NIOS PHYSICS GUIDE

Physics, it is the branch of science which deals with the study of particles under motion, it has several different fields in it, like thermodynamics, electricity, nuclear forces, gravitational forces etc.

Physics is of great use because we apply it in day to day life, like for balancing objects, or apply force, it has applications everywhere

There are many career opportunities with Physics, you could pursue Bachelors in Physics and work as an astronomer, astrophysicists, scientists, engineers, psychologists etc.

1) Physics is not an easy subject to master, it can be very complex in certain fields, like study of very small particles called quantum physics, or even understanding motion of different uneven objects, to make there free body diagram and to analyse there motion, also there's physics involved in rocket science as well, which is equally complex.

2) Physics at higher level demands lot of arithmetic knowledge and complex mathematics, so you need to keep maths strong too

3) Since during schooling (class 12^{th}) there are many fields to learn from like, electricity, ray optics, modern physics, it could feel like burden at times to study

But it doesn't mean that the toughness should stop you from pursuing it, it is a highly growing branch with many career opportunities in future and studies/research which could produce life changing results

Flowery words aside, let's address the elephant in the room. How should I study for Physics in NIOS Board and how to stay up with JEE/NEET syllabus as well?

To answer it let us first go through the format for Physics syllabus in Senior Secondary division.

The total marks for this subject here is 100, which is divided into 3 parts, firstly Tutor Marked assignments or TMA in short, which is of maximum 16 marks, secondly is the practical, which would be conducted at the centre for maximum

20 marks, and lastly is the Public Examination which is of maximum 80 marks.

For some who are wondering “wait, if we add this up, it would be 116 marks in total?! How so?”, well NIOS follows a bit different rule compared to other boards here.

See the 16 marks assigned in TMA is added up by deducting 20% of marks from Public Examination, so for example if you scored 14 marks in your TMA and 60 marks in your public exam, 20% of the marks from public exams are cut

20% of 60 marks = 12 marks
80% of 60 marks (max)= 48 marks

Marks in TMA= 14 out of 16 maximum
Total marks= 48+14=62 marks

Hence your finals marks will be 62 out of 80 in Public exam
And if you consider 18 marks out of 20 max marks in practical then final marks in Physics is:

62+18= 80 marks out of maximum 100

The 20% marks is cut from public exam so as to add your TMA marks, NIOS does it so that you could benefit from getting more marks

Passing percentage for Physics in total is 33%
Same goes for other tests/exam: 33% of maximum marks achievable

Syllabus:

In Physics, 40% of the total syllabus is for your tutor marked assignments, and the remaining 60% of the syllabus is for public examinations, the syllabus for each subject will be mentioned in the index page of the book. In total there will be 2 books for Physics given by NIOS, Book 1 and Book 2, for which bifurcation will be mentioned inside it for both TMA and Public exam.

Tutor Marked Assignment (TMA):

As you have learned, TMA is like your internals in subjects, scoring good marks in it will increase your over all marks, the portion of TMA will be given in your book and will be 40% of the total syllabus

To prepare your TMA, you need to write on single side rules paper, with question written in black ink ball pen and answer written in blue ink ball pen

Some questions will ask you to draw diagram, so draw that diagram on the blank side with pencil and label it neatly

Refrain from writing in paragraphs, break down your answers in points, doing that will make your answer look neat and easier to read

Some questions from your TMA, could be asked from your textbooks, so refer to it and write the answers accordingly i.e. reframe it to match the question.

Do not do any calculation work on the TMA answer page, do it on a rough paper and write down the final answer on the answer paper

If you wish to make your TMA look better, write only one question and answer per page, if the answer for question is too long, label P.T.O at bottom of paper and continue answer on new paper.

Chapters which will come in TMA will **not come in Public Examinations** for both April and October sessions.

For JEE/NEET aspirants chapters in TMA and your entrance exams are common, so if you wish to revise theory or practice questions to build your basics or for revision, doing chapters given in TMA will help in your preparation.

