UNIVERSITY OF KOTA

SCHEME OF EXAMINATION

AND

COURSES OF STUDY

Faculty of Science

Bachelor of Science (B.Sc.)
Physics-Course Code PHY9600P

Third Semester (July-December, 2024)
Fourth Semester (January-June, 2025)

Edition: 2024

B.Sc. (Physics) Semester Scheme

Course Code: PHY9600P

B.Sc. (Physics) III and IV Semester

Year / Semester	Serial Number, Code & Nomenclature of Paper			Duration of Exam	Teaching Hrs/Week & Credit			Distribution of Marks			Min. Pass Marks	
	Number	Code	Nomenclature		L	P	C	Internal Assess.	Sem. Assess.	Total Marks	Internal Assess.	Sem. Assess.
II Year III Semester	PHY301	DCC	Thermal and Statistical Physics	3 Hrs	4	--	4	30	70	100	12	28
	PHY302	DCC	Physics Practical III	6 Hrs		4	2	--	50	50	--	25
	Total				**04**	**02**	**06**	**30**	**120**	**150**	--	
II Year IV Semester	PHY401	DCC	Electronics	3 Hrs	4	--	4	30	70	100	12	28
	PHY402	DCC	Physics Practical IV	6 Hrs		4	2	--	50	50	--	25
					04	**02**	**06**	**30**	**120**	**150**	--	
Second Year Total					**08**	**04**	**12**	**60**	**240**	**300**	--	

Maximum Marks:

Maximum marks of a theory and practical paper shall be decided on the basis of their contact hours/credit per week. One teaching hour per week shall equal to one credit and carry 25 maximum marks and therefore, four teaching hours per paper per week shall carry 100 maximum marks for each theory paper/course. Each four contact hours per week for laboratory or practical work shall be equal to two credits per week and carry 50 maximum marks.

Scheme of Examinations:

The examination shall be divided into two parts in which first part is internal assessment and second part is semester assessment or external assessment. The schemes for the internal and external examinations shall be as under:

a) The assessment of the student for theory paper shall be divided into two parts in which first part is internal assessment (30% of maximum marks) and second part is semester assessment or external assessment (70% of maximum marks). For practical papers there will be only one external assessment (100% of maximum marks).

b) The internal assessment for each theory paper shall be taken by the teacher concerned in the Department during each semester. There will be two components of internal assessment; one by test having 2/3 weightage (20 marks) and another by seminar / assignment / presentation / quiz / group discussion / viva-voce of 1/3 weightage (10 marks), for theory papers in each semester. Internal assessment test shall be of one hour duration for each paper and shall be taken according to academic calendar notified by the University / Departments. There will be no internal examination in the practical paper.

c) A student who remains absent (defaulter) or fails or wants to improve the marks in the internal assessment may be permitted to appear in the desired paper(s) (only one time) in the same semester with the permission of the concerned Head of the Department. A defaulter / improvement fee of Rupees 250/- per paper shall be charged from such candidates. Duly forwarded application of such candidates by the teacher concerned shall be submitted to HOD who may permit the candidate to appear in the internal assessment after depositing the defaulter/ improvement fee. A record of such candidates shall be kept in the Department.

d) The external assessment shall be of three hours duration for each theory paper and six hours duration for practical paper. The practical examination shall be taken by the panel of at least one external and one internal examiner at the end of each semester.

e) **Also proposed to include the one hour of practical is equivalent to one hour teaching workload of the faculty member.**

f) The syllabus for each theory paper is divided into five independent units and each theory question paper will have the format as mentioned below:

Section A: Compulsory Part-*There will be ten short answer type questions covering all units but not more than two questions from each unit.*

Section B:*Long answer type questions* covering all units but not more than two questions from each unit, descriptive type. *Students have to attempt* 5 questions in Section B, taking one from each unit. *Paper setter shall be instructed to design question paper covering from all five units.*

g) The pattern of question paper of internal and external shall be as follows:

