

SRR&CVR GOVT DEGREE COLLEGE (A)

VIJAYAWADA-4



DEPT OF PHYSICS & ELECTRONICS

BOS RESOLUTIONS

IN

ELECTRONICS

2017-2018

SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)

Vijayawada 520004

Minutes of the meeting of the Board of Studies in the subject of PHYSICS AND ELECTRONICS

The meeting of the Board of Studies in the subject of PHYSICS AND ELECTRONICS was held on 18 April 2017 in III YEAR PHYSICS LAB , SRR & CVR Govt Degree College (Autonomous), Vijayawada 520004.

The following members attended the meeting:

- | | |
|---------------------------|---|
| 1. Sri.K.Srinivasa Rao | (In-charge of the Department & Chairman, BoS) |
| 2. Dr.J.Siva Rama Krishna | (University Nominee) |
| 3. Smt.P.Sailaja | (Subject Expert) |
| 4. Smt.B.Nagamani | (Subject Expert) |
| 5. Dr.R.Kameswari | (Faculty Member) |
| 6. Sri. Md.Iqbal Pasha | (Faculty Member) |
| 7. Sri.T.V.Rambabu | (Faculty Member) |
| 8. Smt.V.Uma Lakshmi | (Faculty Member) |

Agenda:

Item 1: Approval of syllabus for Semester I and II for the academic year 2017-18

Item 2: Approval of Question paper blue print and model paper

The Chairperson, Board of Studies welcomed the members and initiated discussion on the syllabus for I and II year semesters. He apprised the members of the guidelines of the UGC and the CCE regarding the framing of syllabus, and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

Resolutions:

1. Resolved to adopt the present University CBCS syllabus for semester I and II with the suggested modifications.
2. Resolved to approve the division of marks for internal and external examination along with the suggested blue print and model paper.

Syllabus for CBCS Semester I-Attached

Question Paper Blue Print-Attached

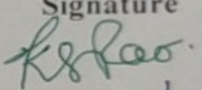
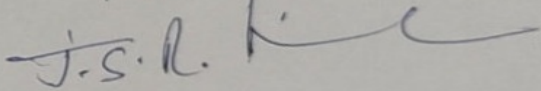
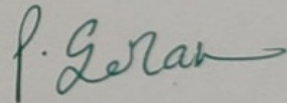
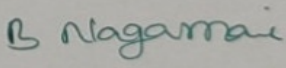
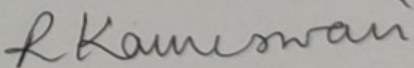
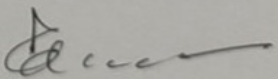
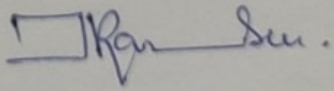
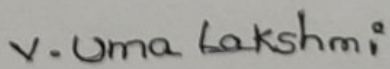
Model Question Paper-Attached

Syllabus for CBCS Semester II-Attached

Question Paper Blue Print-Attached

Model Question Paper-Attached

Signature of the members of the BoS:

	Name	Position	Signature
1	Sri.K.Srinivasa Rao	Chairperson	
2	Dr.J.Siva Rama Krishna	University Nominee	
3	Smt.P.Sailaja	External Expert	
4	Smt.B.Naga Mani	External Expert	
5	Dr.R.Kameswari	Faculty Member	
6	Sri.Md.Iqbal Pasha	Faculty Member	
7	Sri.T.V.Rambabu	Faculty Member	
8	Smt.V.UmaLakshmi	Faculty Member	

Theory Internal Marks: 40

For all theory papers

Internal exam(two) - 10

Assignments (two) - 10

Project - 10

Attendance - 5

Seminar - 5

Total 40

Kerala

J. S. R. K.

P. Giran

B. Nagammai

SRR & CVR GOVT. DEGREE COLLEGE (A)

VIJAYAWADA – 520 004

B.Sc. 1st Semester Electronics

(w.e.f 2017-2018)

Paper I :BASIC CIRCUIT THEORY

BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problem
Unit I	2 (with internal choice)	2	
Unit II	2 (with internal choice)	1	1
Unit III	2 (with internal choice)	1	1
Unit IV	2 (with internal choice)	2	
Unit V	2 (with internal choice)	2	

