K S K V Kachchh University
B. Sc. (Physics) NEP-2020 Syllabus
(In force from June 2023)

Semester – II
(For Major Only))(3 Credits)
MAJPHY – 201- Optics, Electrostatics, Waves and Nuclear Physics

Unit-I

Waves

Introduction; Sinusoidal waves; Concept of frequency and Wavelength; Types of waves; Energy transport in wave motion.

Ref.: Optics by Ajoy Ghatak
(Chapter 9, Art. 9.1 to 9.4)

Optics

Introduction; Coherent sources; Interference in thin film; interference due to reflected and transmitted light; Fringes produced by a wedge shape; Newton's rings; Determination of the wavelength of sodium light using Newton's rings; Refractive index of a liquid using Newton's rings.

Ref.: Optics by Subrahmanym & Brijlal (S.Chand Publication)
(Chapter 15, Art. 15.1, 15.2, 15.3, 15.5, 15.6 (15.6.1 to 15.6.8)

Unit-II

Electrostatics

Coulomb's law; Principle of Super position; Electric field; Lines and tubes of force; Electric flux; Gauss's Law (Integral form); Gauss's Law (differential form); Some applications of Gauss's law (case i to iv); Electrostatic Potential.

Ref.: Electromagnetics by B. B. Laud
(Chapter 1, Art. 1.1 to 1.8, 1.10)

A.C Circuits

Alternating current (Cycle, Frequency, Phase, rms value of a.c.); LCR series resonance, Parallel resonance; Maxwell's bridge; Schering Bridge.

Unit-III

Nuclear Physics

The law of radiation decay; Radioactive growth and decay; Ideal equilibrium; Transient and secular equilibrium; Radioactive series; Radioactive isotopes of lighter element; Artificial radioactivity; Determination of the age of the earth; Carbon Dating.

Ref. : Nuclear physics (An Introduction) By S.B. Patel
(Chapter 2, Art. 2.3, 2.6 to 2.13)

MAJPHY – 202 - P PRACTICALS
(For Major)(1 Credit)

1. Newton's rings.
2. Least square method.
3. Value of inductance
4. Full wave voltage doubler.
5. Zener diode characteristic.
6. Low resistance by projection method.
7. Experimental check up by Multimeter
   (Power supply, resistor, Transistor, Diode, Capacitor)

KSKV Kachchh University: BHUJ

FIRST YEAR B.Sc.: Semester: II (TWO)

SUBJECT: PHYSICS (MAJPHY-201)

Total Marks: 40, Duration: 2 hours 30 min

Passing standard: 16 Marks

PATTERN OF QUESTION PAPER

FOR SEMESTER-END EXAMS

Questions	Section	Marks
Question – 1 Unit – I	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question – 2 Unit –II	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question – 3 Unit – III	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question - 4	**12 short questions of 1 marks,4 questions from each unit and the students have to attempt any 10.**	**10Marks**

- The structure for FIRST THREE question is as under: 30 Marks (10 X 3)

Descriptive type **10 Marks**

(1) Examiner can ask two questions of 10 Marks each out of which one must be answered, The types of questions are varied, like: Derivations, Short/Long notes, Explain, Deduce, Problems etc.10 marks can be divided into 7+3 or 6+4 marks according to the type of question.

OR

(2) Examiner can ask three questions of 05 Marks each out of which two must be answered.

- The structure for Fourth question is as under: 10 Marks

Twelve questions from all three units out of which ten questions shall be answered. Each of 01 marks makes total 10 Marks.

The types of questions are varied, like: Definitions, Reasoning, Explain, Brief, Drawing figures, Multiple choice answers, etc.