(A) Continuous or Internal Assessment-30% weightage of Maximum Marks
The internal assessment for each theory paper shall be taken by the teacher concerned in the Department during each semester as,

Continuous Assessment Weightage					External Assessment Weightage	Total Marks (Total credits)
Regular Students		Private Student		Total	Paper based External Evaluation (End term examination)	
Mid-Term	Seminar/ project report/ presentation	Report Writing	Viva-voce			
20	10	20	10	30	70	100 (04)

- The 30 marks of continuous assessment for each Physics paper will have a mid-term test of 20 marks and remaining 10 marks will be devoted to seminar/project report/presentation. Also, only one chance to improve his/her marks of continuous assessment (mid-term) will also be given to the student in the same semester with a fee of Rs. 250/- per paper, after the approval of the competent authority of Department/College. For private students of B.Sc. program is also divided into two component as report writing (20 marks) and Viva-voce (10 marks) as mentioned above.
- **Report writing and Viva-voce:** Each private student of B.Sc. program will prepare a report on any topic of each course in minimum 1000 words from the prescribed syllabus of the concerned theory paper/course. The student needs to report the Concerned College at the time prescribed by the College/University to submit the report and the College will arrange a Viva-voce on that report. It is proposed that the engaged teacher will be paid at

the rate of per answer book per student charges. The examination section will generate an option of bill when the teacher fills the continuous assessment marks on examination portal (like done for external answer book evaluation). The various components of the report may be:

- Name of Course/Class:
- Name of Student:
- Father's/Husband Name:
- Examination Form No:
- Enroll. No:
- Name of College (Center):
- Name of Paper:
- Title of topic:
- No. of Unit of topic (as per prescribed syllabus):
- Introduction about the topic:
- Details/Analysis about the topic
- Conclusion of the topic:
- References:

(B) Semester or External Assessment-70% weightage of Max. Marks

Semester or External Assessment:

Duration of Examination: 3 Hours **Max. Marks: 70**

SECTION-A: 10x2=20
(Answer all questions)
(Two question from each unit with no internal choice)
Q. No. 1

(i) ……..……	**2 Mark**
(ii) ……..……	**2 Mark**
(iii) ……..……	**2 Mark**
(iv)……..……	**2 Mark**
(v)……..……	**2 Mark**
(vi)……..……	**2 Mark**
(vii)……..……	**2 Mark**
(viii)……..……	**2 Mark**
(ix)……..……	**2 Mark**
(x)……..……	**2 Mark**

SECTION-B: 5x 10 =50
(Answer all questions)
(One question from each unit with internal choice)
(Maximum two sub-divisions only)

Q. No. 2. . …….....……
Or
…….....……
10 Marks

Q. No. 3. …….....……
Or
…….....……...
10 Marks

Q. No. 4. …….....……
Or
…….....……
10 Marks

Q. No. 5. …….....……
Or
…….....……...
10 Marks

Q. No. 6. …….....
Or
…….....
10 Marks

(c) Distribution of Marks for Practical Examinations:

Duration of Exam: 06 Hours **Maximum Marks: 50**

S. No.	Name of Exercise	Marks
1.	Exercise No. 1	30
2.	Viva-voce	10
3.	Practical Record	10
Total Marks		**50**

Rules regarding determination of results:

Each semester shall be regarded as a unit for working out the result of the candidates. The result of each semester examination shall be worked out separately (even if he/she has appeared at the paper of the lower semester along with the papers of higher semester) in accordance with the following conditions:

a) The candidate shall be declared as pass in a semester examination, if he/she secures at least 40% marks in each theory paper separately in external & internal examination and 50% marks in each practical paper/project/dissertation with 40% aggregate marks in that semester.
b) A candidate declared as fail/absent in one or more papers at any odd semester examination shall be permitted to take admission in the next higher semester (even semester) of the same academic session.
c) A candidate may be promoted in the next academic session (odd semester) if he/she has cleared collectively at least 50% of the papers of both semesters of previous academic session. The candidate who does not fulfill the above condition will remain as an ex-student and will reappear in the due papers along with next odd/even semester exams.
d) If any student who is provisionally admitted in higher odd semester but could not secure prescribed minimum marks in previous semesters will be treated as ex-student and his/her admission fee will be carry forwarded to the next odd semester of forthcoming academic session.