BASIC CIRCUIT THEORY

UNIT- 1: (12Hrs)

SINUSOIDAL ALTERNATING WAVEFORMS:

Definition of current and voltage. The sine wave, general format of sine wave for voltage or current, phase relations, average value, effective (R.M.S) values. Differences between A.C and D.C. J-Operator-phasor notation, Complex impedance and admittance (problems)

UNIT-II: (12hrs)

PASSIVE NETWORKS: (D.C)

Kirchhoff's current and Voltage Law's ,Resistor, Capacitor, and Inductor, series and parallel networks.R-L and R-L-C Circuits with DC inputs. Branch current method, Mesh Analysis, Nodal Analysis(Problems on mesh & nodal analysis).

UNIT-III: (14hrs)

NETWORKS THEOREMS: (D.C)

Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power, Milliman and Reciprocity theorems(problems).

UNIT-IV: (12hrs)

RC AND RL CIRCUITS:

Transient response of RC and RL circuits with dc source, Time constants, Frequency response of RC and RL circuits, their action as low pass, high pass & band pass filters. Passive differentiating and integrating circuits. (problems)

UNIT-V: (10hrs)

SERIES AND PARALLEL RESONANCE CIRCUITS:

Series resonance and parallel resonance circuits, Q - Factor, Selectivity and band width, Comparison of series and parallel resonance.

Cathode Ray Oscilloscope – CRT and its working-electrostatic deflection-fluorescent screen-measurement of voltage, frequency and phase by using CRO.

TEXT BOOKS:

1. Introductory circuit Analysis (UBS Publications) ---- **Robert L. Boylestad.**
2. Principles of Electronics by V.K. Mehtha
3. Electronic Devices and Circuit Theory --- **Robert L. Boylestad & Louis Nashelsky.**
4. Circuit Analysis by P.Gnanasivam- Pearson Education

REFERENCE BOOKS:

1. Engineering Circuit Analysis By: **Hayt & Kemmerly - MG.**
2. Networks and Systems – **D.Roy Chowdary.**
3. Unified Electronics (Circuit Analysis and Electronic Devices) by **Agarwal-Arora**
4. Electric Circuit Analysis- **S.R. Paranjothi**- New Age International.

ELECTRONICS LAB-1(50M, Internal 25+ External 25)

(CIRCUIT LAB)

Demonstration of C.R.O: Demonstration using CRO Kit - Block diagram concepts etc., in lab session (Using slides.)

(Assignments are to be given-Marks shall be allotted to this work as internal part.)

LAB LIST:

1. Measurements of D.C & A.C voltage, frequency using CRO
2. Verification of Kirchhoff's laws
3. Network theorems verification
4. RC circuit-Frequency response (low, high pass & band pass)
5. RL circuit-Frequency response (low, high pass & band pass)
6. LCR series resonance circuits-Frequency response-Determination of Q and Band Width.
7. LCR parallel resonance circuits-Frequency response-Determination of Q and Band Width.

Lab experiments are to be done on breadboard and simulation software (using Multi sim) and output values are to be compared and justified for variation.

K. S. Rao
J. S. R. K.
P. G. L. R.
B. N. G. R.

**SRR & CVR GOVERNMENT DEGREE COLLEGE
(AUTONOMOUS): VIJAYAWADA**

**B.SC. 1ST SEMESTER ELECTRONICS
(W.E.F 2017-2018)
PAPER I: BASIC CIRCUIT THEORY**

Time: 3 hours

SECTION-A

MAX MARKS: 60

(Answer the following Questions)

(5x8=40M)

1) a) Derive an expression for average value of an AC and RMS value of an AC.

(Or)

b) What is alternating current? What are the Difference between AC and DC?

2) a) State and explain Kirchhoff's laws. Describe the loop current method for single Source network?

(Or)

b) Explain the node voltage method by using simple networks?

3) a) State and prove Thevenin's theorem?

(Or)

b) State and prove super position theorem?

4) a) Explain transient response of RL circuit in DC source?

(Or)

b) Explain the frequency response of RC low pass and high pass filters?