Practical Examination & PCP Classes:

After TMA, another form of internal assessment would be practical, for this marking would be divided in two parts, Formative Assessment (FA) & Summative Assessment (SA)

Formative Assessment consists of 5 PCP classes, which you will have to attend in your selected study centre to learn or practice the practical for the subject, it is generally for subjects which have practical like, Physics, Chemistry Biology, Computer Science, Data Entry and Operations etc. To check if your opted subject has practical read the syllabus to cross check

50% of the marks for practical will be for PCP classes, and you will have to attend 5 PCP classes for it. In these PCP classes, journal work will be assigned to you to write down experiments performed in Physics Lab in your study centre, the number of experiments to be written depends on study centre, some might ask 5, or 6 or 7, but if not specified, write at least 10 experiments.

To make journal, buy any Physics Journal from stationary store, it should have one side ruled and other side graph. On the graph side, all the **writing work should be done with pencil**, and on ruled side use either **black or blue ball pen** to write and draw lines whenever necessary to make it look neat and tidy.

Summative Assessment is the actual Practical examination where you will have to perform experiments by your own and submit the journal as well, so make sure your journals are complete before it. Here you will report to the study centre assigned to you and you will have to perform 3-4 experiments and write the findings in the paper given to you. Fill out the paper according to the teacher's instruction present at the study centre. **Calculator is not allowed during practical.**

Summative Assessment makes up for the other 50% of the practical examination so again you will have to be careful here and study your experiments written down. Mostly the experiments performed during your PCP classes is asked in it, so it is better to go through your journals before the practical exams. **You are not allowed to see your journals during your experiment and are made to submit it before the examination.**

For your practical examination, an admit card will be given out by NIOS, which you have to download from the official NIOS website, and print it out to show in the study centre along with an ID proof (Aadhar Card preferred) for caution. **You are not allowed entry in the study centre without your admit card, so make sure to have a hard copy for it.**

For Formative & Summative Assessment both marks will be assigned, after practical examination ends for all subjects, and will be displayed on the NIOS website.

Public Examinations:

Now for the main part, the most important exam, your public exams, for Physics, maximum marks for the paper will be 80 marks.

For the year 2024 and later, NIOS has changed the paper pattern overall, focusing more towards multiple choice questions (MCQs), short answer questions, fill in the blanks, match the following, and small comprehension based passage.

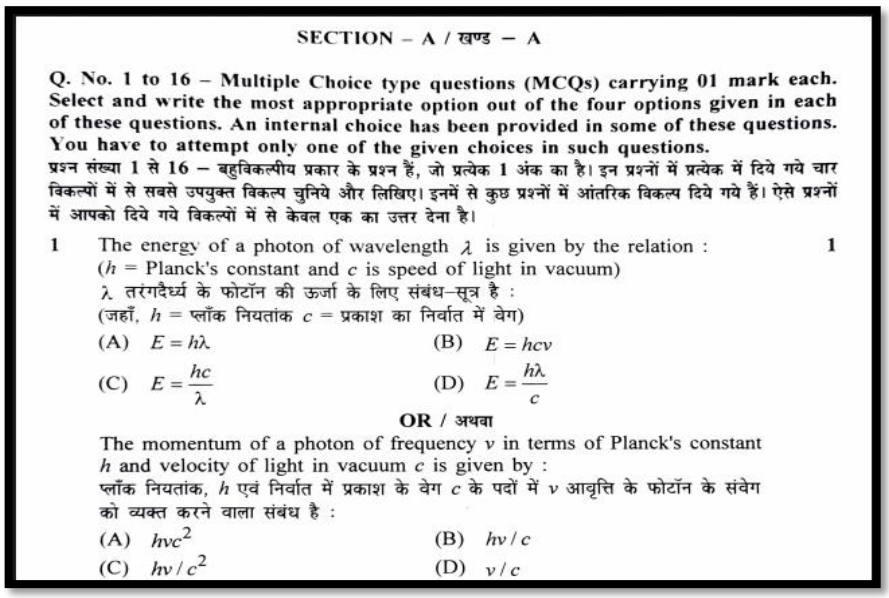
The paper will be divided in 2 parts, Section A and Section B, each of 40 marks.

