week	
6	Extension activity to local high schools	September 2nd week	
7	UPKAR scheme – disbursement of money to the students for their semester end examinations.	September 4th week	

8	Celebration of Sir C.V.Raman's Birth day	November 7th	
9	Guest lecture	November 3rd week	
10	College Quiz programme	December 2nd week	
11	Helping hands programme	January 1st week	
12	School level and college level Competitions with in the district for two days to inculcate awareness in science and technology	February 3rd week	
13	National Science day celebrations	February 28th	
14	UPKAR scheme – disbursement of money to the students for their semester end examinations.	March 1st week	

Certificate

The syllabus and model question papers including **Blue – Print** in Physics subject for 3 years B.Sc. course for the semester I, II, III, IV, V and VI for the academic year **2017-18**, list of examiners and paper setters, departmental activities which contains pages **67**, is approved in the Board of Studies meeting held in the Department of Physics and Electronics on **06- 04 - 2017**.

Members of Board of Studies			Signatures of members
1	Sri K.Venkateswara Rao	Chair person	
2	Dr. K. Srinivasa Rao	University nominee Lec.in charge / phy/V.S.M College, Ramachandrapuram.	
3	Dr. M.V.K.Meher	Subject Expert, Lec.in charge/ phy/Govt. College, Alamuru.	
4	Sri S.S.R Murthy	Subject Expert, Lec.in charge/ phy/Ideal Degree College, Kakinada.	
5	Sri A.V.V .V. Prasad	Representative from Industry, solar systems , Kakinada.	
6	Dr. K. Nanda Gopal	Alumni	
7	Sri. U.V.B.B.Krishna Prasad	Member	
8	Sri A.Simhadri	Member	
9	Sri. K. Jaya Dev	Member	
10	Sri B.Srikanth	Member	
11	Smt.A.Prabhavathi	Member	
12	Kum. P.Divya	Member	
13	P.Usha lavanya	Student III MPCs	
14	M. Mani kanta	Student III MPC (EM)	

Abstract of Course Wise Allocation Of Credits

College : **P.R. Government College (A), Kakinada** **2017 – 18**
Course : **B.Sc.** Subject : **Physics**

Department of Physics & Electronics

este	Core / Elective	Course Code	Course	Hours/ Week	Hours/ Sem	Max. Marks	No. o Credi
	Core - 1	PH1202	Mechanics	04	60	70 + 30	3
	Core practical -1A	PH1202P	Mechanics & Waves and Oscillations	03	45	35+15	1
I	Core - 2	PH2202	Waves and Oscillations	04	60	70 + 30	3
I	Core practical -1B	PH2202P	Mechanics & Waves and Oscillations	03	45	35+15	1
I	Core - 3	PH3202	Optics	04	60	70 + 30	3
V	Core - 4	PH4202	Thermodynamics	04	60	70 + 30	3
& IV	Practical - 2	PH4202P	Optics & Thermodynamics	03	90	70 + 30	2
V	Core - 5	PH5203	Alternating Currents, Basic and Digital Electronics	04	60	70 + 30	3
V	Advanced Elective – 1	PH5204A	Electrostatic & Magnetostatics	02	30	70 + 30	2
V	Advanced Elective – 2	PH5204B	Quantum Mechanics	02	30	70 + 30	2
V	Core Practical -3	PH5203P	Electrostatics & Electromagnetism	03	45	35 + 15	1
V	Elec. Practical-1	PH5204AP	Electronics Expts.	03	45	35 + 15	1
V	Elec. Practical-2	PH5204BP	Electrical Expts.	03	45	35 + 15	1

14	VI	Core - 6	PH6203	Atomic, Molecular spectra & Nuclear Physics	04	60	70 + 30	3	3
15	VI	Skill based Elective – 3	PH6204 A	Electromagnetic induction & Electromagnetisms	02	30	70 + 30	2	2
16	VI	Skill based Elective – 4	PH6204 B	Solid State Physics	02	30	70 + 30	2	
17	VI	Skill based Elective – 5	PH6204 C	Basic measurements in meteorology	02	30	70+ 30	2	
18	VI	Core Practical - 4	PH6203 P	Magnetism Expts.	03	45	35 + 15	1	1
19	VI	Elec. Practical-3	PH6204 AP	Digital Electronics Expts.	03	45	35 + 15	1	1