e) If a candidate, who is declared as pass, wishes to improve his/her performance in the theory papers of previous semester, he/she may re-appear only one time in these papers in next odd/even semester examinations.
f) Candidate shall not be permitted to re-appear or improve the marks obtained in the external examination of practical / dissertation in any condition.
g) If the number of papers prescribed in a semester examination is an odd number, it shall be increased by one for the purpose of reckoning 50% of the papers for considering the student pass/fail.
h) A candidate may be given only two additional chances for passing the semester thus maximum tenure for completing for three years under-graduate programme up to five years and so on.
i) **The marks secured in the Elementary Computer applications (III Semester) and Environment studies (IV Semester)** shall be counted in awarding the division to a candidate. The candidate shall have to clear the compulsory subjects in the additionalthree chances and non-appearance or absence in the examination of compulsory subjects shall be counted as chance and shall be declared fail in that examination.
j) The grace marks scheme shall be applicable as per university norms.

Classification of Successful Candidates:

The classification of successful candidates after last semester examination shall be as under:

Description of Marks Obtained	Division / Result
• 75% and above marks in a paper.	Distinction in that paper.
• A candidate who has secured aggregate 60% and above marks	First Division
• A candidate who has secured aggregate 50% and above but less than 60% marks	Second Division
• A candidate who has secured aggregate 40% and above but less than 50% marks	Pass

Course Outcomes:

Students will have developed a strong understanding of Thermodynamics, statistical mechanics, electronics and digital electronics. They will be able to apply fundamental principles and laws to analyze various physical phenomena, solve problems. By the end of this course, students will have developed a strong understanding of the concerned papers.They will be able to apply the principles and mathematical techniques learned to analyze and solve complex problems in these areas.

This Bachelor of Science programme of university is a pioneering model in Indian science and education, imparting education in Physics while simultaneously encouraging a participation in research. This course shall provide the thorough knowledge of branches of Physics with extensive theoretical and experimental knowledge in major areas. This course also emphasizes on the Communication & Presentation skills of the students.

Paper PHY301- Thermal and Statistical Physics

Lecture- Sixty Lectures including diagnostic and formative assessments during lecture hours.

Unit-I

General Thermodynamical interactions, Dependence of the number of states of external parameters, General relations in equilibrium, equilibrium conditions, infinitesimal quasistatic process, Entropy of an ideal gas, Equilibrium of an isolated system, Equilibrium of a system in contact with reservoir (Gibb's free energy), equilibrium between phases, Clausius-Clapeyron equation, Triple point,Vapour in equilibrium with liquid or solid, equilibrium conditions for a system of fixed volume in contact with heat reservoir (Helmholtz free energy), Equilibrium between phases and condition of chemical equilibrium and equilibrium condition for a system at constant pressure in contact with a heat reservoir (Enthalpy), Maxwell's relations.

Unit-II

Thermal interactions of macroscopic Systems, system in contact with a heat reservoir, first law of thermodynamics and infinitesimal general interaction, Concept of temperature and quantitative idea of temperature scale (thermodynamical parameter), Distribution of energy, second law of thermodynamics, Claussius and Kelvin's statements, partition function (Z), mean energy of an ideal gas and mean pressure, Heat engine and efficiency of the engine, Carnots cycle, thermodynamical scale as an absolute scale.

Unit-III

Production of Low Temperatures and Application, Joule Thomson expansion and J.T.coefficients for ideal as well as Van-der Waal's gas, Temperature inversions, Regenerative cooling, cooling by adiabatic expansion and demagnetization, Liquid He, He – I and He-II, superfluidity, quest for absolute zero, Nernst heat theorem.