(MAJPHY-202-P) PHYSICS PRACTICAL

There will be FOUR Exercises in each Practical, as under, total of **15 Marks.**

(1) Approach (4 marks) (2) Readings and Calculations (5 marks) (3) Viva (4 marks)

(4) Practical Journal (2 marks)

Duration of the exam: 2 Hrs. Passing standard: **6 Marks out of 15 Marks.**

K S K V Kachchh University
B. Sc. (Physics) NEP-2020 Syllabus
(In force from June 2023)

Semester-II
(For Major Only))(3 Credits)
MAJPHY – 203 Thermodynamics, Electrostatics, Electronics

Unit – I

Thermodynamics

Thermodynamic Variables; Extensive and intensive Variables; Maxwell's Thermo dynamical Relations; Applications of Maxwell's Thermodynamic Relations; Specific Heat Equation; Temperature change in Adiabatic Process; Clausius-Clapeyron's Equation (First Latent Heat Equation); Thermodynamic Potentials; Significance of Thermodynamic Potentials; Relation of Thermodynamical Potentials with their Variables; Relation between Cp, Cv and μ; The TdS Equations; Clapeyron's Latent Heat Equation using Maxwell's Thermodynamical Relations; Clapeyron Latent Heat Equation using Carnot's Cycle.

Ref. : Heat and Themodynamics and Statistical Physics
by Brijlal, Subrahmanyam, Hemme. S. Chand & Company (Reprint 2012)
(Chapter 6 Art. 6.1 to 6.3, 6.4, 6.4.1, 6.4.6, 6.4.7, 6.5 to 6.11)

Unit – II

Electrostatics

Electrostatic Energy; Electric Dipol; Dipole in Uniform Electric Field; Electric dipole in Non-Uniform Electric Field; Mutual Potential energy of Two Dipoles; Electric Double layers; Electric Quadrupole.

Conductors and Insulators; Conductor in an Electrostatic field; Electric Field at a surface of a Charged Conductor; Capacitors; Electric Response of a Non-conducting medium to an Electric field; Polarization.

Ref. : Electromagnetics by B. B. Laud
(Chapter 1, Art. 1.14 to 1.20; Chapter 2, Art. 2.1 to 2.4, 2.6, 2.7)

Unit-III

Electronic Devices:

Transistor & its action, Characteristics of Transistor, Use as an Amplifier, FET(Types of Field effect transistor, Junction Field Effect Transistor; Principal and Working of JFET; Schematic symbol of JFET; Importance of JFET) UJT; Equivalent Circuit of UJT; Characteristics of UJT ;

Solar cell. LED, LED voltage and Current, Advantages of LEDMulticolor LEDs, Application of LEDs, Photo Diode, Photo Diode Operation, Characteristics of Photo Diode, Application of Photo Diode,

Ref. : Principles of Electronics by V.K.Mehta and Rohit Mehta (11thEdition)

MAJPHY – 204 - P PRACTICALS

(For Major Only))(1 Credit)

1) Resonator.
2) Verification of Stefan's 4^{th} power law.
3) Decay constant of condenser.
4) Vibration magnetometer.
5) Newton's law of cooling.
6) Frequency of A.C. emf by Parallel resonance.
7) Numerical Differentiation.

KSKV Kachchh University: BHUJ

FIRST YEAR B.Sc.: Semester: II(TWO)

SUBJECT: PHYSICS(MAJPHY-203)

Total Marks: 40, Duration: 2 hours 30 min

Passing standard: 16 Marks

PATTERN OF QUESTION PAPER

FOR SEMESTER-END EXAMS

Questions	Section	Marks
Question – 1 Unit – I	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question – 2 Unit –II	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question – 3 Unit – III	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question - 4	**12 short questions of 1 marks,4 questions from each unit and the students have to attempt any 10.**	**10Marks**

- The structure for FIRST THREE question is as under: 30 Marks (10 X 3)

Descriptive type **10 Marks**

(1) Examiner can ask two questions of 10 Marks each out of which one must be answered, The types of questions are varied, like: Derivations, Short/Long notes, Explain, Deduce, Problems etc.10 marks can be divided into 7+3 or 6+4 marks according to the type of question.

OR

(2) Examiner can ask three questions of 05 Marks each out of which two must be answered.

- The structure for Fourth question is as under: 10 Marks

Twelve questions from all three units out of which ten questions shall be answered. Each of 01 marks makes total 10 Marks.