5) a) Define resonance? Derive an expression for resonant frequency for RLC series Resonant circuit?

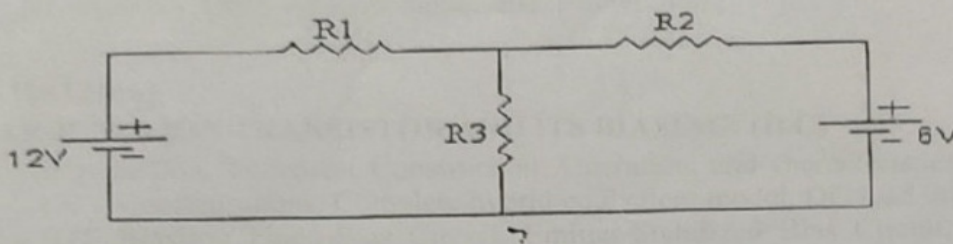
(Or)

b) Draw the block diagram of CRO and explain the working of each block?

SECTION-B
(ANSWER ANY FIVE QUESTIONS)

4x5=20M

- 6) Find peak, average and R.M.S values of an AC current represented by $I=28.4\sin 628t$. And also find frequency.
- 7) Explain J-operator and its significance?
- 8) For the circuit given below figure. Find the current through R_1 by the method of mesh currents?



- 9) Explain resistors are connected in series combination?
- 10) State and prove maximum power transfer theorem?
- 11) State and prove Millmann's theorem?
- 12) Explain the frequency response of RL high pass filter?
- 13) Discuss about RC integrating circuit?
- 14) Explain the measurement of voltage and frequency by using CRO?
- 15) A series RLC circuit has $R=5\Omega$, $L=40\text{mH}$, $C=1\mu\text{F}$. Calculate the resonant frequency and Q-factor?

.Electronic Devices and Circuits

UNIT I: (12Hrs)

PN JUNCTION DIODES:

P-N junction Diode, Depletion region, Barrier Potential, Working in Forward and Reverse bias condition – Junction capacitance, Diode current equation – Effect of temperature on reverse saturation current – construction, working, V-I characteristics and simple applications of Junction Diode, varactor diode, Zener diode, Zener Diode as voltage regulator, varactor diode, and Tunnel diode.

UNIT –II:(12hrs)

BIPOLAR JUNCTION TRANSISTOR AND ITS BIASING: (D.C)

Introduction, Transistor Construction, Operation, and characteristics of CB, CE, and CC – Configurations. Complete hybrid equivalent model, DC load line analysis.

BJT Biasing: Fixed-Bias Circuit, Emitter-Stabilized Bias Circuit, Voltage-Divider Bias, Bias Stabilization.

UNIT-III:(16hrs)

FIELD EFFECT TRANSISTORS , UJT & SCR:

Introduction, Construction, Operation and Characteristics of FET/JFET, Drain and Transfer characteristics, Depletion-type, and Enhancement-Type MOSFETs.

FET Biasing: Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Biasing.

UNIT IV: (08hrs)

Uni-Junction Transistor (UJT)

UJT construction-working, V-I characteristics, UJT as a Relaxation oscillator.

Silicon Controlled Rectifier (SCR):

Structure and working of SCR. Two transistor representation, Characteristics of SCR. Experimental set up to study the SCR characteristics, simple applications of SCR.

UNIT-V:(12hrs)

PHOTO ELECTRIC DEVICES:

Light-Emitting Diodes (LEDs), IR Emitters, Photo diode, Photo transistors, Structure and operation of LDR, and Opto-Isolators.

TEXT BOOKS:

1. Electronic Devices and Circuit Theory --- Robert L. Boylestad & Louis Nashelsky.
2. Electronic Devices and Circuits I – T.L.Floyd- PHI Fifth Edition
3. Principles of Electronics, V.K. Mehata

REFERENCE BOOKS:

1. Integrated Electronics – Millmam & Halkias.
2. Electronic Devices & Circuits – Bogart.
3. Sedha R.S., A Text Book Of Applied Electronics, S.Chand & Company Ltd