2. Weightage by type of questions

Sl. No.	Type of Question	No. of questions	Marks
1.	MCQ (1 mark) #	16	16
2.	Objective Type Questions (1*2 = 2 marks) ## (with 2 sub-parts of 1 mark each) [Fill in the blanks, match the column, paragraph or case-based questions, one-word questions, True False, etc.]	12	24
	Total	**28**	**40**
3.	Very Short Answer (2 marks)	9	18
4.	Short Answer (SA) (3 marks)	4	12
5.	Long Answer (LA) (5 marks)	2	10
	Total	**15**	**40**
	G. Total	**43**	**80**

Given in above picture is the weightage of the questions asked, consider it as your paper design.

Section A consists of the MCQs, fill the blanks and other short answer questions as I mentioned earlier, here in some questions you could have an option to answer the question which you know. Like in the picture given below for Section



SECTION – A / खण्ड – A

Q. No. 1 to 16 – Multiple Choice type questions (MCQs) carrying 01 mark each. Select and write the most appropriate option out of the four options given in each of these questions. An internal choice has been provided in some of these questions. You have to attempt only one of the given choices in such questions.
प्रश्न संख्या 1 से 16 – बहुविकल्पीय प्रकार के प्रश्न हैं, जो प्रत्येक 1 अंक का है। इन प्रश्नों में प्रत्येक में दिये गये चार विकल्पों में से सबसे उपयुक्त विकल्प चुनिये और लिखिए। इनमें से कुछ प्रश्नों में आंतरिक विकल्प दिये गये हैं। ऐसे प्रश्नों में आपको दिये गये विकल्पों में से केवल एक का उत्तर देना है।

1 The energy of a photon of wavelength λ is given by the relation : **1**
(h = Planck's constant and c is speed of light in vacuum)
λ तरंगदैर्ध्य के फोटॉन की ऊर्जा के लिए संबंध–सूत्र है :
(जहाँ, h = प्लाँक नियतांक c = प्रकाश का निर्वात में वेग)

(A) $E = h\lambda$ (B) $E = hcv$

(C) $E = \frac{hc}{\lambda}$ (D) $E = \frac{h\lambda}{c}$

OR / अथवा

The momentum of a photon of frequency v in terms of Planck's constant h and velocity of light in vacuum c is given by :
प्लाँक नियतांक, h एवं निर्वात में प्रकाश के वेग c के पदों में v आवृत्ति के फोटॉन के संवेग को व्यक्त करने वाला संबंध है :

(A) hvc^2 (B) hv / c

(C) hv / c^2 (D) v / c

(Picture from Physics Paper Sr. Secondary Examination 2024)

As I said, paper is much balanced now, and there are more such small answer questions which could be asked from different parts of books, these are very scoring, so you should be thorough with your book.

Now for Section B, to score maximum marks, you need to be sure about the weightage of topics asked from the syllabus.

3. Weightage by Content

Sl.	Module	Marks
1.	Motion Force and Energy	14
2.	Mechanics of solid and Fluid	06
3.	Thermal Physics	06
4.	Oscillation and Wave	06
5.	Electricity and Magnetism	16
6.	Optics and Optical Instruments	14
7.	Atoms and Nuclei	08
8.	Semiconductor Devices and Communication	10
	Total	**80**

(Picture of Exam Paper design, original document link given at end)

Like in the above picture, it shows the breakdown of weightage of topics, but don't be swayed by it saying "Oh Thermal Physics is asked less, so it might not come in Section B". there are chances that question from Thermal physics could be asked for 5 marks, so prepare all topics possible, but if you're in time crunch, and you have other exams to prepare for like for example if you're preparing for JEE/NEET/CUET etc. stick to this weightage table in order to maximize marks.

Format for writing in public exam is simple, just write neatly, if there are fill in the blanks questions given in paper, write the full statement mentioned in paper.

20	**Fill in the blanks:** (*Attempt **any two parts** from following questions* (i to iv))	1 X 2
(i)	When the observer moves away from the stationary source, the apparent frequency is _____ than the actual frequency of the source.	
(ii)	The frequency of the sound appear to be _____ than the actual frequency when the source towards the stationary observer.	
(iii)	The Waves set up in the string fixed at both the ends are_____ waves	
(iv)	_____ effect is observed for light waves as well as sound waves.	