Unit-IV

Classical Statistics, Maxwell Boltzman Statistics, Phase space, micro and macro states, Thermodynamic probability, Entropy and probability, Partition function (Z), The monatomic ideal gas, The principle of equipartition of energy, most probable, average and rms velocity, Specific heat capacity of diatomic gas, Specific heat capacity of solids.

The Distribution of Molecular Velocities, the energy distribution, Transport phenomenon. mean free path, coefficients of viscosity, thermal conductivity, diffusion.

Unit-V

Quantum Statistics, Black body radiation and failures of classical statistics, Postulates of quantum statistics, Indistinguishability, Wave function and exchange degeneracy, Priori probability, Bose-Einstein's Statistics, Planck's distribution law, Fermi-Dirac statistics, completely degenerate system, Bose-Einstein condensation, Thermionic Emission, specific heat anamoly of metals, contact potential, Ortho and Para hydrogen.

Text/Reference Books:

1. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.
2. A Treatise on Heat, Meghnad Saha, and B.N.Srivastava, 1958, Indian Press
3. Thermal Physics, S. Garg, R. Bansal and Ghosh, 2nd Edition, 1993, Tata McGraw-Hill
4. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer.

5. Thermodynamics, Kinetic Theory & Statistical Thermodynamics, Sears & Salinger. 1988, Narosa.
6. Concepts in Thermal Physics, S.J. Blundell and K.M. Blundell, 2nd Ed., 2012, Oxford University Press.
7. Thermal Physics, A. Kumar and S.P. Taneja, 2014, R. Chand Publications.
8. Statistical Mechanics, R.K. Pathria, Butterworth Heinemann: 2nd Ed., 1996, Oxford University Press.
9. Statistical Physics, Berkeley Physics Course, F. Reif, 2008, Tata McGraw-Hill
10. Statistical and Thermal Physics, S. Lokanathan and R.S. Gambhir. 1991, Prentice Hall
11. An Introduction to Statistical Mechanics & Thermodynamics, R.H. Swendsen, 2012, Oxford Univ. Press

Suggested E-resources:

Online Lecture Notes and Course Materials:
• MIT Open Course Ware: Classical Mechanics - This resource provides lecture notes, problem sets, and solutions for a complete course
• HyperPhysics - This online resource provides concise explanations and interactive simulations for various topics.

प्रश्न पत्र **PHY301** –ऊष्मीय एवं सांख्यिकीय भौतिकी

इकाई – 1

व्यापक उष्मागतिक अन्योन्य कियाय, vOLFkkvk की संख्या की बाह्य प्राचलों पर निर्भरता, साम्यावस्था में व्यापक सम्बन्ध, साम्यवस्था प्रतिबन्ध अनन्त सूक्ष्म स्थैतिककल्प प्रक्रम, आदर्श गैस की एन्ट्रापी, विलगित निकाय के साम्यवस्था प्रतिबन्ध, उष्मा भण्डार के सम्पर्क में निकाय की साम्यवस्था (गिब्स मुक्त उर्जा), प्रावस्थाओं में संतुलन, क्लासियस –क्लेपरान समीकरण, त्रिक बिन्दु, द्रव या ठोस के साथ संतुलन में वाष्प, उष्मा भण्डार के सम्पर्क में नियत आयतन वाले निकाय के लिए सन्तुलन प्रतिबन्ध (हेल्महोल्टज् मुक्त उर्जा), प्रावस्थाओं के मध्य संतुलन और रासायनिक साम्यवस्था प्रतिबन्ध, उष्मा भण्डार के सम्पर्क में नियत दाब वाले निकाय के लिए सन्तुलन प्रतिबन्ध (एन्थेल्पी), मैक्सवैल सम्बन्ध।