SYLLABUS UP GRADATION

ELECTRONICS

2017-18

Paper	Syllabus revision	justification
sem-1 paper -1 Basic circuit theory	Deletions:-- -Star to delta and delta to star conversions Additions :--- Cathode Ray Oscilloscope -CRT and its working- Electrostatic deflections- fluorescent screen- measurement of voltage ,frequency and phase by using CRO.	outdated To develop operational knowledge of CRO .
sem-2,PAPER -2 Electronic devices and circuits	Deletions— power supplies	All ready covered

ELECTRONICS LAB-2 (50M, Internal 25+ External 25)
(ELECTRONIC DEVICES AND CIRCUITS LAB)

LAB LIST:

1. V-I Characteristics of junction diode
2. V-I Characteristics of zener diode
3. Zener Diode as a Voltage Regulator
4. BJT input and output characteristics
5. FET input and output characteristics
6. UJT characteristics
7. LDR characteristics
8. V-I characteristics of SCR
9. LED Characteristics

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.

K. S. Rao

J. S. R. K.

P. Sivan

B. N. Gammali

SRR & CVR GOVT. DEGREE COLLEGE (A)

VIJAYAWADA – 520 004

B.Sc. 2nd Semester Electronics

(w.e.f 2017-2018)

Paper II: Electronic Devices and Circuits

BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problem
Unit I	2 (with internal choice)	2	Any three problems from five units
Unit II	2 (with internal choice)	1	
Unit III	2 (with internal choice)	1	
Unit IV	2 (with internal choice)	1	
Unit V	2 (with internal choice)	2	

K. S. Rao

1

SRR & CVR GOVERNMENT DEGREE COLLEGE
(AUTONOMOUS): VIJAYAWADA

B.SC. 2nd SEMESTER ELECTRONICS
(W.E.F 2017-2018)
PAPER I: ELECTRONIC DEVICES AND CIRCUITS

Time: 3 hours

SECTION-A

MAX MARKS: 60

(Answer the following Questions)

(5x8=40M)

1. a) What is P-N junction diode? Explain the V-I characteristics of P-N junction diode?

(Or)

b) Describe the working of zener diode and draw its characteristics?

2. a) Explain the input and output characteristics of BJT at CE configuration?

(Or)

b) Define H- parameters? Describe how they determined from the characteristics?

3.a) Discuss the structure and working of an JFET and explain its characteristics?

(Or)

b) Explain the construction and working of Depletion MOSFET. Draw and explain the characteristics of depletion MOSFET?

4)a) Explain the construction and working of UJT? Explain the V-I characteristics of UJT?

(Or)

b) Study the characteristics of SCR with experimental setup.

5. a) Explain the proper circuit diagram and construction of a light emitting diode?

(Or)

b) Explain the construction and operation of photo diode?

SECTION-B
(ANSWER ANY FIVE QUESTIONS)

4x5=20M

6. Explain the concept of Junction capacitance?
7. Explain zener diode as a voltage regulator?
8. For a Transistor circuit $\alpha=0.99$, $I_{CO}=5\mu A$ and $I_E=5mA$. Calculate I_C , I_B , β and I_{CBO} ?
9. Explain the working of PNP?
10. An N-channel JFET has a pinch-off voltage of $-4.5V$ and $I_{DSS}=9mA$. At what value of V_{GS} in the pinch-off region will I_D equal to $3mA$?
11. Explain the working of Enhancement MOSFET in N-channel?
12. A silicon UJT has an inter base resistance of $10K\Omega$. Its intrinsic standoff ratio 0.6 .
Find the values of resistances R_{B1} and R_{B2} ?
13. Explain two transistor representation of SCR?
14. Explain about OPTO-isolators?
15. Explain the working of photo transistor?

**SRR&CVR GOVT DEGREE COLLEGE (A)
VIJAYAWADA-4**



**DEPT OF PHYSICS & ELECTRONICS
BOS RESOLUTIONS
IN
PHYSICS
2017-2018**

2017-18

SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)

Vijayawada 520004

Minutes of the meeting of the Board of Studies in the subject of PHYSICS AND ELECTRONICS

The meeting of the Board of Studies in the subject of PHYSICS AND ELECTRONICS was held on **18 April 2017** in III YEAR PHYSICS LAB , SRR & CVR Govt Degree College (Autonomous), Vijayawada 520004.