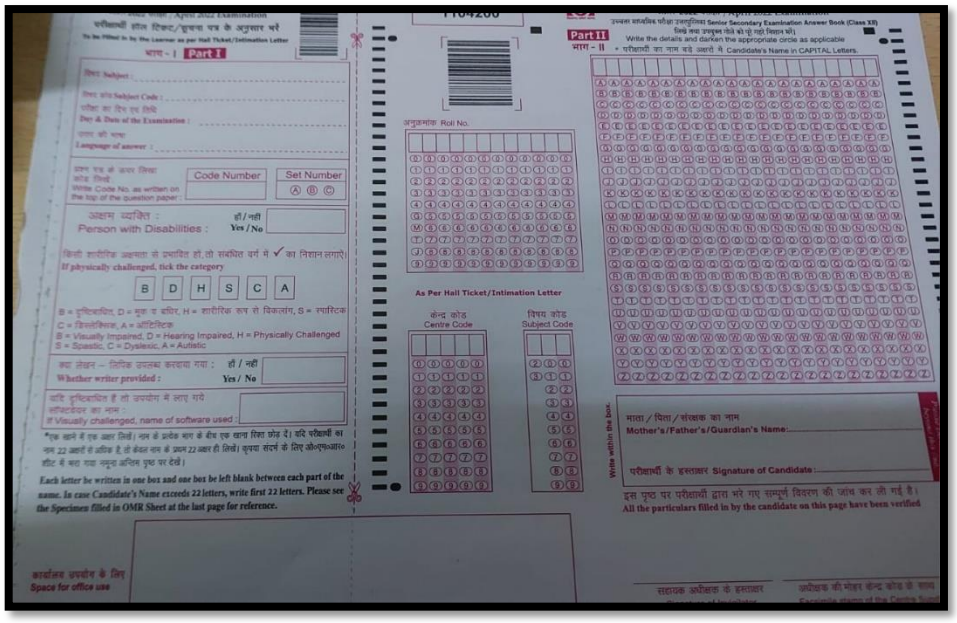
[***Picture of Physics Sample Paper (new format)***]

Follow the instructions carefully written on paper, do not write long answer questions in paragraph, it will cause deduction in marks. Break down long answers in multiple points, so the person checking the paper can read it easily and it will look neat as well.

Draw lines after every answer if you have the time to do so. Make sure you write your answers precisely as in exam hall **you cannot ask for extra supplements, you will be given 28 pages booklet to write your answers in.** So please be careful about it.

If question asks to draw diagram, make it with a sharp pencil, and draw arrows using ruler, and label with pen.

While filling out your details be very careful while marking the circles, because the details are machine checked.



(Picture of first page of the answer booklet given in exams)

Given above in the picture, you will have to mark the OMR, with a ball pen, so there is zero chance you could revert your mistake, **marking the wrong circle means the answer paper would be invalid and no marks will be awarded, so take your time and fill it carefully.**

Try to keep 5 minutes in hand to go through your answer paper to check if you have made any mistakes or left our any question which you are yet to answer.

I forgot to mention earlier, keep your hall ticket and an ID proof (Aadhar Card preferred) with you in the exam centre, your exam centre will be different from the study centre where you gave your practical exam in. The location of exam centre will be mentioned in your Hall ticket. Without Hall ticket and ID proof you will not be allowed in the exam centre.

With that, I conclude my guide for Physics here. Wish you all the very best for your examinations students, keep studying 😊.

Links to NIOS sources:

Physics Book and Table of content:

https://nios.ac.in/online-course-material/sr-secondary-courses/Physics-(312).aspx

Marking Scheme and Paper design:

https://nios.ac.in/media/documents/Course_Bifurcation_2023/QPD/12th/312.pdf

Physics Syllabus Bifurcation:

https://nios.ac.in/media/documents/Course_Bifurcation_2023/12th/312Bifurcation.pdf

Physics Sample Paper:

https://nios.ac.in/media/documents/Course_Bifurcation_2023/SQP-MS/12th/312.pdf