इकाई – 2

स्थूल निकायों में अन्योन्य कियायें, उष्मीय अन्योन्य कियायें (उष्मा रोधन)। रुद्धोष्म अन्योन्य किया, सामान्य अन्योन्य किया ;उष्मागतिकी का प्रथम नियमद्ध और अत्यणु व्यापक अन्योन्य किया। ताप की अभिधारणा और ताप पैमाने का परिणात्मक विचार (उष्मागतिक प्राचल), उर्जा का वितरण, लघु मात्रा में उष्मा स्थान्तरण ;उष्मा गतिकी का दूसरा नियमद्ध और उष्मा भण्डार के सम्पर्क में निकाय, आदर्श गैस की माध्य उर्जा और माध्य दाब, उष्मा इंजन की दक्षता, कार्नो चक्र (विभिन्न कथन), उष्मागतिकीय पैमाना प्रामाणिक पैमाने के रूप में।

इकाई – 3

न्यून ताप का उत्पादन एवं अनुप्रयोग जूल थामसन प्रसार, जूल थामसन गुणांक आदर्श एवं वाण्डरवाल गैसों के लिए, संरन्ध डॉट प्रयोग, ताप उत्क्रमणीयता, पुनर्निवेशी शीतलन, रूद्धोश्म प्रसार द्वारा शीतलन एवं रूद्धोष्म विचुम्बकन के द्वारा शीतलन, द्रव हीलियम बिन्दु He-I vkj He-II, अतितरलता, परम शून्य ताप की खोज, नन्र्स्ट उष्मा प्रमेय।

इकाई – 4

चिरसम्मत सांख्यिकी, **मैक्सवेल बोल्टजमान** सांख्यिकी, कला आकाश, सूक्ष्म एवं स्थूल अवस्था, उष्मागतिक प्रायिकता, एन्ट्रापी और प्रायिकताए संवितरण फलन (Z)। एक परमाणु आदर्श गैस, वायुदाब समीकरणें, उर्जा के समविभाजन का सिद्धान्त, सर्वाधिक प्रायिक, औसत एवं वर्ग माध्य मूल वेग, द्विपरमाणुक गैस की विशिष्ठ उष्माधारिता, ठोसों की विशिष्ठ उष्माधारिता।
आणविक वेगों का वितरण, उर्जा वितरण, उर्जा के समविभाजन का सिद्धान्त, विशिष्ठ उष्माधारिता का चिरसम्मत सिद्धान्त, ठोस की विशिष्ठ उष्मा, अभिगमन परिघटनाएं, माध्य मुक्त पथ, श्यानता गुणांक, उष्मा चालन, विसरण।

इकाई – 5

क्वांटम सांख्यिकी कृष्णिका विकिरण एवं चिरसम्मत सांख्यिकी की असफलताएं। क्वांटम सांख्यिकी के अभिग्रहीत, अविभेद्यता, तरंग फलन एवं विनिमय , अपभ्रष्टता, पूर्व प्रायिकता, बोस–आइन्सटीन सांख्यिकी, प्लांक वितरण नियम, फर्मी–डिराक सांख्यिकी और उनके संवितरण फलन, सम्पर्क विभव और तापायनिक उत्सर्जन, धातुओं की विशिष्ट उष्मा में विसंगति, नाभिकीय प्रचक्रण सांख्यिकी, पैरा व आर्थो हाइड्रोजन।

PHY302 - Physics Practical-III

Duration 6 hrs. Min. Pass Marks 25 Max. Marks 50

Note- Only one experiment must be performed in the semester examination. Marks distribution will be as: Experiment I- 30, Practical record – 10, Viva Voce – 10.

1. Study of dependence of velocity of wave propagation on line parameters using torsional wave apparatus.
2. Study of variation of reflection coefficient with nature of termination using torsional wave apparatus.
3. To find the melting point of a given substance using Platinum resistance thermometer.
4. Using Michelson's interferometer: Find out the wavelength of a given monochromatic source (sodium light); Determine difference in wave length of D1and D2 lines.
5. Determine the thermodynamic constant (γ=Cp/Cv) using Clement's and Desorme's methods.
6. Determine Thermal conductivity of a bad conductor by Lee's Disc method.
7. Determination of Ballistic constant of Ballistic galvanometer.
8. Determination of high resistance by method of leakage.
9. Study the variation of total thermal radiation with temperature.
10. Any experiment, equivalent to the UG level.