The following members attended the meeting:

- | | |
|---------------------------|---|
| 1. Sri.K.Srinivasa Rao | (In-charge of the Department & Chairman, BoS) |
| 2. Dr.J.Siva Rama Krishna | (University Nominee) |
| 3. Smt.P.Sailaja | (Subject Expert) |
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| 5. Dr.R.Kameswari | (Faculty Member) |
| 6. Sri. Md.Iqbal Pasha | (Faculty Member) |
| 7. Sri.T.V.Rambabu | (Faculty Member) |
| 8. Smt.V.Uma Lakshmi | (Faculty Member) |

Agenda:

Item 1: Approval of syllabus for Semester I and II for the academic year 2017-18

Item 2: Approval of Question paper blue print and model paper

The Chairperson, Board of Studies welcomed the members and initiated discussion on the syllabus for I and II year semesters. He apprised the members of the guidelines of the UGC and the CCE regarding the framing of syllabus, and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

Resolutions:

1. Resolved to adopt the present University CBCS syllabus for semester I and II with the suggested modifications.
2. Resolved to approve the division of marks for internal and external examination along with the suggested blue print and model paper.

Syllabus for CBCS Semester I-Attached

Question Paper Blue Print-Attached

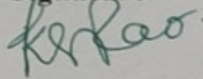
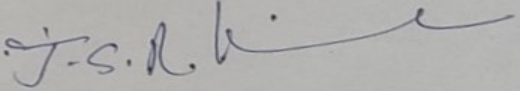
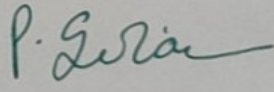
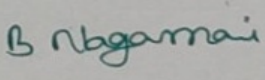
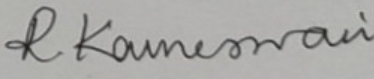
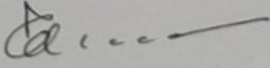
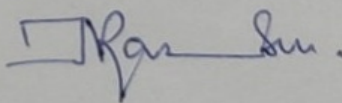
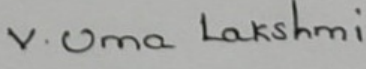
Model Question Paper-Attached

Syllabus for CBCS Semester II-Attached

Question Paper Blue Print-Attached

Model Question Paper-Attached

Signature of the members of the BoS:

	Name	Position	Signature
1	Sri.K.Srinivasa Rao	Chairperson	
2	Dr.J.Siva Rama Krishna	University Nominee	
3	Smt.P.Sailaja	External Expert	
4	Smt.B.Naga Mani	External Expert	
5	Dr.R.Kameswari	Faculty Member	
6	Sri.Md.Iqbal Pasha	Faculty Member	
7	Sri.T.V.Rambabu	Faculty Member	
8	Smt.V.UmaLakshmi	Faculty Member	

Model question Paper for all theory papers

Time : 3 hrs

Max marks : 60M

Section-A (Essay type)

Answer All questions with internal choice from all units (I to V). Marks : 5 X 8 M = 40 M
(Two questions are to be set from each unit with internal choice)

Section-B (Short answer type)

Answer any five out of 10 questions from all units (I to V) Marks: 5 x 4M = 20 M

At least two questions should be set from each unit.
(At least three problems should be given.)

K. Rao

J. S. R. K.

P. Sivan

B. N. Gama

Theory Internal Marks: 40

For all theory papers

Internal exam(two) - 10

Assignments (two) - 10

Project - 10

Attendance - 5

Seminar - 5

Total 40

K. S. Rao

J. S. N. K. K.

P. S. Rao

B. Nagammai

SRR & CVR GOVT. DEGREE COLLEGE (A)

VIJAYAWADA - 520 004

B.Sc. 1st Semester Physics

(w.e.f 2017-2018)

Paper I: Mechanics & Properties of Matter

BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problem
Unit I	2 (with internal choice)	1	1
Unit II	2 (with internal choice)	1	1
Unit III	2 (with internal choice)	1	1
Unit IV	2 (with internal choice)	2	
Unit V	2 (with internal choice)	2	

S.R.R & C.V.R GOVT. DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA – 520 004

B.Sc. 1st Semester Physics

(w.e.f 2017-2018)

Paper I: Mechanics & Properties of Matter

Work load: 60 hrs per semester

4 hrs/week

UNIT-I (10 hrs)

1. Vector Analysis

Scalar and vector fields, gradient of a scalar field and its physical significance, Divergence and curl of a vector field with derivations and physical interpretation, Vector integration (line, surface and volume), Statement and proof of Gauss, Stokes & Greens theorems.