The types of questions are varied, like: Definitions, Reasoning, Explain, Brief, Drawing figures, Multiple choice answers, etc.

(MAJPHY-204-P) PHYSICS PRACTICAL

There will be FOUR Exercises in each Practical, as under, total of **15 Marks.**

(1) Approach (4 marks) (2) Readings and Calculations (5 marks) (3) Viva (4 marks)

(4) Practical Journal (2 marks)

Duration of the exam: 2 Hrs. Passing standard: **6 Marks out of 15 Marks.**

K S K V Kachchh University
B. Sc. (Physics) NEP-2020 Syllabus
(In force from June 2023)

Semester – II
(For Minor Only))(3 Credits)
MINPHY – 205- Optics, Electrostatics, Waves and Nuclear Physics

Unit-I

Waves

Introduction; Sinusoidal waves; Concept of frequency and Wavelength; Types of waves; Energy transport in wave motion.

Ref.: Optics by Ajoy Ghatak
(Chapter 9, Art. 9.1 to 9.4)

Optics

Introduction; Coherent sources; Interference in thin film; interference due to reflected and transmitted light; Fringes produced by a wedge shape; Newton's rings; Determination of the wavelength of sodium light using Newton's rings; Refractive index of a liquid using Newton's rings.

Ref.: Optics by Subrahmanym & Brijlal (S.Chand Publication)
(Chapter 15, Art. 15.1, 15.2, 15.3, 15.5, 15.6 (15.6.1 to 15.6.8)

Unit-II

Electrostatics

Coulomb's law; Principle of Super position; Electric field; Lines and tubes of force; Electric flux; Gauss's Law (Integral form); Gauss's Law (differential form); Some applications of Gauss's law (case i to iv); Electrostatic Potential.

Ref.: Electromagnetics by B. B. Laud
(Chapter 1, Art. 1.1 to 1.8, 1.10)

A.C Circuits

Alternating current (Cycle, Frequency, Phase, rms value of a.c.); LCR series resonance, Parallel resonance; Maxwell's bridge; Schering Bridge.

Unit-III

Nuclear Physics

The law of radiation decay; Radioactive growth and decay; Ideal equilibrium; Transient and secular equilibrium; Radioactive series; Radioactive isotopes of lighter element; Artificial radioactivity; Determination of the age of the earth; Carbon Dating.

Ref. : Nuclear physics (An Introduction) By S.B. Patel
(Chapter 2, Art. 2.3, 2.6 to 2.13)

MINPHY – 206 - P PRACTICALS
(For Minor)(1 Credit)

8. Newton's rings.
9. Least square method.
10. Value of inductance
11. Full wave voltage doubler.
12. Zener diode characteristic.
13. Low resistance by projection method.
14. Experimental check up by Multimeter
    (Power supply, resistor, Transistor, Diode, Capacitor)

KSKV Kachchh University: BHUJ

FIRST YEAR B.Sc.: Semester: II (TWO)

SUBJECT: PHYSICS (MINPHY-205)

Total Marks: 40, Duration: 2 hours 30 min

Passing standard: 16 Marks

PATTERN OF QUESTION PAPER

FOR SEMESTER-END EXAMS

Questions	Section	Marks
Question – 1 Unit – I	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question – 2 Unit –II	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question – 3 Unit – III	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question - 4	**12 short questions of 1 marks,4 questions from each unit and the students have to attempt any 10.**	**10Marks**

- The structure for FIRST THREE question is as under: 30 Marks (10 X 3)

Descriptive type **10 Marks**

(1) Examiner can ask two questions of 10 Marks each out of which one must be answered, The types of questions are varied, like: Derivations, Short/Long notes, Explain, Deduce, Problems etc.10 marks can be divided into 7+3 or 6+4 marks according to the type of question.

OR

(2) Examiner can ask three questions of 05 Marks each out of which two must be answered.