प्रायोगिक भौतिक विज्ञान

समय 6 घण्टे कुल अंक 50

1. मरोड़ी तरंग उपकरण का उपयोग कर तरंग संचरण के वेग का लाइन प्राचालों पर निर्भरता का अध्ययन करना।
2. मरोड़ी तरंग उपकरण का उपयोग कर परावर्तन गुणांक का अन्तस्था भार के साथ परिवर्तन का अध्ययन करना।

3. प्लैटिनम प्रतिरोध तापमापी की सहायता से किसी पदार्थ का गलनांक ज्ञात करना।
4. माइकल्सन व्यतिकरणमापी की सहायता से एक वर्णीय प्रकाश स्रोत की तरंग दैर्ध्य ज्ञात करना एवं सोडियम प्रकाश की D_1 व D_2 रेखाओं की तरंग दैर्ध्य में अन्तर ज्ञात करना।
5. क्लेमेन्ट व डिसोर्म विधि से उष्मागतिकी नियतांक $\gamma = Cp/Cv$ का मान ज्ञात करना।
6. किसी कुचालक पदार्थ की उष्माचालकता ली की विधि द्वारा ज्ञात करना।
7. चल कुण्डली प्रक्षेप धारामापी का प्रक्षेप नियतांक ज्ञात करना।
8. क्षरण विधि से उच्च प्रतिरोध का मान ज्ञात करना।
9. वस्तु के कुल उत्सर्जित विकिरणों का उसके ताप के साथ अध्ययन करना।
10. स्नातक स्तर के समकक्ष कोई भी प्रयोग |

Paper PHY401- Electronics

Lecture- Sixty Lectures including diagnostic and formative assessments during lecture hours.

Unit-I
Circuit Analysis, Network-some important definitions, loop and nodal equation, Kirchhofs Laws, driving point and transfer impedances, four terminal network parameters, Open circuit, short circuit and hybrid network theorems, Superposition, Thevenin, Norton, Reciprocity, Compensation and maximum power transfer.

Unit-II
Semiconductors, Intrinsic and extrinsic semiconductors, charge densities in N and P materials, conduction by drift and diffusion of charge, Formation of PN junction, PN diode equation, capacitance effect of diode.
Rectification and power Supply, Half-wave and full wave rectifiers, calculation of Ripple factor, efficiency and regulation, bridge rectifier, Filters: shunt capacitor, L and π filters, Voltage regulation and voltage stabilization, Zener diode, Voltage multiplier circuits.

Unit-III
Transistor and Transistor Amplifiers, Notations and volt ampere relations for bipolar junction transistor, CB, CE, CC configurations, characteristic curves and their equivalent circuits, Biasing of transistors, Fixed and emitter bias, bias stability in transistor circuits, concept of load line and operating point, hybrid parameters, Field effect transistor (JFET and MOSFET) and its circuit characteristics, Analysis of transistor amplifiers using hybrid parameters and its frequency response.

Unit-IV
Amplifiers with feed back, Concept of feed back Positive and negative feed back advantage of negative fead beck, stabilization of gain by negative feed back, Effect of feed back on output and input resistance, Reduction of nonlinear distortion by negative feed back, frequency response, Voltage and current feed back circuit.
Oscillators, Feed back requirements for oscillations, circuit requirement for oscillation, basic oscillator analysis, Colpitt and Hartley oscillators, R-C Phase shift oscillator, Piezoelectric frequency control oscillations.

Unit-V

Operational amplifier (OP-AMP), Differential amplifier, DC levels shifter, operational amplifier, input and Output impedances, input offset curren, Application of OP-AMP, Unity gain buffer, Adder, Subtractor, Integrator and Differentiator, Comparator, Waveform generator, Voltage regulator using integrated amplifiers.

Digital Circuits: Binary, Hexadecimal and Octal number systems, Binary arithmetic, Logic fundamentals, AND, OR, NOT, NOR., NAND, XOR gates, Boolean theorems, transistor as a switch, circuit realization of logic functions.