UNIT-II (10 hrs)

2. Mechanics of particles

Laws of motion, motion of variable mass system, Equation of motion of a rocket, Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering (qualitative treatment only)

UNIT-III (16 hrs)

3. Mechanics of Rigid bodies

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

4. Mechanics of continuous media

Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio in terms of ν , n , k . Classification of beams, types of bending i.e uniform & non-uniform bending, point load, distributed load.

UNIT-IV (12Hrs)

5. Central forces

Central forces, definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, Derivation of Kepler's laws, Coriolis force.

UNIT-V (12 hrs)

6. Special theory of relativity

Galilean relativity, absolute frames, Michelson-Morley experiment, negative result, Postulates of special theory of relativity, Lorentz transformation, time dilation, length contraction, mass-energy relation.

REFERENCE BOOKS:

1. B. Sc. Physics, Vol.1, Telugu Academy, Hyderabad
2. Fundamentals of Physics Vol. I - Resnick, Halliday, Krane ,Wiley India 2007
3. Unified Physics, Vol. 1, S.L. Gupta & S. Gupta, Jai Prakash Nath & Co, Meerut.
4. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
5. University Physics-FW Sears, MW Zemansky & HD Young, Narosa Publications, Delhi
6. Mechanics, S.G.Venkatachalapathy, Margham Publication, 2003.

Practical paper 1: Mechanics & Properties of Matter (50M , Internal 25+External 25)

Work load: 30 hrs per semester

3 hrs/week

Minimum of 6 experiments to be done and recorded

1. Viscosity of liquid by the flow method (Poiseuille's method)
2. Young's modulus of the material of a bar (scale) by uniform bending
3. Young's modulus of the material a bar (scale) by non- uniform bending
4. Surface tension of a liquid by capillary rise method
5. Bifilar suspension –moment of inertia of a regular rectangular body.
6. Determination of moment of inertia using Fly-wheel
7. Determination of the height of a building using a sextant.
8. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)

Signatures:

K. S. Rao
J. S. A. K.
P. S. Rao
B. Nagammai

SRR & CVR GOVT. DEGREE COLLEGE (A)

VIJAYAWADA – 520 004

B.Sc. 2nd Semester Physics

(w.e.f 2017-2018)

Paper II: Waves & Oscillations

BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problem
Unit I	2 (with internal choice)	1	1
Unit II	2 (with internal choice)	1	1
Unit III	2 (with internal choice)	2	
Unit IV	2 (with internal choice)	2	
Unit V	2 (with internal choice)	1	1

S.R.R & C.V.R GOVT. DEGREE COLLEGE (AUTONOMOUS)
VIJAYAWADA – 520 004

B.Sc. 2nd Semester Physics
(w.e.f 2017-2018)
Paper II: Waves & Oscillations

Work load: 60 hrs per semester

4 hrs/week

UNIT-I (12 hrs)

1. Simple Harmonic oscillations

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

UNIT-II (12 hrs)

2. Damped and forced oscillations

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

UNIT-III (10 hrs)

3. Complex vibrations

Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, saw tooth wave, simple problems on evolution of Fourier coefficients.

UNIT-IV (16hrs)

4. Vibrating strings & Bars 16 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, Longitudinal vibrations in bars-wave equation and its general solution, Tuning fork.

UNIT-V (10 hrs)

5. Ultrasonics: 10hrs

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

REFERENCE BOOKS:

1. BSc Physics Vol.1, Telugu Academy, Hyderabad.
2. Waves and Oscillations. N. Subramanyam and Brijlal, Vikas Publications.
3. Unified Physics Vol., Mechanics, Waves and Oscillations, Jai Prakash Nath&Co.Ltd.
4. Fundamentals of Physics.
5. Halliday/Resnick/Walker, Wiley India Edition 2007.
6. Waves & Oscillations. S.Badami, V. Balasubramanian and K.R. Reddy, Orient Longman.
7. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
8. Science and Technology of Ultrasonics- Baldevraj, Narosa, New Delhi, 2004
9. Introduction to Physics for Scientists and Engineers. F.J. Buche. McGraw Hill.

