



# DIRECTORATE OF DISTANCE EDUCATION

L.N. Mithila University, Kameshwaranagar, Darbhanga-846008 (BIHAR)

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## M.Sc. Physics (Previous) DEC 2022

### सत्रीय कार्य ( ASSIGNMENT )

All Questions are to be answered (सभी प्रश्नों के उत्तर आवश्यक है।)

All Questions are of equal value (सभी प्रश्नों के मान बराबर है।)

Each Maximum in 800 words

Max. Marks/weightage = 30%

### Paper - I (Paper Code - PHY101)

#### Course Title : Classical Physics & Relativity

1. Explain Kepler's problem under inverse square law.
2. Derive Cauchy's integral theorem and formula.
3. Explain equivalence principle & Derive Einstein's field equation.

### Paper - II (Paper Code - PHY102)

#### Course Title : Quantum Mechanics - I

1. State & explain postulates of quantum mechanics.
2. Derive time dependent Schrodinger equation.
3. Give the theory of first order stark effect for the first excited state ( $n=2$ ) of hydrogen atom.

### Paper - III (Paper Code - PHY103)

#### Course Title : Electronics

1. Explain the brief solar cell and semiconductor laser diode.
2. Explain the detail the working of a stable multivibrator.
3. Explain experimental determination of transistor's h-parameters.

### Paper - V (Paper Code - PHY105)

#### Course Title : Quantum Mechanics - II

1. Give the theory of time dependent perturbation and obtain transition probability.
2. Obtain born approximation formula for scattering amplitude.
3. Using Dirac theory, obtain expression for spin of electron.

### Paper - VI (Paper Code - PHY106)

#### Course Title : (Statistical Mechanics)

1. Explain the statistical model of atom.
2. Discuss theoretically the critical exponents and scaling relations.
3. Define with examples the term Microstate and Macrostate.

### Paper - VII (Paper Code - PHY107)

#### Course Title : (Atomic, Molecular & Laser Spectroscopy)

1. Discuss in detail the quantum mechanical treatment of Helium atom.
2. What is optical pumping? Discuss the pumping mechanism in a four level laser system.
3. Explain the theory of Anomalous Zeeman effect in brief. State polarization rules associated with this effect.

नोट:- दत्त कार्य जमा करने की अंतिम तिथि 15/12/2022

## **GENERAL INSTRUCTION FOR ASSIGNMENT**

1. Assignment in each course consists of 30% weightage whereas TEE consists of 70% weightage.
2. The assignment carrying equal weightage shall be evaluated for the purpose of examination. Assignment writing is compulsory.
3. If the assignment is not submitted before the prescribed date, the study required of the student will not be considered to have been completed and he/she will be declared as 'not completed' the course.
4. The weightage obtained by the candidate in assignment will be clubbed with the weightage obtained by a student at TEE of that course of the programme, therefore, it is in the interest of the student to submit the assignment work in time.
5. Assignment should be written very carefully and in own handwriting. It should not be copied from the learning materials.
6. Assignments can be submitted in the Answer Books provided to the students by Directorate of Distance Education, L.N. Mithila University, Kameshwarnagar, Darbhanga for this purpose or on A4 size paper.
7. The candidate must write his/her ***Enrolment No., Session, Programme, Course, Course Code, Course title, date of submission*** on the Assignments.
8. Assignment may be sent by Post also and the student must keep a proof of submitting assignment along with photocopy of the submitted assignment for future.
9. No assignment will be accepted after TEE of that course. Hence, assignment must be submitted on or before fixed date.
10. Assignment should be handwritten only. No typed or photocopy will be accepted.
11. Each and every assignment should be submitted separately.
12. Assignment may be written either in Hindi or English.
13. **PCP (Personal Contact Programme)** is organised by counseling P.G. Dept. to help in programme related problems.
14. The candidates are advised to attend PCP and they should come after reading the materials.
15. Project Work/Dissertation, wherever prescribed, must also be submitted by the fixed date, failing which the student will be deemed to have not completed in the concerned course.
16. Enrolled Students must visit the official website ([www.ddelnmu.ac.in](http://www.ddelnmu.ac.in)) regularly for update information.

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