Text/Reference Books:

1. Principles of Electronics by V.K. Mehta, S. Chand, 2002.
2. Integrated Electronics: Analog and Digital Circuits and Systems by J. Millman and C.C. Halkias.

Suggested E-resources:

Online Lecture Notes and Course Materials:

• MIT Open Course Ware: Classical Mechanics - This resource provides lecture notes, problem sets, and solutions for a complete course

• HyperPhysics - This online resource provides concise explanations and interactive simulations for various topics.

PHY401– प्रश्न पत्र II –इलेक्ट्रानिकी

इकाई – 1

परिपथ विश्लेषण: जाल– कुछ महत्वपूर्ण परिभाषाएं, पाश तथा संधि समीकरण, किरचाफ नियम, परिचालन बिन्दु तथा आन्तरिक प्रतिबाधाएं, चतुर्टर्मिनल जाल प्राचल। खुला परिपथ, लघुपथित परिपथ तथा संकर प्राचल, जाल प्रमेय–अध्यारोपण, थेवेनिन, नॉर्टन, पारस्परिकता एवं अधिकतम शक्ति हस्तान्तरण प्रमेय।

इकाई – 2

अर्द्धचालक : नैज तथा अपद्रव्यी अर्द्धचालक, n तथा p अर्द्धचालकों में आवेश घनत्व, अपवहन एवं विसरण द्वारा चालन, PN डायोड समीकरण, धारितीय प्रभाव।

दिष्टकरण तथा विद्युत प्रदायक : अर्द्ध तरंग तथा पूर्ण तरंग दिष्टकारी, उर्मिका गुणांक, दक्षता तथा वोल्टता नियमन की गणना, फिल्टर–पार्श्व पथ संघारित्र, L तथा π फिल्टर, सेतु दिष्टकारी, वोल्टता नियमन तथा जीनर डायोड द्वारा वोल्टता स्थायीकरण, वोल्टता गुणक परिपथ।

इकाई – 3

ट्रांजिस्टर तथा ट्रांजिस्टर प्रवर्धक : प्रतीक तथा द्विध्रुवीय ट्रान्जिस्टर के लिए वोल्ट एम्पीयर संबंध, लोड लाइन की अवधारणा तथा प्राचल बिन्दु, संकर प्रचालन, क्षेत्र प्रभाव ट्रान्जिस्टर तथा इसके परिपथीय अभिलक्षण, ट्रांजिस्टर के CB, CE तथा CC विन्यास तथा उनके तुल्य परिपथ, संकर प्राचलों के उपयोग से ट्रांजिस्टर प्रवर्धक का विश्लषण तथा इसकी आवृत्ति अनुक्रिया, नियत तथा उत्सर्जक बायसन तथा ट्रांजिस्टर परिपथों में बायस स्थायित्व।

इकाई – 4

पुनर्निवेश युक्त प्रवर्धक– पुनर्निवेश की अवधारणा, ऋणात्मक पुनर्निवेश द्वारा लब्धि का स्थाईकरण, ऋणात्मक पुनर्निवेश का निर्गत एवं निवेशी प्रतिरोधों पर प्रभाव, ऋणात्मक पुनर्निवेश द्वारा अरेखीय विरूपण का न्यूनीकरण, वोल्टता तथा धारा पुनर्निवेश परिपथ, आवृत्ति अनुक्रिया।

दोलित्रः दोलनों के लिए पुनर्निवेश प्रतिबन्ध, दोलनों के लिए परिपथीय प्रतिबन्ध, आधारभूत दोलित्र विश्लेषण, कॉल्पिट तथा हार्टले दोलित्र, R.C. दोलित्र, दाब विद्युत आवृत्ति नियंत्रण।

इकाई – 5

संक्रियात्मक प्रवर्धक : भेद प्रवर्धक, दिष्टधारा स्तर विस्थापक, संक्रियात्मक प्रवर्धक, निवेशी तथा निर्गम प्रतिबाधाएं, निवेशी ऑफसेट धारा। अनुप्रयोगःएकांक लब्धि बफर, योजक, व्यवकलित्र, समाकलक एवं अवकलक, तुलनित्र, तरंग रूपजनित्र की जानकारी, एकीकृत प्रवर्धक का उपयोग करते हुए वोल्टता नियामक।