Practical Paper II: Waves & Oscillations (50M , Internal 25+External 25)

Work load: 30 hrs per semester

3 hrs/week

Minimum of 6 experiments to be done and recorded

1. Volume resonator experiment
2. Determination of 'g' by compound/bar pendulum
3. Simple Pendulum- estimation of errors.
4. Velocity of transverse wave along stretched string using sonometer
5. Verification of laws of vibrations of stretched string –sonometer
6. Determination of frequency of a bar –Melde's experiment.
7. Formation of Lissajous figures using CRO.
8. Study of oscillations of a mass under different combinations of springs.

Signatures:

K. K. Rao
J. S. R. K.
P. Zelan
B. Nagammai

SYLLABUS UP GRADATION

PHYSICS

BOS 2017-2018

Paper	Syllabus revision	justification
paper I: Mechanics & Properties of matter	Deletions: Rutherford scattering derivation, shearing force, motion of satellite, GPS, addition of velocities four vector formalism Additions: Green theorem, Coriolis force	More focus was given to the qualitative treatment rather than quantitative. ill give deeper knowledge
practical paper I p: Mechanics & Properties of matter lab	Deletion: Determination of radius of capillary tube Hg thread method, Viscosity of liquid by Searls viscometer method	All ready covered in intermediate
paper II: waves & Oscillations	Deletions: Energy tranport and transverse impedence	Since applications of vibration of strings is more relevant topics, related to vibrations in rods are deleted.
Practical paper II p: waves & Oscillations lab	Deletions: Elastic constant of spring, Study of damped oscillations in liquid immersed torsional pendulum.	All ready covered in intermediate

S.R.R & C.V.R GOVT. DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA – 520 004

B.Sc. 2nd Semester Physics

(w.e.f 2017-2018)

Paper II: WAVES AND OSCILLATIONS

Class: I B.Sc
Time: 3 hours

Subject: Physics
Max.marks: 60 marks

SECTION-A

Answer ALL the questions. Each question carries equal marks.

5x8 = 40 Marks

1. (a) Define compound pendulum. Explain how you determine acceleration due to gravity using compound pendulum.

గురు లోలకమును నిర్వచించుము. గురు లోలకమును ఉపయోగించి గురుత్వ త్వరణమును ఎట్లు కనుగొందురో వివరించుము.

Or

- (b) What is the principle of superposition of waves? Explain the combination of two mutually perpendicular simple harmonic vibrations with equal frequency?

తరంగముల అధ్యారోపణ నియమేమి? రెండు పరస్పరం లంబముగా ఉన్న రెండు సరళ హరాత్మక తరంగముల కలయికను వివరించండి.

2. (a) What are damped harmonic oscillations? Derive the equation of motion of damped harmonic oscillator and find its general solution?

అవరుద్ధ హరాత్మక డోలనాలు అనగానేమి? అవరుద్ధ హరాత్మక డోలని యొక్క చలన సమీకరణమును ఉత్పాదించుము మరియు దాని యొక్క సాధారణ పరిష్కారమును కనుగొనండి.

Or

- (b) What are forced oscillations? Discuss the differential equation of a forced damped oscillator and obtain its general solution?

బలాత్పూత డోలనాలు అనగానేమి? బలాత్పూత డోలని యొక్క అవకలన చలన సమీకరణమును ఉత్పాదించుము మరియు దాని యొక్క సాధారణ పరిష్కారమును కనుగొనండి.

3. (a) State Fourier theorem? Analyze a square wave using Fourier theorem?

పురియే సిద్ధాంతమును పేర్కొనుము. చతురస్ర తరంగామును పురియే సిద్ధాంతమును ఉపయోగించి విశ్లేషించండి.

Or

(b) Analyze saw tooth wave using Fourier theorem.