20	VI	Elec. Practical-4	PH6204 BP	Modern Physics Expts.	03	45	35 + 15	1	
21	VI	Elec. Practical-5	PH6204 CP	Basic measurements in meteorology	03	45	35+ 15	1	
22	VI	Project Work	PHPW	Self Study & Skill based Project			70 + 30	2	2*
23	IV	Add – on course	PH4202 AOC	Solar power design & system integration	02	30	70 + 30	2	2*
Total Credits offered by the department								42	36* or 30

LIST OF LIBRARY BOOKS

S.NO	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	Electronic Devices And Circuits	Atul P. Godes,Uday A. Bakshi	Technical publications
2	Microcontrollers (Theory and applications)	Ajay V Deshmukh	Tata Mc Graw-Hill
3	Fundamentals of Microprocessor and Microcontroller	B. Ram	Dhanpat Rai & Sons
4	Microprocessor Architecture, programming and applications – Latest edition	S. Goanker	Penram International
5	The 8051 Microcontrollers and embedded systems with C language-Latest edition	Muhammad Ali Mazidi& JaniceMazidi	Pearson education Asia
6	Micro Electronic circuits	Adel S. sedra, Kenneth carless smith	Oxford university press
7	Atomic and molecular spectra	Rajkumar	
8	Quantum Mechanics	G.Aruldas	
9	Solid state physics	Wahab	
10	Nuclear Physics	Babbar , Puri	
11	Statistical mechanics	B.B.Laud	
12	Classical mechanics	J.C. Upadhyaya	
13	Modern Physics- sixth edition	Arthur Beiser	Tata Mc Graw-Hill
14	Fundamentals of Physics	Halliday/Resnick/Walker	Wiley India edition
15	First year physics –Telugu Academy		
16	Lectures on Physics	Richard Feymann	
17	Mechanics, waves and oscillations	S.L.Gupta and Sanjeev gupta	
18	Second year Physics-Telugu Academy		
19	Fundamentals of Optics	Jenkins A. Francis and White E. Harvey.	Mc. Graw Hill Inc.
20	Third year Physic(paper III &IV)- Telugu Academy		
21	Principles of Electronics	O.K.Mehta	S.Chand &Co.

22	Introduction to Electro Dynamics	David J. Griffiths	Pearson education Limited
23	Digital electronics	Malvino	
24	Modern physics	G. Aruldas & P.Rajagopal	Eastern Economy Edition
25	Nuclear Physics	D.C. Tayal	Himalayan publications
26	Elements of Solid State Physics	J.P. Srivastava	Prentice-hall of India Pvt. Ltd.
27	Switching theory and Logic design	A.P.Godse&D.A.Godse	Technical Publications
28	Electronic devices and circuits-II	U.A Bakshi and A.P Godse	Technical Publications
29	Hand book of Electronics	Gupta & Kumar	

Certificate

The syllabus and model question papers including **Blue – Print** in Physics subject for 3 years B.Sc. course for the semester I, II, III, IV, V and VI for the academic year **2017-18**, list of examiners and paper setters, departmental activities which contains pages **67**, is approved in the Board of Studies meeting held in the Department of Physics and Electronics on **06- 04 - 2017**.

Members of Board of Studies			Signatures of members
1	Sri K.Venkateswara Rao	Chair person	
2	Dr. K. Srinivasa Rao	University nominee Lec.in charge / phy/V.S.M College, Ramachandrapuram.	
3	Dr. M.V.K.Meher	Subject Expert, Lec.in charge/ phy/Govt. College, Alamuru.	
4	Sri S.S.R Murthy	Subject Expert, Lec.in charge/ phy/Ideal Degree College, Kakinada.	
5	Sri A.V.V .V. Prasad	Representative from Industry, solar systems , Kakinada.	
6	Dr. K. Nanda Gopal	Alumni	
7	Sri. U.V.B.B.Krishna Prasad	Member	
8	Sri A.Simhadri	Member	
9	Sri. K. Jaya Dev	Member	
10	Sri B.Srikanth	Member	
11	Smt.A.Prabhavathi	Member	
12	Kum. P.Divya	Member	
13	P.Usha lavanya	Student III MPCs	
14	M. Mani kanta	Student III MPC (EM)	