अंकीय परिपथ– द्वआधारी, अष्टाधारी तथा शोडशाधारी प्रणाली, द्विआधारी अंकगणित, मूलभूत तर्क अवयव & AND, OR, NOT, NOR, NAND, XOR द्वार, बूलीय प्रमेय, ट्रान्जिस्टर स्विच के रूप में, तर्कद्वार, तर्क संक्रियाओं की परिपथों द्वारा प्राप्ति।

PHY402 - PHYSICS PRACTICAL IV

Duration 6 hrs. Min. Pass Marks 25 Max.Marks 50

Note-Oneexperiments must be performed in the semester examination. Marks distribution will be as: Experiment I- 30, Practical record – 10, Viva Voce – 10.

1. Plot thermo emf versus temperature and find the neutral temperature.
2. Study of power supply using two diodes/bridge rectifier using various filter circuits.
3. Study of half wave rectifier using L and pi section filters.
4. Characteristics of given transistor PNP/NPN (common emitter, common base and common collector configurations).
5. Determination of band gap using a junction diode.
6. Determination of power factor of a given coil using CRO.
7. Study of single stage transistor audio amplifier(variation of gain with frequency)
8. Study of diode as integrator with different voltage wave forms.
9. Determination of e\m of electron by Thomson's method.
10. Determination of velocity of sound using CRO, microphone and speaker by standing wave method.
11. Determination of self inductance of a coil by Anderson's bridge method.
12. Determination of unknown capacity by De'sauty-bridge method and to determine dielectric constant of a liquid.
13. Any experiment, equivalent to the UG level.

प्रायोगिक भौतिक विज्ञान

समय 6 घण्टे कुल अंक 50

1. किसी तापयुग्म के ताप वि.वा.ब. तथा ताप के बीच वक्र खींचना तथा उदासीन ताप ज्ञात करना।
2. विभिन्न फिल्टर परिपथों का उपयोग करते हुए पूर्ण तरंग दिष्टकारी वाले शक्ति प्रदायक में (दो डायोड या ब्रिज दिष्टकारी) का अध्ययन करना।

3. अर्द्ध तरंग दिष्टकारी L and II प्रकार के फिल्टरों के उपयोग से अध्ययन करना।
4. PNP/NPN ट्रांजिस्टर के अभिलाक्षणिकों का अध्ययन करना (उभयनिष्ठ आधार, उभयनिष्ठ उत्सर्जक व उभयनिष्ठ संग्राहक संरूपण में)।
5. P/N संधि डायोड की सहायता से किसी अर्द्ध चालक का बैण्ड अन्तराल ज्ञात करना।
6. किसी दी हुई कुण्डली का शक्ति गुणांक CRO के द्वारा ज्ञात करना।
7. एकल चरण ट्रांजिस्टर श्रव्य प्रवर्धक का अध्ययन करना (आवृत्ति के साथ लब्धि का अध्ययन) ।
8. भिन्न–भिन्न प्रकार के तरंग रूप वोल्टताओं के समाकलन क रूप में डायोड का अध्ययन करना।
9. इलेक्ट्रोनों के विशिष्ट आवेश e/m का मान थामसन की विधि से ज्ञात करना।
10. CRO स्पीकर तथा माइक्रोफोन द्वारा अप्रगामी तरंग विधि से ध्वनि का वायु में वेग ज्ञात करना।
11. एण्डरसन सेतु से कुण्डली के स्व– प्रेरकत्व का मापन करना।
12. डिसॉटी के सेतु से किसी गैंग संधारित्र की धारिता ज्ञात करना तथा इससे दिए गए द्रव का परावैद्युतांक ज्ञात करना।
13. **स्नातक स्तर के समकक्ष कोई भी प्रयोग |**