- The structure for Fourth question is as under: 10 Marks

Twelve questions from all three units out of which ten questions shall be answered. Each of 01 marks makes total 10 Marks.

The types of questions are varied, like: Definitions, Reasoning, Explain, Brief, Drawing figures, Multiple choice answers, etc.

(MINPHY-206-P) PHYSICS PRACTICAL

There will be FOUR Exercises in each Practical, as under, total of **15 Marks.**

(1) Approach (4 marks) (2) Readings and Calculations (5 marks) (3) Viva (4 marks)

(4) Practical Journal (2 marks)

Duration of the exam: 2 Hrs. Passing standard: **6 Marks out of 15 Marks.**

K S K V Kachchh University
B. Sc. (Physics) NEP-2020 Syllabus
(In force from June 2023)

Semester – II
(For Multi Disciplinary Only))(3 Credits)
MDCPHY – 207- Optics, Electrostatics, Waves and Nuclear Physics

Unit-I

Waves

Introduction; Sinusoidal waves; Concept of frequency and Wavelength; Types of waves; Energy transport in wave motion.

Ref.: Optics by Ajoy Ghatak
(Chapter 9, Art. 9.1 to 9.4)

Optics

Introduction; Coherent sources; Interference in thin film; interference due to reflected and transmitted light; Fringes produced by a wedge shape; Newton's rings; Determination of the wavelength of sodium light using Newton's rings; Refractive index of a liquid using Newton's rings.

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Electrostatics

Coulomb's law; Principle of Super position; Electric field; Lines and tubes of force; Electric flux; Gauss's Law (Integral form); Gauss's Law (differential form); Some applications of Gauss's law (case i to iv); Electrostatic Potential.

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(Chapter 1, Art. 1.1 to 1.8, 1.10)

A.C Circuits

Alternating current (Cycle, Frequency, Phase, rms value of a.c.); LCR series resonance, Parallel resonance; Maxwell's bridge; Schering Bridge.

Unit-III

Nuclear Physics

The law of radiation decay; Radioactive growth and decay; Ideal equilibrium; Transient and secular equilibrium; Radioactive series; Radioactive isotopes of lighter element; Artificial radioactivity; Determination of the age of the earth; Carbon Dating.

Ref. : Nuclear physics (An Introduction) By S.B. Patel
(Chapter 2, Art. 2.3, 2.6 to 2.13)

MDCPHY – 208 - P PRACTICALS
(For Multi Disciplinary)(1 Credit)

15. Newton's rings.
16. Least square method.
17. Value of inductance
18. Full wave voltage doubler.
19. Zener diode characteristic.
20. Low resistance by projection method.
21. Experimental check up by Multimeter
    (Power supply, resistor, Transistor, Diode, Capacitor)

KSKV Kachchh University: BHUJ

FIRST YEAR B.Sc.: Semester: II (TWO)

` SUBJECT: PHYSICS (MDCPHY-207)

Total Marks: 40, Duration: 2 hours 30 min

Passing standard: 16 Marks

PATTERN OF QUESTION PAPER

FOR SEMESTER-END EXAMS

Questions	Section	Marks
Question – 1 Unit – I	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question – 2 Unit –II	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
Question – 3 Unit – III	***2 questions of 10 Marks, student have to attempt any 1***	**10marks**
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OR

(2) Examiner can ask three questions of 05 Marks each out of which two must be answered.

- The structure for Fourth question is as under: 10 Marks

Twelve questions from all three units out of which ten questions shall be answered. Each of 01 marks makes total 10 Marks.

The types of questions are varied, like: Definitions, Reasoning, Explain, Brief, Drawing figures, Multiple choice answers, etc.

(MDCPHY-208-P) PHYSICS PRACTICAL

There will be FOUR Exercises in each Practical, as under, total of **15 Marks.**

(1) Approach (4 marks) (2) Readings and Calculations (5 marks) (3) Viva (4 marks)

(4) Practical Journal (2 marks)

Duration of the exam: 2 Hrs. Passing standard: **6 Marks out of 15 Marks.**