FVIII HOMI HI DWH HIWOMDP AMHVW HWIIU HOGG HI UHHIRUKSK VIEVH

Tata Institute of Fundamental Research

PHYSICAL SCIENCES

Syllabus

In general, the syllabus for the Admissions Tests in Physics (Written and Interview) is typically a course of studies in Physics as the main subject in the Undergraduate and Master's levels in an Indian University. The questions in the written test (multiple choice types) and the interviews are distributed over the following areas: Classical Mechanics; Mathematics relevant to Physics; Electricity and Magnetism; Quantum Mechanics; Heat, Thermodynamics and Statistical Physics; General Physics; Modern Physics; Electronics and Experimental Physics.

SAMPLE QUESTIONS

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(NOTE: Wrong answers will get you negative marks)

The function $f(z) = z^2 + 1$ is integrated over a circle of unit radius in the complex z plane. What is the value of the integral?

[a] 1 [b] *I* [c] 0

2. Charged particles are beamed into a region having a uniform electric field of 10³ Newton/Coulomb and a uniform magnetic field of 10-2 Newton/(ampere meter). The electric and magnetic fields are at right angles to each other and the beam of particles is directed perpendicular to both of them, so that the electrical and magnetic forces on an ion oppose each other. The speed of those ions that are unaffected through this region is:

[a] 10⁴ m/s [b] 10^5 m /s [c] 10⁶ m/s

3. The electron in a free Hydrogen atom is initially in the state with quantum numbers n = 3 and 1 = 2. It makes an electric dipole transition to a lower energy state. Which of the given states could it finally be in?

[a] n = 3, 1 = 0[b] n = 2, 1 = 2[c] n = 2, 1 = 1

4. N particles are distributed amongst three levels having energies 0, kT and 2kT. If the total equilibrium energy of the system is approximately 425kT, what is the value of N?

[c] 425 [a] 1001 [b] 335 [d] 390 [e] 181

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Tata Institute of Fundamental Research (TIFR)

The Tata Institute of Fundamental Research is India's premier institution for advanced research in fundamental sciences. The Institute runs a graduate programme leading to the award of Ph.D., Integrated M.Sc.-Ph.D. as well as M.Sc. degree in certain subjects. With its distinguished faculty, world class facilities and stimulating research environment, it is an ideal place for aspiring scientists to initiate their career.

The Graduate Programme at TIFR is classified into the following Subjects - Mathematics, Physics, Chemistry, Biology, Computer & Systems Sciences (including Communications and Applied Probability) and Science Education. It is conducted at the Mumbai campus and various National Centres of TIFR.

TIFR Schedule

TIFR is conducted **once in a year**, i.e., in the months of **December**. The notifications announcing the **TIFR** published in the months of October in the weekly journal of nation-wide circulation (Employment News).

Eligibility Physics

For Ph.D.: M.Sc.(Physics)/B.Tech. (Engineering Physics)

For I-Ph.D.: B.Sc./B.E./M.E./M.Tech./B.Tech./B.Chem. or equivalent,

M.Sc./B.Tech.,

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(not in Physics / Engingeering Physics).

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For Ph.D. Program in TCIS: M.Sc. in Physics, Chemistry or Biology; B.Tech. (Engg. Physics).

For Ph.D. Program in ICTS: M.Sc. in Physics, Chemistry, Biology or Mathematics; B.Tech. (Engg. Physics).

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Scheme of TIFR Test

This test consists of three parts: Section A, Section B and Section C. You must answer questions according to the programme you are applying for.

Candidate applying for	Must answer	Should not attempt
Integrated M.ScPh.D.	Section A + Section B	Section C
Ph.D.	Section A + Section C	Section B

Section A has 20 questions: 1-10 are multiple choice; 11-20 are numerical

Section B has 15 questions: 21-30 are multiple choice; 31-35 are symbolic

Section C has 15 questions: 36-45 are multiple choice; 45-50 are symbolic

Indicate your ANSWER ON THE OMR ANSWER SHEET as follows.

Multiple choice questions have four options (a), (b), (c) and (d), of which only one option is correct. Indicate the answers by filling up the bubble on the Answer Sheet corresponding to the correct option. If more than one bubble is filled in, it will be treated as not answered.

Numerical questions have answers which are 3 (three) digit integers. Indicate the answers by filling in the corresponding bubbles on the Answer Sheet. Unless all three bubbles for a given question are filled, it will be treated as not answered. (See inside for details)

Symbolic questions have answers which are a number, a short formula or a word. Indicate the answers by writing in the boxes on the Answer Sheet next to the appropriate question numbers. (See inside for details)

The marking for these questions shall be as follows:

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If the answer is	Multiple-choice	Numerical	Symbolic
Correct	+3	+5	+5
Incorrect	-1	0	0
Not attempted	0	0	0
Multiple options marked	0		

Note: Only multiple choice type questions have negative marking.

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