పురియే సిద్ధాంతమును ఉపయోగించి రంపపు పళ్ళ తరంగమును విశ్లేషించండి.

4. (a) Derive the expression for the velocity of transverse wave along a stretched string. State the laws of transverse vibrations in strings?
ఒక సాగ దీసిన తీగలో ఏర్పడే తిర్యక్ తరంగపు వేగాన్ని కనుగొనె సమీకరణాన్ని రాబట్టండి. సాగ దీసిన తీగలో ఏర్పడే తిర్యక్ కంపనాల నియమాలను పేర్కొనండి.

Or

(b) What are longitudinal waves? Obtain the general wave equation for velocity of longitudinal vibrations in bars and its solution.

అనుదైర్ఘ్య తరంగములు అనగానేమి? దండములో ఏర్పడే అనుదైర్ఘ్య కంపనాల వేగమునకు తరంగ సమీకరణమును దాని రాబట్టండి మరియు సాధారణ పరిష్కారమును కనుగొనండి.

5. (a) What are ultrasonic waves? Describe how ultrasonic waves are produced by the method of piezo electric method?

అతి ద్వనులు అనగానేమి? పిజో-విద్యుత్ పద్ధతిలో అతి ద్వనులను ఏ విధంగా ఉత్పత్తి చేస్తారో వర్ణించండి.

Or

(b) Explain how do you determine the wavelength of ultrasonics in liquid.

ద్రవములో అతి ద్వనుల తరంగ దైర్ఘ్యమును ఎలా కనుగొందురో వివరించండి.

SECTION-B

Answer any FIVE questions. Each question carries equal marks. 5X 4 = 20 Marks

6. A particle of mass 5gm executes SHM has amplitude 8 cm. If it makes 16 vibrations per second, then find its maximum velocity and energy at mean position.

సరళ హరాత్మక చలనంలో ఉన్న 5 గ్రా ద్రవ్య రాశి గల వస్తువు కంపన పరిమితి 8 సెం.మీ. వస్తువు ఒక సెకనుకు 16 కంపనములు చేస్తున్నచో, గరిష్ఠ వేగమును మరియు మాధ్యమిక బిందువు వద్ద వస్తువు శక్తిని కనుగొనండి.

7. What are Lissajous figures? Write any two applications of Lissajous figures?
లిస్సజో చిత్రాలు అనగానేమి? లిస్సజో చిత్రాల ఏవేని రెండు ఉపయోగాలను వ్రాయండి.

8. The amplitude of oscillator of frequency 200Hz falls to 1/10 of its initial value after 2000 cycles. Calculate (a) its relaxation time (b) its quality factor.

ఒక అవరుద్ధ దోలకం కంపన పరిమితి 2000 కంపనాల తర్వాత తొలి విలువలో 1/10 వ వంతుకు క్షీణించినది. అవరుద్ధ పౌనఃపున్యం 200 Hz అయితే (a) రిలాక్సేషన్ కాలం (b) గుణ బాజకము ను కనుగొనండి.

9. Write a short note on velocity resonance.

వేగ అనునాదం గురించి ఒక లఘుటీక వ్రాయండి.

10. What are the limitations of Fourier theorem?

ఫురియే సిద్ధాంతము యొక్క అవదులు ఏమిటి?

11. State and explain Fourier theorem.

ఫురియే సిద్ధాంతమును పేర్కొనండి మరియు వివరించండి.

12. Explain harmonics and overtones?

అనుస్వరాలను మరియు అతి స్వరాలను వివరించండి.

13. Write a short note on tuning fork.

శృతి దండము గురించి ఒక లఘుటీక వ్రాయండి.

14. Write the detecting methods of ultrasonic waves?

అతి ధ్వనులను శోధించుటకు గల పద్ధతులను వ్రాయండి.

15. The velocity of sound in a piezo electric x-cut crystal of thickness 0.003 m is 5750 m/s. Calculate the fundamental frequency of the ultra sonic waves produced.

x-ఖండిత పీడన విద్యుత్ స్పటికం యొక్క మందం 0.003 mm. దానిలో ధ్వని వేగం 5750 m/s . దానిలో జనించే అతి ధ్వనుల ప్రాథమిక పౌనఃపున్యం ఎంత?