



**UNIVERSITY OF MADRAS**  
**DEPARTMENT OF THEORETICAL PHYSICS**  
*Guindy Campus, Chennai - 600 0 25, India.*

**Dr. RITA JOHN**  
**Professor and Head**

**Phone:** 91-44-22202825 (HoD)  
91-44-22202830 (Office)  
**Fax:** 91-44-2235-2494

**DEPARTMENT NOTIFICATION TO THE APPLICANTS OF M.Sc. (Physics) COURSE OFFERED BY THE DEPARTMENT OF THEORETICAL PHYSICS FOR THE ACADEMIC YEAR 2017-2018**

**General Instructions**

1. The entrance examination will be conducted on **23 JUNE 2017** at **Guindy Campus** at **2.30 pm**. All candidates should report at the Department of Theoretical Physics half an hour before the exam.
2. The question paper has three parts: A,B and C. Need to answer ALL questions.
3. Each correct answer in PART A carries ONE Mark, an unanswered question carries ZERO Mark; A WRONG ANSWER CARRIES MINUS 1/3 MARK
4. Each correct answer in PART B carries TWO Marks, an unanswered question carries ZERO Mark; A WRONG ANSWER CARRIES MINUS 2/3 MARK
5. Each correct answer in PART C carries THREE Marks, an unanswered question carries ZERO Mark; A WRONG ANSWER CARRIES MINUS ONE MARK
6. Calculators and mobile phones are not allowed.
7. WORK-SHEETS will be given for rough work.

**Specific Instructions**

Question paper contains 50 questions. The division of questions from various topics (at UG level) is given below.

Topic	Question Nos.		
	Part A	Part B	Part C
a) Mathematical Physics	1-5	16-18	36-38
b) Mechanics & Sound	6	19-21	39
c) Heat & Thermodynamics	7	22-24	40
d) Optics	8,9	25,26	41
e) Electricity & Magnetism	10	27-29	42,43
f) Electronics	11	30,31	44-46
g) Modern Physics	12-15	32-35	47-50

- For the purposes of admission, the weightage of B.Sc. Marks (Part-III) to Entrance Test Marks will be 1:1.
- Permission to write the entrance test does not imply that you satisfy all the requirements for admission to the course.
- Candidates who have not yet submitted the final semester/year mark sheet need to submit the attested scanned copy at **theoreticalphysics@unom.ac.in** at the earliest without which their applications will not be considered. **Such candidates can appear for the entrance examination however their applications will be processed only after the receipt of mark sheets of all semesters. Copy of the application can also be submitted if not sent to department already.**

  
(Rita John)

**Professor & Head**  
**Department of Theoretical Physics**  
**University of Madras**  
**Guindy, Chennai-600 025;**

Model Questions for M.Sc. (Physics) Entrance Exam

1. Answer **ALL** questions in Parts A, B, and C.
2. Each correct answer in **PART A** carries **ONE** Mark; an unanswered question carries **ZERO** Mark; **A WRONG ANSWER CARRIES '- 1/3' MARK**
3. Each correct answer in **PART B** carries **TWO** Marks; an unanswered question carries **ZERO** Mark; **A WRONG ANSWER CARRIES '- 2/3' MARK**
4. Each correct answer in **PART C** carries **THREE** Marks; an unanswered question carries **ZERO** Mark; **A WRONG ANSWER CARRIES '-1' MARK**
5. For each question, the correct choice (either "A" or "B" or "C" or "D") must be entered only in the corresponding box provided in the SEPARATE ANSWER SHEET.

NOTE: The questions in each part will be distributed in the following topics: Mathematical Physics, Mechanics and Sound, Heat and Thermodynamics, Optics, Electricity and Magnetism, Electronics and Modern Physics (up to **B.Sc.** level).

**PART A (15 Questions) (15x1 = 15 Marks)**

1. A vector perpendicular to any vector that lies on the plane defined by  $x + y + z = 10$ , is  
(A)  $\hat{i} + \hat{j}$       (B)  $\hat{j} + \hat{k}$       (C)  $\hat{i} + \hat{j} + \hat{k}$       (D)  $\hat{i} + 2\hat{j} + 3\hat{k}$
2. The SI unit of Planck's constant is:  
(A) J      (B) J/s      (C) J.s      (D) J/K

**PART B (20 Questions) (20x2 = 40 Marks)**

1. The sum of the infinite geometric series  $1 + r + r^2 + \dots + r^{n-1} \dots$ , where  $|r| < 1$  is  
(A)  $\frac{1}{1-r}$       (B)  $\frac{1}{1+r}$       (C)  $\frac{1}{r^2}$       (D) 1
2. The maximum efficiency of an ideal reversible heat engine operating between  $277^\circ\text{C}$  and  $177^\circ\text{C}$  is  
(A) 2/11      (B) 50/227      (C) 100/277      (D) 177/277

**PART C (15 Questions) (15x3 = 45 Marks)**

1. One of the complex solutions of  $x^6 + 64 = 0$  is  
(A)  $-i$       (B)  $\sqrt{3} - i$       (C)  $1 - i$       (D) 1
2. A particle travels 5 cm in the 1<sup>st</sup> second and travels 7 cm in the 2<sup>nd</sup> second at a constant acceleration. The initial velocity (in cm/s) and acceleration (in  $\text{cm/s}^2$ ) are respectively  
(A) 4 and 2      (B) 2 and 4      (C) 2 and 2      (D) 4 and 4

